

9TH INTERNATIONAL SCHOLARS' CONFERENCE PROCEEDINGS



IMPACTFUL INVESTIGATIONS: ADVANCING RESEARCH FOR SOCIAL CHANGE

ISBN (E-Book) 978-616-93795-2-2

OCTOBER 25-26, 2022

HOSTED BY ASIA-PACIFIC INTERNATIONAL UNIVERSITY
MUAH LEK CAMPUS, SARABURI, THAILAND

IN PARTNERSHIP WITH
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UNIVERSITAS ADVENT INDONESIA
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EDITOR'S PREFACE

Dear participants of 9th International Scholars' Conference,

We all have faced significant changes due to Coronavirus that enable us not to meet face-to-face for the last two years. I would like to thank God for guiding us through such a difficult time, and it is such a special privilege for us to organize 9ISC, so we can meet in person again.

The International Scholars Conference (ISC) aims to celebrate and encourage impactful investigations and the advancement of research for social change with the partnerships from Indonesia and the Philippines – Adventist University of the Philippines, Universitas Advent Indonesia, and Universitas Klabat.

On this year event, Asia-Pacific International University hosted the 9th International Scholars' Conference in the theme of "IMPACTFUL INVESTIGATIONS: ADVANCING RESEARCH FOR SOCIAL CHANGE". This event is held onsite which does open opportunities for us to learn from our honorable keynote speakers, presenters and colleagues, and it has the potential to expand our experience through the exchange of knowledge and ideas from scholars from various fields and cultures.

We would like to offer sincere appreciation and thanks to all conference attendees, including audience participants, speakers, and visitors from all around the world. I wish all conference participants a great time and an uplifting experience throughout the 9th International Scholars' Conference.

Sincerely,
Associate Professor Dr. Wanlee Putsom
Asia-Pacific International University
Research Director

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The Effectivity of Stimulability Test on Phonemes Nasal Air Emission in Filipino Cleft Palate Patients with and without Prosthesis

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Abstract: The aim of this study is to assess the phonemes of nasal air emission (NAE) in Filipino Cleft Palate patients with and without prostheses, including a palatal lift and speech bulb/obturator, using a stimulability test. This is to identify phonemes for which there are possible difficulties in the articulatory production of missing sounds from the phonetic inventory.

Material and Methods: A descriptive study of twenty-four cleft palate Filipino patients, aged 19 to 45 years, at the Philippines Band of Mercy Foundation, Philippines, underwent dental rehabilitation with the prosthesis on a follow-up made 1 to 2 weeks later. A convenience sampling of two stimulability tests for the articulation of word sentences was conducted by the percentage of correction scores evaluated by 0%-100% scores.

Results: From the above measurements, a regression analysis of $p < 0.05$ is statistically significant for the phonemes NAE /m/, /i/, /t/, and /p/ with prostheses (mean = 60%) and without prostheses (mean = 52%).

Conclusion: A stimulability test is a useful tool for assessing phonemes NAE in cleft palate patients with difficulties in the articulatory production of missing sounds. It indicates that the phoneme /i/, when combined with the high vowel /i/, is stimutable both with and without a prosthesis. In this instance, plastic surgery would be preferable to a prosthesis.

Keywords: *nasal air emission, cleft palate, prosthesis, stimulability test*

Introduction

Many various volunteer medical organizations have been devoted to continuously providing surgical operations and education to patients in the rural and urban areas around the Philippines.¹ No other extraordinary treatments were described.² A multidisciplinary team approach to rehabilitation for patients with cleft lip and palate (CLP) is an established protocol. However, it is common for prosthodontic speech and psychological considerations to be overlooked after surgical treatment. The reasons for this attitude could be varied. The financial implications, the time factor, and the distance needed to travel to reach the site of availability of a required facility are a few to name.³

Individuals with cleft lip and palate may often present speech problems due to the presence of a fistula, an unrepaired palate, or certain situations that damage the appropriate closure of the velopharyngeal valve. The velopharynx is a tridimensional muscular valve located between the oral and nasal cavities that controls the passage of air between the mouth and nose.² A prosthesis may be the best choice in several situations, for example, when surgery may not be performed because of systemic, anatomic, or functional limitations, or if the individual is not willing to undergo surgery; or the individual may also receive prostheses as a treatment for velopharyngeal dysfunction and eventually stimulate the muscle movement of the lateral pharyngeal walls, aiming for future surgery.⁴ Nasal air emission (NAE) that occurs during the production of all pressure-sensitive phonemes suggests a large velopharyngeal opening, particularly if it is associated with hypernasality. Nasal air emission that occurs inconsistently but on all pressure-sensitive phonemes suggests a smaller opening because the patient can close the gap with short utterances or with effort. In contrast, nasal air emission that occurs consistently on certain speech phonemes but not on all pressure-sensitive sounds indicates that the cause is faulty articulation placement rather than velopharyngeal insufficiency (VPI). This finding is sometimes noted in patients with no history of cleft or VPI. It is also common in patients with a history of VPI who use pharyngeal fricatives as a compensatory production

for certain phonemes. Despite surgical correction of the VPI, nasal air emission (and sometimes hypernasality) persists because of the abnormal placement.⁵

Nasometry is one of its diagnostic modalities for assessing speech production in patients who demonstrate symptoms of velopharyngeal disorder (VPD), which cannot differentiate between NAE and hypernasality. There is currently no acoustic measure of NAE used clinically.⁶ The stimulability test can identify possible difficulties in the articulatory production of missing sounds from the phonetic inventory.⁷ One reason for including stimulability testing in an assessment is that the results may have clear prognostic indications. Improvements in articulatory accuracy for an unmastered phoneme are more likely to occur over a given period, allowing for accurate production of the speech sound.⁸

The goal of this study is to use a stimulability test on NAE phonemes with and without prosthesis to identify phonemes that may have difficulties in articulatory production of missing sounds from the phonetic inventory.

Materials and Methods

Subjects

From June 2016 to February 2017, a descriptive study of twenty-four Filipino cleft palate patients, aged 19 to 60 (female or male), underwent dental rehabilitation with a prosthesis at the Philippines Band of Mercy, Philippines. The sizes and locations of the defect vary among patients with edentulous or dentulous non-syndrome cleft palate who have undergone surgical treatment. Facial clefts and/or non-surgical lips, as well as cleft lip and palate, are not eligible. Patients are asked to sign an informed consent form. This research was approved by the ethical committee of the National University Research and Innovation Office (NURAIN: COD 2016-02-1S) on June 20, 2016.

Prostheses

Palatal lift and speech bulb/obturator prostheses with an acrylic mass are used for closing residual velopharyngeal gaps to achieve closure when there is inadequate tissue. In an inactive palate with the soft palate, a portion is given initially for a period of 1 to 2 weeks prior to the addition of extensions to the posterior portion. Later, Korrekta wax is supported by a wire loop or acrylic for building the tail of the plate and, in conjunction with a speech pathologist, for a speech assessment.⁹

Stimulability test

Filipino cleft palate patients are subjected to a convenience sampling of two stimulability tests (in Tagalog) for word and sentence articulation by a speech pathologist. In the first stimulability test, each patient is asked to remove their prosthesis and speak its articulating words, and in the second test, the patient is asked to wear their prosthesis. All twenty consonant phonemes occur in three positions: initial, medial, and final, when paired with a high vowel /i/, a central vowel /a/, and a low vowel /u/. The percentage of correct answers ranges from 0% to 100%. Patients who have 100% self-correction for half of the sounds being tested and 0% for the remaining would be said to be 50% stimuable.¹⁰ This testing is frequently used and simplifies speech assessment at the Philippines Band of Mercy Foundation.

Statistical Analysis

From the above measurements, regression analysis in phonemes describes a percentage of correction scores as a dependent variable, as with and without prosthesis, which is an independent variable. Its scores evaluate possible difficulties in the articulatory production of missing sounds from the phonetic inventory. The Statistical Package for Social Sciences (SPSS) 19 version is used at p 0.05 and considered statistically significant.

Result

After 1 to 2 weeks of prosthesis adjustment, 22 cleft palatal patients underwent a stimulability test by a speech pathologist. Two patients were not able to go to a speech assessment. Their ages ranged from 19 to 49, with an average age of 29 in 12 females and an average age of 31 in 10 males. In a population with cleft palate, 12 patients were classified as VeauIII: clefts of the soft and hard palate extending unilaterally through the alveolus, and 10 as VeauI: clefts of the soft palate and VeauII: clefts of the soft and hard palate, up to the incisive foramen. There were no VeauIV patients (Table 1.).

Six patients had hypernasality in /a/, /e/, /i/, /o/, and /u/ phonemes; three had audible /t/ and /p/ NAEs; and one had /r/ phonemes as weak pressure consonants, while the remaining twelve did not have NAEs evaluated. In terms of percentage of corrected score, /m/phonemes have 100% with and without prostheses; /i/, /t/, and /p/phonemes have 50%. It was determined that phonemes /i/ were statistically significant with a prosthesis (mean = 60%) and without a prosthesis (mean = 52%) when paired with a high vowel (i) in three positions: initial, medial, and final (Table 2).

Discussion

These patients were the first prosthesis wearers, and adjustments were made before speech assessment for evaluation of possible difficulties in the articulatory production of missing sounds from the phonetic inventory. Patients classified as VeauI had a gagging problem that occurs during insertion. It is most likely related to the hypersensitivity gag reflex associated with prostheses. This needs a prosthesis adjustment to avoid sensitive areas where prostheses are interfered with during speech articulation. The majority of VeauIII cleft palates had a larger defect size. The amount of obturation of the prosthesis increases with adjustment to minimize the nasality.

Previous experimental studies suggest that beyond a VP gap of around 2mm, the relationship between velopharyngeal closure and nasal resonance is weakened¹². In speech, remediation by prosthesis is designed to reduce the size of the nasopharynx at the place of maximum muscle mobility, which is then indicated.¹³ On speech evaluation, one or two weeks of prosthesis obturation are frequently performed. It reveals a lower evaluation than after 3 or 4 weeks. The duration of obturation appeared to have a significant effect, and clinicians should be patient and persistent in their patients' rate of progress.¹⁴ However, age plays an important role, mainly because younger people tend to have a greater potential for adaptation and have articulatory and vocal disorders that are not well established.

Earlier in the patient's obturation of a prosthesis, it appears that they will eventually discard them without affecting their speech. Consequently, based on sex, females may be more highly motivated than males to obtain the acceptance and approval of their parents, teachers, and perhaps their speech pathologist and their dentist.¹⁴ Adults may have an equivalent measurement based on their age and gender, though there are no established age ranges to specify how it changes with prosthesis.

The prosthesis wearer has a 100% score in phoneme /m/. In contrast, in patients with VPI, there will be more acoustic energy measured from the nasal cavities during the production of oral sounds, resulting in a high nasalance score.¹⁵

Some studies reported that hypernasality is more likely to occur in the production of high vowels, due to the need for greater effort in the velopharyngeal closure, and that speech samples devoid of nasal consonants are not representative of spontaneous speech, representing only a partial sample of hypernasality.¹⁶ Here, there was no prosthesis evaluated for nasality. In /i/, 50% audible NAE, there is reduced acoustic energy from the nasal cavities during the production of nasal consonants, resulting in a low nasalance score and nasal obstruction.¹⁵ A tentative decision concerning the advisability of plastic surgery, as opposed to a prosthesis, was made.¹³ The phonemes /t/ and /p/ show 50% audible NAE caused by turbulent airflow through the nasal cavities during oral speech (consonant) production. These often occur in patients with malocclusion. Deviations in dentition or occlusion that result in abnormal surfaces for lingual or labial contacts could result in speech sound (consonant) distortion.¹⁵ These few patients with prostheses had hypernasality in all vowels during speech assessment. It is characterized by a structural defect or physiological disorder that requires surgical management.¹⁷

Further studies are needed to point out how vowel production implies hypernasality. There was some difficulty with the glide phoneme /r/, which indicates a weak pressure consonant in a cleft patient. This might be expected with an open cleft. It is suggested that the groove-narrowing strategy may be as common as well as effective means of air conservation.¹² Phonation is closely interrelated to the site of the VPI defect as the articulation varies with the location of the defect, or NAE, which can be very soft or very loud depending on the size of the opening.⁹ A description of the training procedure for the speech mechanism in newly treated prostheses is needed.¹⁸

Limitations and Implications

This study is limited to the stimulability test assessment on phonemes, where there is a correlation between the percentage of correction scores with and without prostheses. Further research on the health-related quality of life of cleft palate patients with and without a prosthesis is needed for future evaluation and treatment.

The benefits of these study findings will strengthen those people with these conditions by promoting education, awareness, and well-planned treatments.

Conclusion

Most patients are classified as Veau III. A stimulability test is a useful tool for assessing phonemes NAE in cleft palate patients with possible difficulties in the articulatory production of missing sounds. It determines whether a phoneme /i/ paired with the high vowel /i/ can be stimulated with or without a prosthesis. Here, there is reduced acoustic energy from the nasal cavities during the production of nasal consonants, resulting in a low nasalance score and nasal obstruction.¹⁵ A tentative decision concerning the advisability of plastic surgery, as opposed to a prosthesis, was made.¹³

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References

- [1] Morimata J. and Mura H. (2010). The Status Of Orofacial Clefts In National Capital Region (NCR), Philippines: A Literature Review Of Prevalence, Classifications And Risk Factors. *J.Natl.Inst.Public Health*. 56 (4).
- [2] Daack-Hirsh S. and Gambia H. (2010). Filipino Explanatory Models of Cleft Lip With or Without Cleft Palate. *Cleft Palate-Craniofacial Journal*. 47(2):122-133.
- [3] Dhakshaini M R. et al. (2015). Prosthodontic Management in Conjunction with Speech Therapy in Cleft Lip and Palate: A Review and Case Report. *Journal of International Oral Health*. 7(Suppl 2):106-111.
- [4] de Souza Freitas J A. et. al. (2013). Rehabilitative Treatment Of Cleft Lip And Palate: Experience Of The Hospital For Rehabilitation Of Craniofacial Anomalies/USP (HRAC/USP) – Part4: Oral Rehabilitation. *J Appl Oral Sci*. 21(3):284-92.
- [5] Kummer A .E. (2014). Speech Evaluation for Patients with Cleft Palate. *Clin Plastic Surg*. 41: 241–251
- [6] Cler G.J. et. al. (2016). Objective Measurement of Nasal Air Emission Using Nasal Accelerometry. *Journal of Speech and Hearing Research*. 59:1018-1024.
- [6] de Castro M. M. and Wertzner H. (2012). Stimulability: Auxiliary Measure In The Identification Of Difficulty In Speech Sounds Production. *J Soc Bras Fonoaudiol*. 24(1):49-56.
- [7] Rvachew, S. (2005). Stimulability and Treatment Success. *Topics in Language Disorders*. 25(3):207-219.
- [8] Shyammohan A. and Sreenivasulu D. (2010). Speech Therapy with Obturator. *J Indian Prosthodont Soc*. 10(4):197–9. <https://doi:10.1007/s13191-011-0044-2>.

- [9] Powel, T W. and Miccio A W. (1996). Stimulability: A Useful Clinical Tool. *J.COMMUN.DISORD.* 29: 237-253. [https://doi:10.1016/0021-9924\(96\)00012-3](https://doi:10.1016/0021-9924(96)00012-3)
- [10]Allori A C. et al. (2017). Classification of Cleft Lip/Palate: Then and Now. *The Cleft Palate Craniofac J.* 54(2):175-188. <https://doi:10.1597/14-080>.
- [11]Fletcher S G.. (1985). Speech Production And Oral Motor Skill In An Adult With An Unrepaired Palatal Cleft. *J.Speech Hear Disord.* 50:254-61. <https://doi:10.1044/jshd.5003.254>.
- [12]Gallagher B. (1982). Prosthesis In Velopharyngeal Insufficiency: Effect On Nasal Resonance. *J. Commun Disord.* 15(6): 469-473. [https://doi: 10.1016/0021-9924\(82\)90020-x](https://doi: 10.1016/0021-9924(82)90020-x).
- [13]Wong L P. and Weiss C E. (1972). A Clinical Assessment Of Obturator-Wearing Cleft Palate Patients. *J.Prosthet. Dent.* 27(6):632-639. [https://doi:10.1016/0022-3913\(72\)90310-1](https://doi:10.1016/0022-3913(72)90310-1)
- [14]Smith B. and Guyette T W. (2004). Evaluation Of Cleft Palate Speech. *Clin Plast Surg.* 31(2):251-60,ix. [https://doi: 10.1016/S0094-1298\(03\)00123-8](https://doi: 10.1016/S0094-1298(03)00123-8).
- [15]Larangeria F R. et. al. (2016). Speech Nasality And Nasometry In Cleft Lip And Palate. *Braz J Otorhinolaryngol.* 82(3):326-33. <https://doi:10.1016/j.bjorl.2015.05.017>.
- [16]Kummer A W. (2006). Resonance Disorders And Nasal Emission: Evaluation And Treatment Using “Low Tech” And “No-Tech” Procedures. *American Speech-Language-Hearing Association.* 11:4-26. <https://doi.org/10.1044/leader.FTR1.11022006.4>
- [17]Shelton R L. and Trier W C. (1976). Issues Involved In The Evaluation Of Velopharyngeal Closure. *Cleft Palate J.* 13:127-37.

Table 1. Patient's characteristics

Patients	Age	Gender	Dentition	Classification*
A	34	Female	Dentulous	II
B	21	Female	Dentulous	III
C	49	Female	Dentulous	III
D	19	Female	Dentulous	I
E	19	Female	Dentulous	II
F	38	Female	Dentulous	II
G	22	Male	Dentulous	III
H	38	Male	Dentulous	III
I	19	Female	Dentulous	III
J	20	Female	Dentulous	I
K	20	Male	Dentulous	III
L	46	Female	Dentulous	III
M	23	Female	Edentulous	III
N	36	Female	Dentulous	III
O	27	Male	Dentulous	II
P	25	Male	Dentulous	II
Q	57	Male	Dentulous	III
R	19	Male	Dentulous	II
S	42	Male	Dentulous	I
T	21	Female	Dentulous	I
U	20	Male	Dentulous	III
V	37	Male	Edentulous	III

*According to Veau Classification¹¹

Table 2. *Stimulability test on phonemes NAE in Filipino cleft palate patients with and without prosthesis*

Phonemes	With prosthesis (mean=60%)	Without prosthesis (mean=52%)
/a/	0.027	0.027
/e/	0.027	0.006
/i/	0.019	0.005*
/o/	0.308	0.064
/u/	0.000	0.000
/p/	0.020	0.005*
/b/	0.039	0.007
/t/	0.019	0.005*
/d/	0.340	0.007
/k/	0.383	0.089
/g/	0.171	0.034
/m/	0.005*	0.002
/n/	0.007	0.003
/ŋ/	0.007	0.003
/l/	0.013	0.004
/r/	0.017	0.005*
/j/	0.000	0.000
/w/	0.000	0.000
/h/	0.185	0.039
/s/	0.000	0.000

*Significant at p 0.005

Effects of a Four-Week Physical Activity Promotion Program on the Knowledge, Attitudes, and Practices among Healthcare Workers in a Tertiary Care Medical Center

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Abstract: Physical inactivity among healthcare workers can adversely affect their health and productivity. Rotating work shifts and demanding tasks make it difficult for them to plan physical activities, particularly exercise. A one-group, pre-test, and post-test study was done to determine the effects of a four-week workplace physical activity promotion program on the knowledge, attitudes, and practices of healthcare workers in a tertiary care medical center. Using convenience sampling, 25 participants were recruited for the program. Participants were aged 27–60 years, and most were female (72%). The difference in levels of KAP before and after the program was analyzed using a paired sample Student's t-test. The baseline pre-test results show moderate knowledge, a positive attitude, and moderate practices in physical activity. After the program, both knowledge and attitudes significantly increased at p-values of .004 and .006, respectively. The practice scores failed to show a significant difference, probably due to the program's short duration. T-test analysis revealed small, insignificant linear correlations between knowledge-attitudes ($r = -0.042$, $p < .843$), attitudes-practices ($r = -0.115$, $p < .584$), and knowledge-practices ($r = -0.155$, $p < .460$). A more comprehensive program, integrating nutrition and weight management, of longer duration with more participants, would likely be able to measure significant improvements in KAP in physical activity among healthcare workers.

Keywords: *health promotion, workplace, physical activity, healthcare workers, KAP*

Introduction & Literature Review

Physical inactivity is prevalent and associated with poor health outcomes, including increased mortality (Patel et al., 2018). The Global Burden of Disease (GBD) 2019 Risk Factors Collaborators (2020) identified physical inactivity as one of the top risk factors for global attributable deaths, alongside high blood pressure, tobacco use, an unhealthy diet, and air pollution. Unfortunately, the proportion of physically inactive adults worldwide is estimated to be one in every four and has been increasing (Guthold et al., 2018). In the Philippines, it is estimated that 43% of adults are physically inactive (Department of Science and Technology-Food and Nutrition Research Institute [DOST-FNRI], 2015).

Regular physical activity has clear benefits, including a lower incidence of cardiovascular disease and all-cause mortality (Kodama et al., 2009). A 2016 meta-analysis of 16 studies involving over one million individuals has shown that the higher all-cause mortality risk was reduced among those previously sedentary individuals who engaged in a moderate-intensity activity (35.5 metabolic equivalents [MET] for task hours per week) that is at least 60-75 minutes per day (Ekelund et al., 2016).

Hospitals are settings where there can be negative impacts on the health of their workers. Often, healthcare workers are physically and mentally burdened. Aside from not getting enough exercise, they may also indulge in an unhealthy diet and alcohol use, which further increase their risk of professional burnout (Saridi, 2019). In the United States, workplace wellness programs for healthcare workers are being provided in 83% of hospitals to address this problem (Centers for Disease Control and Prevention [CDC], 2020). The extent of the availability of similar programs in Philippine hospitals, however, is unknown but likely much lower.

This research is on a short workplace health promotion (WHP) program promoting physical activity and office ergonomics that was implemented in a 300-bed capacity tertiary care public medical center in Metro Manila. The hospital has an existing employee health service that provides annual physical examinations, vaccinations, and health education activities, but before the WHP program, it did not

regularly promote physical activity. Its annual sports fest and Zumba sessions for employees were canceled due to restrictions resulting from the current COVID-19 pandemic. This study aimed to determine the effects of a four-week WHP program promoting physical activity and office ergonomics among hospital workers in a public medical center. Specifically, the objectives were:

To determine whether there is a significant difference in the knowledge, attitudes, and practices (KAP) of hospital workers, before and after a WHP program promoting physical activity

To describe the demographic characteristics of hospital workers who participated in a WHP program promoting physical activity

To describe the feedback from hospital workers who participated in a WHP program promoting physical activity collected through a post-activity survey

A systematic review of 11 studies of workplace interventions in healthcare settings in the United Kingdom noted that whole-system healthy workplace interventions can improve health and wellbeing and promote healthier behaviors among healthcare staff (Brand et al., 2017). Similar information is not yet available in the Philippines, and therefore, this research describing and analyzing the effects of a short WHP program in a healthcare setting could contribute to a growing body of knowledge in occupational health and wellness.

Methodology

The four-week WHP program entitled "Galaw Galaw, Araw-Araw" (Keep Moving, Every Day), had the goal of increasing physical activity and improving office ergonomics among healthcare workers. Multiple strategies were utilized, and these included education (virtual lectures and chatroom messaging about physical activity and office ergonomics), program feedback (pictures and video recordings of pedometer use, office exercises, and ergonomic practices), socialization (virtual Zumba sessions), incentives (rewards to competition winners), environmental improvement (signages on stair use and office ergonomics), and policy creation (a hospital memorandum encouraging 9:00 AM and 3:00 PM 15-minute work breaks).

A quasi-experimental (one-group, pre-test, and post-test) study design was used to determine the effects of the four-week WHP physical activity and office ergonomics promotion program on the KAP of healthcare workers. Convenience sampling was used to recruit participants to the program. Prospective participants were asked to form groups of five members each. Recruitment lasted the entire first week of April 2022. Each participant was provided with a wrist pedometer (M4 brand) at the start of the program, and they were asked to submit their daily recorded number of steps. Participants attended a one-hour virtual lecture on physical activity and office ergonomics and an orientation on the mechanics of the program, which were done during the second week of April 2022. The lecture was supplemented by chatroom messages that provided reminders and tips on physical activity performance for the entire duration of the program. Participants were shown YouTube videos of workplaces with employees performing office exercises and ergonomics, which they were encouraged to imitate. A virtual Zumba session for all participants was also organized.

Upon recruitment, each participant was asked to answer a Google Form that included questions on demographic variables (age, sex, civil status, hospital division/department/office, years employed, and past participation in any health promotion program) and a pre-test to assess their KAP on physical activity. The knowledge assessment section of the pre-test used five true-or-false questions (maximum score of 5), the attitudes section used five four-point Likert scale questions (maximum score of 20), and the practices assessment section used a modified Global Physical Activity Questionnaire (GPAQ). GPAQ is a validated tool developed by the World Health Organization (WHO) for the estimation of physical activity expressed in MET-minutes per week (WHO, 2022).

Participants were equally divided into five groups based on which office or department they belonged to. Each group was asked to submit daily video recordings (a maximum of 15 minutes) of their office exercises. They were also asked to submit a video demonstrating their practice of office ergonomics. As part of a competition, all office videos were judged by the program manager based on duration, participation, technical correctness, and apparent level of enjoyment. Attendance was used to

measure participation in the virtual Zumba session. At the end of the program (April 29, 2022), each participant was asked to answer a Google Form that included the same post-test questions as in the pre-test but with an accompanying post-activity satisfaction survey (four-point Likert scale) that asked about the participant's level of satisfaction with the program and suggestions for future WHP programs.

The social learning theory suggests that to advance behavior change, people need to see models performing the behavior and the consequences of that behavior. Through the use of YouTube videos, the program showed models performing office exercises and ergonomics that they could observe and imitate. Additionally, the social cognitive theory proposes that people learn by observing others, and successful behavior change involves self-efficacy despite barriers and goals. In this program, goal-setting and self-efficacy were built through monitoring (pedometer use), social support (a virtual Zumba session, and group and individual competitions), and reinforcements (rewards).

Findings/Results

Data were analyzed with descriptive and inferential statistics using Jamovi computer software version 2.2. A total of 25 participants (72% female) enrolled in the program with ages ranging from 27 to 60 years old. A majority (68%) have had no participation in any WHP program in the past. The rest of the participant characteristics are shown in Table 1.

To analyze the difference in levels of KAP before and after the program, a paired sample Student's t-test was used. Table 2 shows the baseline pre-test results, indicating moderate knowledge, a positive attitude, and moderate practices in physical activity. Post-test results show that both knowledge and attitudes among participants significantly increased, with a p-value of .004 and .006, respectively. However, the physical activity practice scores failed to show a significant difference with a very wide standard deviation (SD). Cohen's d effect size of the WHP program indicates medium effects on knowledge and attitudes but a trivial effect on practices (0.644, 0.600, and 0.178, respectively). T-test analysis revealed small, insignificant linear correlations between knowledge-attitudes ($r = -0.042$, $p < .843$), attitudes-practices ($r = -0.115$, $p < .584$), and knowledge-practices ($r = -0.155$, $p < .460$), as shown in Table 3.

The post-activity satisfaction survey showed positive feedback from the 25 participants, with all of them expressing either agreement or strong agreement with the 11 questions. These are shown in Table 4. Future WHP programs most recommended by the participants were diet and nutrition, weight management, and stress management.

Table 1. Participant characteristics of healthcare workers.

Variable	Mean (Range)	SD
Age in years	39.1 (27-60)	10.6
Years employed	11.2 (0.25-30.0)	10.2
Sex	Counts	% of Total
Female	18	72.0%
Male	7	28.0%
Civil status		
Married	15	60.0%
Single	9	36.0%
Annulled	1	4.0%
Division		
Administrative	10	40.0%
Nursing	9	36.0%
Medical	6	24.0%
Past participation in WHP		
Yes	8	32%
No	17	68%

Table 2. Pre-test and post-test mean scores and SD on KAP.

Variable	Pre-Test Mean (SD)	Post-Test Mean (SD)	<i>p</i>	Cohen's d
Knowledge	3.68 (0.690)	4.24 (0.723)	.004	0.644
Attitude	15.04 (1.837)	16.56 (1.873)	.006	0.600
Practices	2,442.14 (3,591.047)	3,839.44 (6486.42)	.383	0.178

Table 3. Matrix showing the correlations between knowledge-attitudes, attitudes-practices, and knowledge-practices.

		Knowledge Post-Test	Attitude Post-Test	Practices Post-Test
Knowledge Post-Test	Pearson's r	-		
	<i>p</i> -value	-		
Attitude Post-Test	Pearson's r	-0.042	-	
	<i>p</i> -value	.843	-	
Practices Post-Test	Pearson's r	-0.155	0.115	-
	<i>p</i> -value	.460	.584	-

Table 4. Post-activity satisfaction survey among participants in the physical activity promotion program.

	Strongly Agree	Agree	Disagree	Strongly Disagree
"Well prepared & organized"	20	5	0	0
"Clear & concise"	19	6	0	0
"Key information was provided"	19	6	0	0
"Opportunity for questions were provided"	19	6	0	0
"Questions were addressed"	21	4	0	0
"Knowledge provided was applicable"	20	5	0	0
"Skills were helpful to achieve goals"	20	5	0	0
"Developed team pride"	22	3	0	0
"Fostered team cohesion"	21	4	0	0
"Would recommend program"	22	3	0	0
"Would join future programs"	20	5	0	0

Discussion

Physical activity is any movement of the body resulting from skeletal muscle contraction that involves energy expenditure. By definition, this includes activities that are done at work, in the household, during leisure time, and while traveling (WHO, 2018). The term "exercise," on the other hand, refers to a form of physical activity that is planned, structured, repetitive, and purposeful with the main objective of improvement or maintenance of one or more components of physical fitness (US Department of Health and Human Services, 2018).

It is estimated that in 2008, the global risk attributable to physical inactivity was 9% of premature deaths worldwide (Lee et al., 2012). Furthermore, in middle-income countries, such as the Philippines,

all-cause and cardiovascular mortality due to physical inactivity is much higher than in high- and low-income countries (Katzmarzyk et al., 2022). According to a monitoring report by the WHO, 68% of annual deaths in the Philippines are caused by non-communicable diseases (NCDs). The age group 30-70 years is the most affected group, with almost a third of them (29%) at risk of dying from any of the NCDs (WHO, 2017). The economic cost of these diseases is enormous, costing the Philippine economy 4.8% of the nation's gross domestic product (GDP), or roughly P757 billion per year (WHO, 2019).

Sedentary behavior, defined as any waking behavior characterized by an energy expenditure ≤ 1.5 MET while in a sitting, reclining, or lying posture (Tremblay et al., 2017), is associated with negative health outcomes including increased all-cause mortality, and NCD incidence and mortality at all levels of physical activity (Biswas et al., 2015). A prospective study demonstrated that replacing sitting time with exercise was associated with a decrease in all-cause mortality among adults aged 59-82 years. For inactive adults, replacing one hour of sitting time with a variety of non-exercise activities (e.g., household chores, lawn and garden work, and daily walking outside of exercise) was also associated with decreased all-cause mortality (Matthews et al., 2015).

Since adults spend most of their waking hours at work, workplaces are key settings where physical activity needs to be promoted. Physical activity promotion is a highly recommended component of comprehensive health promotion programs in workplaces (DOST-FNRI, 2019). WHP programs can result in a healthier workforce, increased productivity, reduced absenteeism, and higher employee morale, as well as help companies attract and keep high-quality employees (CDC, 2022). Globally, however, it is estimated that less than 10% of the workforce receives any form of WHP program, and the majority of them are in medium and large multinational companies in the wealthy economies of North America and Europe. WHP programs for these workers commonly address NCDs such as cardiovascular diseases, cancers, chronic pulmonary disorders, and diabetes, as well as other risk factors and concerns such as stress, work-life balance, company engagement, and workplace culture and management structures. In Asia, only 5% of companies provide WHP programs to their employees (Global Wellness Institute, 2016). The WHO reported that the issue of workplace health and wellness is particularly underdeveloped in low-income countries plagued with poverty, a low level of education, poor occupational conditions, and an unhealthy diet (WHO, 2013).

Healthcare workers are particularly at risk for developing sedentary behavior. Because of their rotating work shifts and demanding tasks, healthcare workers frequently find it difficult to plan and perform physical activities, particularly exercise. Physical activity promotion programs for healthcare workers are, at best, sparse. In general, WHP programs encounter implementation challenges including rising costs (69%), a lack of data to measure outcomes and behavior change (50%), and a lack of appropriate technology for implementation (35%) (Willis Towers Watson, 2021).

This research showed that the four-week WHP program promoting physical activity significantly improved the knowledge and attitudes of a group of healthcare workers regarding physical activity. Physical activity practices, however, did not significantly change, probably because of the limited duration of the program. A better-designed comprehensive program, integrating nutrition, weight, and stress management, with a duration of months, if not years, and more participants enrolled, would more likely be able to measure improvements in physical activity practices as well as assess more important outcomes such as increased productivity, lowered absenteeism and healthcare claims, and reduced incidence of NCDs.

Limitations & Implications

The WHP program studied in this research was implemented in a medical center with limited resources, which is the case in most public hospitals. Low-resource, high-impact strategies were prioritized, such as the formulation of workplace policies and guidelines that would support health and wellness promotion without requiring significant financial resources. Additionally, for this short, four-week WHP program, it was not realistic to measure economic outcomes, such as the return of investments, savings generation, reduced absenteeism, or increased productivity, nor was it realistic to measure the reduced incidence of NCDs or weight loss. Therefore, more suitable outcomes for this

program were measured, such as team cohesion, pride, individual participation, and engagement. Although pedometers were used for the competition among participants, because of the program's short duration, no baseline pedometer readings were obtained, and therefore no meaningful interpretation of step data could be derived.

Conclusions

Physical activity is essential in achieving and maintaining good health as it lowers the risk of developing NCDs, especially among the adult working population. Programs that promote physical activity are essential components of comprehensive WHP programs. It is encouraging that workplaces such as healthcare facilities are starting to appreciate the importance of workplace wellness promotion in improving the health of employees and attaining company targets. Low-resource strategies need to be prioritized and adapted to company resources, and target goals would have to be time-bound and realistic. As shown in this study involving healthcare workers, even WHP programs of short duration can significantly improve their knowledge of and attitudes towards physical activity. A more comprehensive program, integrating nutrition and weight management, of longer duration with more participants, would likely be able to measure significant improvements in KAP in physical activity among healthcare workers.

It needs to be emphasized that to encourage the general population to move more, there has to be a huge effort on many fronts outside of workplaces, including national and local governments and communities. In many countries, the Philippines included, the lack of physical activity underscores the need to address environmental barriers that include the lack of spaces for physical activity such as parks, the lack of sidewalks and signages that encourage people to walk or bike, and the lack of personal time to exercise. Lastly, there needs to be a continuing national initiative to help millions of Filipinos to become more physically active across all sectors and settings, particularly in the workplace.

References

- [1] Biswas, A., Oh, P. I., Faulkner, G. E., Bajaj, R. R., Silver, M. A., Mitchell, M. S., & Alter, D. A. (2015). Sedentary time and its association with risk for disease incidence, mortality, and hospitalization in adults: a systematic review and meta-analysis. *Annals of internal medicine*, 162(2), 123–132. <https://doi.org/10.7326/M14-1651>
- [2] Brand, S. L., Thompson Coon, J., Fleming, L. E., Carroll, L., Bethel, A., & Wyatt, K. (2017). Whole-system approaches to improving the health and wellbeing of healthcare workers: A systematic review. *PloS one*, 12(12), e0188418. <https://doi.org/10.1371/journal.pone.0188418>
- [3] Centers for Disease Control and Prevention. (2020, May 28). *Hospital Employees' Health*. US Department of Health and Human Services. <https://www.cdc.gov/workplacehealthpromotion/features/hospital-employees-health.html>
- [4] Centers for Disease Control and Prevention. (2022, March 16). *What's Your Role? Employers*. US Department of Health and Human Services. <https://www.cdc.gov/physicalactivity/activepeoplehealthynation/everyone-can-be-involved/employers.html>
- [5] Department of Science and Technology-Food and Nutrition Research Institute (DOST-FNRI). (2019). *A Guide to Workplace Wellness Promotion Program*. DOST-FNRI. Taguig City, Philippines
- [6] Department of Science and Technology-Food and Nutrition Research Institute (DOST-FNRI). (2015). *Philippine nutrition facts and figures, 2015: updating of the nutritional status of Filipino children and other population groups*. http://enutrition.fnri.dost.gov.ph/site/preview.php?xx=%20uploads/2015_CLINICAL_AND_HEALTH_SURVEY.pdf

- [7] Ekelund, U., Steene-Johannessen, J., Brown, W. J., Fagerland, M. W., Owen, N., Powell, K. E., Bauman, A., Lee, I. M., Lancet Physical Activity Series 2 Executive Committee, & Lancet Sedentary Behaviour Working Group (2016). Does physical activity attenuate, or even eliminate, the detrimental association of sitting time with mortality? A harmonised meta-analysis of data from more than 1 million men and women. *Lancet (London, England)*, 388(10051), 1302–1310. [https://doi.org/10.1016/S0140-6736\(16\)30370-1](https://doi.org/10.1016/S0140-6736(16)30370-1)
- [8] GBD 2019 Risk Factors Collaborators (2020). Global burden of 87 risk factors in 204 countries and territories, 1990–2019: a systematic analysis for the Global Burden of Disease Study 2019. *Lancet (London, England)*, 396(10258), 1223–1249. [https://doi.org/10.1016/S0140-6736\(20\)30752-2](https://doi.org/10.1016/S0140-6736(20)30752-2)
- [9] Global Wellness Institute. (2016, January). *The Future of Wellness at Work*. https://globalwellnessinstitute.org/wp-content/uploads/2018/06/GWI_2016_Future_of_Wellness_at_Work.pdf
- [10] Guthold, R., Stevens, G. A., Riley, L. M., & Bull, F. C. (2018). Worldwide trends in insufficient physical activity from 2001 to 2016: a pooled analysis of 358 population-based surveys with 1·9 million participants. *The Lancet. Global health*, 6(10), e1077–e1086. [https://doi.org/10.1016/S2214-109X\(18\)30357-7](https://doi.org/10.1016/S2214-109X(18)30357-7)
- [11] Katzmarzyk, P. T., Friedenreich, C., Shiroma, E. J., & Lee, I. M. (2022). Physical inactivity and non-communicable disease burden in low-income, middle-income and high-income countries. *British journal of sports medicine*, 56(2), 101–106. <https://doi.org/10.1136/bjsports-2020-103640>
- [12] Kodama, S., Saito, K., Tanaka, S., Maki, M., Yachi, Y., Asumi, M., Sugawara, A., Totsuka, K., Shimano, H., Ohashi, Y., Yamada, N., & Sone, H. (2009). Cardiorespiratory fitness as a quantitative predictor of all-cause mortality and cardiovascular events in healthy men and women: a meta-analysis. *JAMA*, 301(19), 2024–2035. <https://doi.org/10.1001/jama.2009.681>
- [13] Lee, I. M., Shiroma, E. J., Lobelo, F., Puska, P., Blair, S. N., Katzmarzyk, P. T., & Lancet Physical Activity Series Working Group (2012). Effect of physical inactivity on major non-communicable diseases worldwide: an analysis of burden of disease and life expectancy. *Lancet (London, England)*, 380(9838), 219–229. [https://doi.org/10.1016/S0140-6736\(12\)61031-9](https://doi.org/10.1016/S0140-6736(12)61031-9)
- [14] Matthews, C. E., Moore, S. C., Sampson, J., Blair, A., Xiao, Q., Keadle, S. K., Hollenbeck, A., & Park, Y. (2015). Mortality Benefits for Replacing Sitting Time with Different Physical Activities. *Medicine and science in sports and exercise*, 47(9), 1833–1840. <https://doi.org/10.1249/MSS.0000000000000621>
- [15] Patel, A. V., Maliniak, M. L., Rees-Punia, E., Matthews, C. E., & Gapstur, S. M. (2018). Prolonged Leisure Time Spent Sitting in Relation to Cause-Specific Mortality in a Large US Cohort. *American journal of epidemiology*, 187(10), 2151–2158. <https://doi.org/10.1093/aje/kwy125>
- [16] Saridi, M., Filippopoulou, T., Tzitzikos, G., Sarafis, P., Souliotis, K., & Karakatsani, D. (2019). Correlating physical activity and quality of life of healthcare workers. *BMC research notes*, 12(1), 208. <https://doi.org/10.1186/s13104-019-4240-1>
- [17] Tremblay, M. S., Aubert, S., Barnes, J. D., Saunders, T. J., Carson, V., Latimer-Cheung, A. E., Chastin, S., Altenburg, T. M., Chinapaw, M., & SBRN Terminology Consensus Project Participants (2017). Sedentary Behavior Research Network (SBRN) - Terminology Consensus Project process and outcome. *The international journal of behavioral nutrition and physical activity*, 14(1), 75. <https://doi.org/10.1186/s12966-017-0525-8>
- [18] US Department of Health and Human Services. (2018). *Physical Activity Guidelines for Americans, 2nd edition*. https://health.gov/sites/default/files/2019-09/Physical_Activity_Guidelines_2nd_edition.pdf

- [19] Willis Towers Watson. (2021, April 7). *85% of Philippine employers plan to use wellbeing program as differentiator as workplace stress increases*. <https://www.wtwco.com/en-PH/News/2021/04/85-percent-of-philippine-employers-plan-to-use-wellbeing-program-as-differentiator>
- [20] World Health Organization. (2013). *WHO Global plan of action on workers' health (2008-2017): Baseline for implementation*.
http://www.who.int/occupational_health/who_workers_health_web.pdf
- [21] World Health Organization (2017). *Noncommunicable diseases progress monitor 2017*.
<http://apps.who.int/iris/bitstream/handle/10665/258940/9789241513029-eng.pdf>
- [22] World Health Organization. (2018). *Global action plan on physical activity 2018–2030: more active people for a healthier world*.
<https://apps.who.int/iris/bitstream/handle/10665/272722/9789241514187-eng.pdf>
- [23] World Health Organization (2019). *Prevention and control of noncommunicable disease in the Philippines: The case for investment*.
<https://www.ph.undp.org/content/philippines/en/home/library/prevention-and-control-of-noncommunicable-diseases-in-the-philip.html>
- [24] World Health Organization. (2022). *Physical Activity Surveillance*.
<https://www.who.int/teams/noncommunicable-diseases/surveillance/systems-tools/physical-activity-surveillance>

Online Social Media Usage Attitude, Behavior and Health Impact of Nursing Students at Mission Faculty of Nursing, Asia-Pacific International University.

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Abstract: In this study, correlation and differences regarding attitudes, behaviors, and health impacts in relation to online social media usage were investigated among nursing students at the Mission Faculty of Nursing, Asia-Pacific International University. Respondents (N= 219) were selected. An online questionnaire was used for data collection, and the information was analyzed using descriptive statistics, i.e., percentage, mean and standard deviation, one-way ANOVA, and Pearson correlation coefficient statistics. The overall attitudes toward using social media were at a moderate level (\bar{x} = 3.44, S.D. = .44), the overall behaviors toward using online social media were at a very good level (\bar{x} = 4.19, S.D. = .70), and the overall health impact from using social media was moderate (\bar{x} = 3.46, S.D. = .81). The attitudes and behaviors were statistically correlated at the .01 level. The attitudes and the health impacts were statistically related at the .05 level. The behaviors and the health impacts were statistically correlated at the .05 level. The health impacts of using social media in each class were not statistically different and the comparison of the behaviors from online social media usage between sophomore and senior classes were significantly different at the .05 level.

Keywords: *online social media, attitude, behavior, health impacts, nursing students*

Introduction

Covid-19 has served as the catalyst for Thai people to widely and quickly adapt to the digital lifestyle. Social networking is connecting many people and creating social interactions or groups of people with similar activities and interests. These interactions include coordinating various activities, exchanging ideas and information, expressing opinions, and applying social networking in daily life such as communication, education, marketing, entertainment, communicating political ideas, etc. Many people emphasize the importance of online social networks or the virtual world so much that it has become a daily routine of people's lives today, and many people cannot live without them (Panicha Nitipornmongkol, 2011).

Using social media is not only for entertainment but could also be used in teaching and learning at various levels. Social media is used for online presentations instead of writing and using papers. Online learning comes with a lot of benefits, but also many side effects for the users if it is used too much (Thanawat Wannaprapha, 2015). During the COVID-19 crisis, the social media platforms can best showcase their core functions, which are to connect everyone together remotely. It is up to the users to use this tool correctly and effectively (Patcha Hengsadekul, 2021).

Nowadays, social media users are increasing every year, especially in the past year because the COVID-19 situation forced people to stay at home and work from home for the most part. Social media is therefore an important tool for communication, including doing business on online platforms. According to the statistics of Thailand, people aged 15-24 years have the highest internet usage (Statistical Office of Thailand, 2018). According to a survey, the social media that was most popular with Thai people in 2015 was Facebook (92.2%), which ranked first, followed by Google (63.7%), and Line (61.1%) (ET 24hrs, 2015). As for the results of the 2021 Social Media Usage Survey, the number one popular social network is Youtube (94.2%), the second is Facebook (93.3%), and the third is Line (86.2%) (Muangtum Nattapon, 2021).

Higher education institutions in Thailand need to develop the quality of their education by using information technology as a tool for teaching and learning, focusing on learning management in line with the 21st century, which has lifelong learning based on 3R X 7C principles as the foundation, which are communications, information and media literacy, computing and ICT literacy, and career and learning skills (Critique Panich, 2010). Outstandingly, communications, information and media

literacy, computing and ICT literacy, and career & learning skills enable learners to communicate with people around the world quickly and be able to search or disseminate information from all over the world. As a result, social media has become a huge source of knowledge for learners. The organization of teaching activities through social media also increases systematic thinking skills, especially analytical skills, analytical thinking, data analysis, problem-solving, and independent thinking provided to learners. This shows that social media has played an increasingly important role in education, making it an alternative channel for collaboration, sharing, and exchanging knowledge, news, and entertainment. It is a network between small entities that are linked together to form a large online society that can be used to benefit the education system.

The students of Asia-Pacific International University's Mission Faculty of Nursing are primarily a group of Thai youths between the ages of 18 and 24 (student council, Asia-Pacific International University, 2021), who are classified as Generation Z, and they are familiar with the internet because they have used it since a very young age, as well as the use of social media in daily life and, more importantly, in teaching and learning during the COVID-19 pandemic. Therefore, the researcher is interested in studying the attitudes, behaviors, and health impacts toward using social media among Asia-Pacific International University Mission Faculty of Nursing students to find out which direction is likely to go and to use the results of this research as a guideline to develop a model and be able to use it as a basis for formulating policies on the use of social media for students in the future.

Objectives

1. To study the attitudes, behaviors, and health impacts of using social media among the students of Mission Faculty of Nursing at Asia-Pacific International University.
2. To study the relationship between attitudes, behaviors, and health impacts of using social media among the students of Mission Faculty of Nursing at Asia-Pacific International University.
3. To compare the attitudes, behaviors, and health impacts of using social media among the students of Mission Faculty of Nursing at Asia-Pacific International University classified by each class.

Hypotheses

1. The attitude is related to behavior in social media usage among the students of the Mission Faculty of Nursing at Asia-Pacific International University.
2. The attitude is related to the health impacts of online social media usage among the students of the Mission Faculty of Nursing at Asia-Pacific International University.
3. Behavior is related to health impacts toward online social media usage among the students of Mission Faculty of Nursing at Asia-Pacific International University.
4. The attitudes, behaviors, and health impacts toward using social media among the students of the Mission Faculty of Nursing at Asia-Pacific International University differ each year.

Research Framework

The author applied Bloom's Taxonomy (Bloom, 1956) as a conceptual framework for studying students' attitudes, behaviors, and health impacts of using social media at Mission Faculty of Nursing, Asia-Pacific International University as shown in Figure 1.

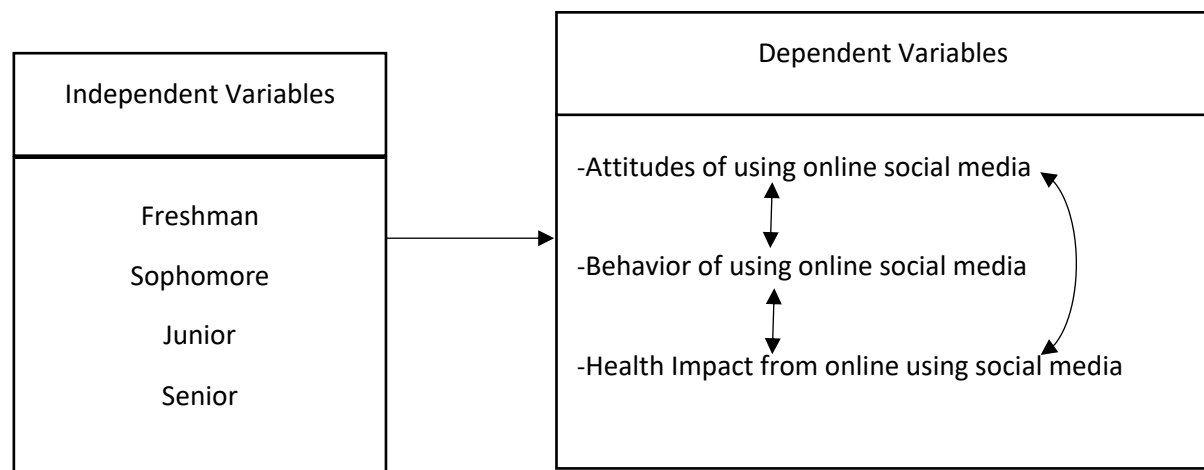


Figure 1. *Research Framework*

Research Methodology

A descriptive approach was taken in the research reported here.

Population and Sample

The population in this study was the students of the Bachelor of Nursing program (Thai Program) at the Mission Faculty of Nursing at Asia-Pacific International University, Academic Year 2021, with a total of 219 students, classified as freshmen, consisting of 61 first-year students, 73 second-year students, 40 third-year students, and 45 fourth-year students (Asia-Pacific International University Student Registration Department, 2021).

Data Collection Tools

The data collection using an online questionnaire (Google form) consisted of 4 parts:

Part 1: General information about the population group consisting of gender, age, domicile, academic year, grades, frequency of social media usage, the average amount of time spent on social media per day, the place where the students use social media the most, the time range of the day spent on using social media, the device used to access the social media, the social media sites used, by what means the social media sites introduced, the reasons for using the social media sites, years of experience in using social media, the number of friends on social media sites (including all the websites used).

Part 2: Attitudes toward using social media.

Part 3: Behavior towards using social media.

Part 4: Health impacts of using social.

Criteria Used and Interpretation

The criteria for evaluating attitudes, behaviors, and the health impact of using social media among the students of the Mission Faculty of Nursing at Asia-Pacific International University are calculated using the midpoint average (Pongthep Jiraro, 2019) and divided into five levels: highest level (average score = 4.50 – 5.00), high level (average score = 3.50 – 4.49), moderate level (average score = 2.50 – 3.49), low level (average score = 1.50 – 2.49), and lowest level (average score = 1.00 – 1.49).

Psychometric Evaluation of the Questionnaire

Reliability testing of the questionnaire was calculated using Cronbach's Alpha Coefficient method (Pongthep Jiraro, 2019). The reliability of each section, which involved attitudes, behaviors, and health impacts toward using social media was .695, .815 and .867 respectively.

Protecting the Rights of Participants

The participants' rights were adequately protected given the research design. The researcher introduced herself and asked for the consent of the sample group to participate in the study. The researcher also clarified the right of invitees to accept or decline participation in the study. The participants were informed that they could terminate their participation in this study at any time.

Data Analysis

1. Statistical analysis of respondents' answers is given as frequency and percentage values.
2. Statistical analysis as indicated under objective 1 consisted of mean and standard
3. Statistical analysis as indicated under objective 2 was undertaken by calculating Pearson's product-moment correlation coefficient.
4. Statistical analysis as indicated under objective 3 was accomplished using one-way ANOVA.

Results

General information of the respondents

There were 219 respondents from the Bachelor of Nursing program (Thai Program) of the Mission Faculty of Nursing at Asia-Pacific International University, Academic Year 2021. Among these, 87.21% were female, 50.23% were 18-20 years old, 36.07% were from both the northern and northeastern regions of Thailand, 33.33% were second-year students, 39.73% had a cumulative grade point average (CGPA) in the range of 2.50–2.99. 70.31% used social media more than 4 times a day, 65.75% had an average daily time spent on social media more than 3 hours, 53.42% use social media in the dorms, 52.05% spent their time using social media between 20.01-00.00, 100 % used mobile phones/smartphones to access social media. 90.41% used Facebook, followed by YouTube 88.13%, and the least were My Space, Windows Live Space, Multiply, and Live Journal, which accounted for 1.83%. Only 7.31% were recommended or persuaded by friends to use social media sites, while 92.69% chose to do so. The reasons for using social media sites for most of them were: contacting the people they know, which accounted for 88.58%; entertainment, which accounted for 77.63%; and the least, inviting others to buy products or services, which accounted for 4.57%. Most had 2-3 years of social media experience, representing 74.89%, and 61.64% had 501 or more friends on social media sites.

Attitudes, behaviors and health impacts toward using social media among the students of Mission Faculty of Nursing at Asia-Pacific International University using the mean and standard deviation.

It was found that the attitudes towards using social media of the students of the Mission Faculty of Nursing at Asia-Pacific International University were, overall, at a moderate level ($\bar{x} = 3.44$, S.D. = .44). When considering the items in descending order, it was found that the respondents knew that social media has both positive and negative aspects with the highest average score ($\bar{x} = 4.54$, S.D. = .84), followed by the respondents having fun and enjoying access to social media ($\bar{x} = 4.28$, S.D. = .83) and the respondents who think social media should not be used as it is a waste of time with the lowest average score ($\bar{x} = 2.73$, S.D. = 1.21), as shown in Table 1.

Table 1. Mean, standard deviation, and the level of attitude in using social media among the students ($n=219$).

Attitudes towards Using Social Media	Mean (\bar{x})	S.D.	Level of Attitude
1. I have fun and enjoy using social media.	4.28	0.83	Very Good
2. I feel good, proud, and happy when people like or share my photos, videos, or stories.	3.90	0.93	Very Good
3. I feel happy to share stories, pictures, and videos through social media for my friends to see.	4.01	0.91	Very Good

Attitudes towards Using Social Media	Mean (\bar{x})	S.D.	Level of Attitude
4. I feel like social media is a virtual world. I can be myself as much as I can when using social media.	3.46	1.00	Moderate
5. I have knowledge of various matters and I am willing to exchange comments on group activities or on friends' posts on social media.	3.78	0.92	Very Good
6. There is a belief that social media is a society that is free and open to expressing opinions.	3.82	1.00	Very Good
7. I know that social media has both good and bad sides.	4.54	0.84	The Best
8. I have the idea that I can find new friends, new knowledge, and a new society by using social media.	3.98	0.91	Very Good
9. You contact work through social media networks such as for meetings, assigning work, and submitting reports	3.87	0.90	Very Good
10. Social media is often used for online learning during the COVID-19 pandemic.	3.95	0.90	Very Good
11. I think that social media should not be used as it is a waste of time	2.73	1.21	Moderate
12. I think that social media makes it easy to be deceived.	3.09	1.28	Moderate
13. I think that most of the news from social media is fake news.	3.00	0.80	Moderate
14. I think that using social media in teaching will cost more.	3.06	1.16	Moderate
15. I think using social media for my studies is not safe if the appliance is used too much and gets hot.	3.05	1.18	Moderate
16. I think social media shouldn't be used because it makes us write less.	2.85	1.02	Moderate
17. I think social media shouldn't be used because of the loss of concentration in studying.	2.91	1.05	Moderate
18. I think social media shouldn't be used because people will not want to socialize with friends.	2.95	1.10	Moderate
19. Think Social Media Use results in a lack of creativity all around	2.75	1.23	Moderate
20. I think social media shouldn't be used because it may cause a lack of careful decision-making.	2.79	1.03	Moderate
Total average score	3.44	0.44	Moderate

The use of social media by students at the Mission Faculty of Nursing, Asia-Pacific International University, was found to be high in the overall region ($x = 4.19$, S.D. = .70). When considering the items in descending order, it was found that the respondents who were studying and taking online exams during the COVID-19 pandemic, will choose to use social networks (eg Zoom, Microsoft Team, etc.) with the highest average score ($\bar{x} = 4.45$, S.D. = .79), followed by respondents who submit information or discuss work or public relations via online social networks (such as Line, Facebook, E-mail, etc.) * ($\bar{x} = 4.42$, S.D.= .81) line, Instagram, etc.), with the lowest average score ($\bar{x} = 3.45$, S.D. = 1.37), as shown in Table 2.

Table 2. *The mean, standard deviation, and the level of students' behavior towards social media usage (n=219).*

Behavior towards Social Media Usage	Mean (\bar{x})	S.D.	Level of Behavior
1. When searching for general information, I often choose to access social networks (such as Facebook, Google, YouTube, etc.) first.	4.30	0.90	Very Good
2. If I want to communicate with someone urgently or conveniently, I always choose to do it via social networks (such as Facebook Messenger, Line, etc.).	4.29	0.91	Very Good
3. When I want to watch entertainment or relax, I will access every social network (e.g. Facebook, YouTube, games, TikTok, etc.)	4.38	0.82	Very Good
4. I send information or discuss work or public relations via social networks (such as Line, Facebook, E-mail, etc.) regularly.	4.42	0.81	Very Good
5. When wanting to communicate with others, I always choose to use social networks (such as Facebook, line, etc.) first.	4.34	0.82	Very Good
6. When there are new achievements, photos, videos, or experiences, I often upload those on social networks (such as YouTube, Facebook, Instagram, etc.) always.	3.87	1.05	Very Good
7. When wanting to send the work to the teacher, I always choose to use social networks (eg E-mail, line, etc.).	3.45	1.37	Moderate
8. When studying and taking exams online during the COVID-19 pandemic, I always choose to use social networks (e.g. Zoom, Microsoft team, etc.).	4.45	0.79	Very Good
Total average score	4.19	0.70	Very Good

The overall effects of using social media were found to be at a moderate level (\bar{x} = 3.46, S.D. = .81). When considering the items in descending order, it was found that the respondents had sore eyes and dry eyes while using the social media without taking a break, with the highest average score (\bar{x} = 4.20, S.D. = .91), followed by the respondents having neck pain while using the phone for a long time with the highest average score (\bar{x} = 3.90, S.D. = 1.05) and the respondents who had aggressive behaviors such as being upset and easily angered when not using social media had the lowest average score (\bar{x} = 2.85, S.D. = 1.45), as shown in Table 3.

Table 3. *The mean, standard deviation, and the degree of health impacts of social media usage overall and by each item (n=219).*

Health Impacts of Social Media Usage	Mean (\bar{x})	S.D.	Level of Impact
1. There is a risk of malnutrition	2.88	1.20	Moderate
2. There is a risk to a physical characteristic, such as being a hunchback.	3.75	1.18	High
3. There are symptoms such as sore eyes and dry eyes when using social media without taking a break for your eyes.	4.20	0.91	High

4. There are symptoms such as mild headaches, fatigue, and not having a clear mind when using social media for a long time.	3.95	1.01	High
5. There is an emergence of aggressive behavior such as being upset, and easily angered when an individual does not get to use social media.	2.85	1.25	Moderate
6. There is symptom such as a trigger finger when there is a prolonged time of using the phone.	3.43	1.18	Moderate
7. There is symptom such as neck pain when there is a prolonged time of using the phone.	3.90	1.05	High
8. There is insomnia.	3.21	1.26	Moderate
9. There's a lack of concentration in activities.	3.21	1.18	Moderate
10. It causes stress.	3.12	1.25	Moderate
11. It causes tight and rigid muscles when there is a long period of sitting.	3.62	1.18	High
12. It causes obesity for not doing other active activities such as exercise, etc.	3.41	1.19	Moderate
13. It causes stomach disease for not eating on time.	3.50	1.26	High
Total average score	3.46	0.83	Moderate

The relationship among attitudes, behaviors, and health impacts toward using online social media.

It was found that attitudes and behaviors toward online social media usage were statistically significant at the .01 level. The attitudes toward social media usage were statistically correlated at the .05 level, and the behavior and health impacts toward social media usage were statistically correlated at the .05 level, as shown in Table 4.

Table 4. *The relationships among attitudes, behaviors, and health impacts toward using online social media by using Pearson's Correlation Coefficient (n=219).*

Variables	Attitude	Behavior	Health Impact
Attitude	-		
Behavior	0.357**	-	
Health Impact	0.167*	0.170*	-

**P < .01, *P < .05

The comparison of attitudes, behaviors, and health impacts toward using online social media classified by each class by using One-way ANOVA.

There were no statistically significant differences in attitudes or health impacts, but online social media behaviors were significantly different at the .05 level, as shown in Table 5.

Table 5. *The comparison of attitudes, behaviors, and health impacts of using social media among the students in the Mission Faculty of Nursing at Asia-Pacific International University classified by year using One-way ANOVA (n=219).*

Source of Variance		SS	df	MS	F	Sig.
Attitude	Among the groups	1.18	3	0.39	2.08	.103
	Within the groups	40.53	215	0.19		
	Total	41.71	218			
Behavior	Among the groups	5.08	3	1.69	3.53*	.016
	Within the groups	103.18	215	0.48		
	Total	108.26	218			
	Among the groups	1.248	3	0.42	0.60	.617

Health Impacts	Within the groups	149.545	215	0.70.		
	Total	150.793	218			

**P < .01, *P < .05

By using Scheffe's method, it was found that the second-year and the fourth-year students had significantly different behaviors of social media usage at the .05 level. It showed that the fourth-year students had behaviors of social media usage statistically significantly better than the second-year students, as shown in Table 5.1.

Table 5.1. *The comparison of behaviors toward using social media classified by Scheffe's Method (n=219).*

\bar{x}	Academic Year	Freshman	Sophomore	Junior	Senior
4.2295	Freshman	-			
4.0291	Sophomore	.20040	-		
4.1219	Junior	.10763	-.09277	-	
4.4444	Senior	-.21494	-.41533*	-.32257	-

Discussion

According to the study's findings, attitudes, behaviors, and health effects of using social media revealed that the study can be used for discussion on the following issues:

1. Regarding the attitudes toward using social media, they were found to be at a moderate level. This could be because the majority of respondents, 33.33% of sophomore students, stated that the majority of their reasons for using social media sites were to contact people they used to know, accounting for 88.58% of the reasons, and because there hasn't been much research done on teaching and learning, the attitude is therefore moderate. In addition, the results of the research showed that the reasons and opinions for the following concepts were at a moderate level: It's a waste of time; people can easily be deceived via social media; most of the news on social media is fake news; it is expensive; the use of social media in teaching is not safe as the appliances are heated over the time of usage; social media should not be used because it makes the students write less; the students lose concentration in their study; the students are not interested in socializing with friends; using social media results in a lack of creativity in all areas and causes a lack of due diligence in making a certain decision. This is inconsistent with the research conducted by Senkaew (2017) on the social networking behavior of Gen-X in Bangkok. The purpose of this research was to study the expectations, perceptions, learning, and acceptance of social networking usage and the attitudes towards social networking usage that affect the behavior of Generation X groups living in Bangkok. The overall attitude towards the use of social networks is high, and when considering each item by its mean value, it was found that for most people it was fun and enjoyable when using social networks, followed by the feeling of convenience and ease in selling and exchanging goods and services through the social networks, and followed by the knowledge that social media has both the good and the bad sides.

2. Regarding the behavior of using social media, the overall behavior of the respondents was at a very good level. The details of activities with a very good level of behavior include searching for information, urgent communication, entertainment or relaxation, work, regular publicity of work, communicating with others, uploading work, photos, videos, or new experiences, and teaching online in the current COVID-19 situation through social networks. However, when it comes to submitting the work to the teacher, the students choose to use social networks (such as email, line, etc.) instead, which was at a moderate level. Due to the increasing number of social media available for everyone to choose from, there are many channels to submit the work through, in which each university may have a system or social media, for submitting the work, sending messages to assign the work, or having a conversation. Therefore, there has been a decrease in the selection of email and lines for submitting work, and regardless of gender or age, people are paying more attention to social media. Using social media is one activity that humans do to relieve stress from routine activities, as the trend of social

media usage is closely related to study and work. Age is also one of the factors that differentiates individuals in terms of attitudes and behaviors. Individuals tend to have values based on their friends, and social media has a huge influence on decision-making. They tend to like novelty and start looking for new forms of social media. This is consistent with the research results of Saminpanya and Toomsan (2017), who have researched the 21st-century skills of students at the Mission Faculty of Nursing, Asia-Pacific International University. They found that the overall 21st-century skills across all the students from all different academic years of the Mission Faculty of Nursing are at a high level compared to the set criteria. This includes communication, information, and media literacy, as well as computing and ICT (information and communication technology) literacy. However, the results of the aforementioned study are not consistent with the research results of In-ek (2017), a study of students' behavior of social media usage at Lat Thippharot Pittayakhom School, Takhli District, Nakhon Sawan Province, which found that the behavior of social media usage of junior and senior high school students, in all aspects, was at a moderate level. If classified by each aspect, it was found that the behavioral aspect of using social media for education was that students mostly searched for information on social media instead of going to the library, the behavioral aspect of using social media for entertainment was that the students used social media to chat with friends and other people, and the behavioral aspect of using social media for communication was that most of the students used it to communicate with friends and other people.

3. Overall, the health consequences of using social media were moderate. The health impacts such as having a trigger finger when playing with the phone for a long time, being obese due to inactivity, having insomnia, being unable to do activities that cause stress, and the risk of malnutrition are moderate, but the most common impact of social media usage is the respondents having sore eyes and dry eyes when using social media without giving the eyes a break, neck pain when playing with the phone for a long time, and aggressive behaviors such as being upset and easily angered when not using social media. Moreover, 90.41% of the respondents use Facebook, and 61.64% have friends on the website of 501 or more; the frequency of using social media is more than four times per day, which accounts for 70.31%; and the average time spent on social media per day is more than 3 hours, which accounts for 65.75%, which is consistent with the research results of Klinlak (2018) on the impact of social media usage on the students of Hat Yai University, Songkhla Province, which studied the behavior of social media usage and the impact of social media usage. It was found that the impacts of social media usage among the sample group were health impacts, namely back pain, and wrist and shoulder aches.

4. Regarding the relationship among attitudes, behaviors, and health impacts of social media usage, it was found that the attitudes towards social media usage and the behavior of using social media were statistically correlated at the .01 level. As for the attitude towards using social media and health impacts, it was statistically correlated at the .05 level, and the behavior of using social media and the health impacts of using social media were statistically correlated at the .05 level.

5. Regarding the comparison among attitudes, behaviors, and health impacts of using social media among students of the Mission Faculty of Nursing at Asia-Pacific International University classified by each academic year, overall, the difference was not statistically significant. When considering each aspect, it was found that there were no statistically significant differences in attitudes towards social media usage and health impacts of social media usage, and the behaviors of using social media differed significantly at the .05 level. Students in each class had different levels of social media access or any activity with observable responses or interactions in social network usage, such as frequency, time frame, and purpose of use. The different classes play an important role in choosing social media because the students of each class are aware of various reasons to choose to use social media. Students from each class have attitudes, and the health impacts of using social media are not different. However, there are different behaviors in using social media. Especially if the student is in the senior class, there will be more consideration for using social media as well. Students will have to think about various reasons before choosing to use social media. This is consistent with the research results of Saminpanya and Toomsan (2017), who researched 21st-century skills among students of the

Mission Faculty of Nursing, Asia-Pacific International University, to find the overall 21st-century skills comparison of students by class. It was found that the fourth-year students had significantly higher levels of 21st-century skills than third-year and second-year students at the .05 level. However, this is not consistent with the research by Chaisen (2020), a study of desirable skills in the 21st century of Suranaree University of Technology students for the academic year 2019. This research aimed to 1) study the 21st-century desirable skills level of Suranaree University of Technology students and 2) study and compare the 21st-century desirable skills of Suranaree University of Technology students by gender, academic year, and school classified by each class. It was found that the fourth-year students and above had more creative and innovative skills than the first-year students and third-year students. The first-year students had more life and career skills than the second-year students, the third-year students, the fourth-year students, and above.

Recommendations from Research Results

1. Students of the Mission Faculty of Nursing should be encouraged to have knowledge, understanding, and awareness of the importance and impact of using social media in teaching on a regular basis.
2. There should be the development of activities in using social media that promote thinking skills in the 21st century.
3. There should be a project/club "Good health, bright life, keeping the diseases away from using social media" based on the New Normal principle.

Recommendations for the Next Research.

1. There should be comparative research of different faculties at Asia-Pacific International University to obtain more diverse and comprehensive information.
2. There should be research on students' knowledge of using social media as well.

References

- [1] Bloom, B. S. (1956). *Taxonomy of Educational Objectives, the classification of educational goals – Handbook I: Cognitive Domain*. New York: McKay.
- [2] Boonrawd, A. (2020). Media usage behavior of Thai people after contracting COVID-19. Accessed March 29, 2022, from <https://www.bangkokbiznews.com/blogs/columnist/125307>
- [3] Chaisen, C. (2020) A Study of Desirable Skills in the 21st Century of Suranaree University of Technology Students. Nakhon Ratchasima
- [4] Chalongsuk, R. et al. (2014). Behavior and Attitudes of Students of Faculty of Pharmacy of Silpakorn University towards the use of social media in learning. Bangkok, Silpakorn University.
- [5] Hemin, A. (2013) Behavior and opinions on the results of using social media of people in Bangkok. Bangkok: Faculty of Applied Statistics, Graduate Institute Development Administration.
- [6] In-ek, K. (2017) A study of students' behavior in using social media at Lat Thippharot Pittayakhom School, Takhli District, Nakhon Sawan Province. Phitsanulok, Naresuan University.
- [7] Klinlakh, P. (2018). The impact of social media uses among students of Hat Yai University. Songkhla Province. The 9th National and International Hat Yai Academic Conference.
- [8] Kongraj, P. (2011). *Social media and learning in the 21st century*. Liberal Arts Journal. Maejo University. 7(2) Mantara Thambut. Psychology for teachers. (No year of publication). [online] Retrieved August 16, 2020. Accessed from <http://sites.google.com/site/psychologyb1/home>
- [9] Muangtum, N. (2021) *Statistics report of Thailand Digital Stat 2021 from We Are Social*. Retrieved 4 September 2021 from <https://www.everydaymarketing.co/knowledge/thailand-digital-stat--2021we-are-social/>

- [10]Nitipornmongkol, P.(.(2011The behavior of using online social networks of working people in Bangkok. Bangkok: Thammasat University. Pitchayawee Kanaphon. .2010“A study of the attitude on utilization and satisfaction of network communication. Social Network Case Study: Students and Staff of Chalerm College.
- [11]Panich, V. (2010). Ways to create learning for students in the 21st century. Accessed on March 29, 2022, from <http://www.gotoknow.org/blogs/posts/415058>
- [12]Phuangphae, P. (.(2016“Study on behavior of using social media of a student teacher. Faculty of Education Silpakorn University.” Veridian E-Journal. SU Vol. 9No. 2May-August.
- [13]Saminpanya, P., & Toomsan, A. (2017). Twenty-First Century Skills of Nursing Students of Mission Faculty of Nursing, Asia-Pacific International University. *Abstract Proceedings International Scholars Conference*, 5(1), 133. <https://doi.org/10.35974/isc.v5i1.1445>
- [14]Senkaew, K. (2017). Social Networking Usage Behaviors of X Generation in Bangkok. Retrieved August 12, 2021, from http://dspace.bu.ac.th/bitstream/123456789/2395/1./kaikarn_senk.pdf
- [15]Statistics Office of Thailand. (.(2018Survey results indicate that Thai people use smartphones instead of computers. Retrieved August 12, 2021, from <https://www.it24hrs.com//2017nso-thai-stat-app-announce/>
- [16]Student Council at Asia-Pacific International University. (2564), Retrieved August 12, 2021, from <https://www.apiu.edu/th/>.
- [17]Suranaree University of TechnologyNatnicha Duangkajee (.(2020Online Social Media Usage Behavior and Entrepreneurship Competencies of Students. Academic journal of Business Administration (Association of Private Higher Education Institutions of Thailand under royal patronage Her Royal Highness Princess Maha Chakri Sirindhorn
- [18]Thaksin Chonthicha Juinam. “Behavior and consequences of using online social networks among students at Junior High School in Sukhothai Province” Academic Journal Veridian E-Journal.SU Vol.8 No.3 September-December (2016).
- [19]Thammachat, K. (2010).Using Web 3.0 for website development. Bangkok: Computer Office, University

Knowledge, Attitude and Practices on the Use of Masks Among Adults in a Selected Barangay in Silang Cavite: A Basis for Health Education Program

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Abstract: Worldwide, COVID-19 pandemic caused deaths and infections. Experts suggest that face masks are an effective way of preventing its spread. The majority of the literature has focused on healthcare workers' knowledge, attitudes, and practices (KAP) regarding mask use, but there have been few studies on non-healthcare workers. Therefore, the aim of the study was to evaluate the KAP on the use of masks among adults in the community. A descriptive-correlational study was conducted among 201 adults in Silang Cavite using purposive sampling. A self-constructed questionnaire on KAP in the use of masks was used. Data were analyzed using descriptive statistics, Spearman's correlation, Mann Whitney U, and Kruskal Wallis. The data revealed that respondents have a high knowledge (M=8.32; SD=1.07), a positive attitude (M=4.03; SD=.53), and a very good practice (M=4.68; SD=.34) in the use of masks. It showed a significant relationship between knowledge and practices ($p<0.03$) but no significant relationship between attitude and practices ($p=.371$). It also revealed that there is a significant difference in practices considering educational attainment ($p=0.001$) but no significant difference in practices considering age ($p=0.76$) and sex ($p=0.363$). The instrument used may not have adequately assessed the finding; therefore, further studies can be conducted to validate using item response theory.

Keywords: COVID-19, face mask, health education, KAP

Introduction

The first incidence of the COVID-19 virus was reported in Wuhan, Hubei Province, China, in December 2019. Despite careful and strict control, the occurrence of COVID-19 is becoming more and more prevalent. In January 2020, Thailand confirmed the first recorded case of COVID-19 outside of China, which led to public health threats in other countries as it spread globally (Ravelo & Jerving, 2020; Stewart et al., 2021). This virus can be transmitted by direct contact with infected individuals or through contact with objects and surfaces contaminated with the virus (Larson, 2021; Li et al., 2020). COVID-19 has a 5-day incubation period on average but can extend up to 14 days (Lauer et al., 2020; Sauer, 2020). As a result of the rapid spread of COVID-19, infection control measures have been implemented in the hospital setting. Furthermore, the World Health Organization (WHO) and the Department of Health (DOH) advised social distancing, community quarantine, hand cleanliness, face mask use, cancellation of all mass gatherings, and other non-pharmaceutical public health methods for reducing COVID-19 risk and impact (Garcia & Duarte, 2020). The Government of the Philippines enforced an Enhanced Community Quarantine (ECQ) in Luzon as well as the mandatory wearing of face masks in the ECQ area (Parrocha, 2020).

Masks are commonly used in three distinct indications to protect against respiratory infections: for healthcare workers, sick patients, and well-off community members (MacIntyre & Chughtai, 2020), but the usage of face masks by the public to prevent the spread of the COVID-19 pandemic is controversial and widely suggested (Feng et al., 2020). Despite the consistency of the recommendation that face masks should be used in public areas to reduce the spread of infection of the virus, discrepancies were indicated in public and community settings. It was found that the usage of a face mask is insufficient in limiting and preventing the transmission of the virus, and it should not be underestimated, for it can increase the spread of infections (Bai, 2020; Davies et al., 2013; MacIntyre et al., 2017). In the Philippines, limited studies were found on the relationship between knowledge, attitude, and

practices of using personal protective equipment, specifically face masks, in the community among adults that were non-health allies. Thus, the study aimed to determine how to properly utilize face masks and investigate the relationship between knowledge, attitudes, and practices (KAP) regarding the utilization of face masks in adults in a community in the Philippines. Several studies examining KAPs on the proper way of using face masks among healthcare workers have already been conducted, but there is a need to understand KAPs towards the use of masks among adults. In addition, the study will also serve as a basis for a health education program.

Methodology

Research Design

A quantitative research design was used, specifically a cross-sectional descriptive correlational design. Quantitative research is used to study the relationship between one variable and another within a population. In a cross-sectional study, a descriptive research design is also called observational. A cross-sectional study employs a survey method to determine key characteristics of a population at a specific point in time. It is mostly implemented for public health planning and is usually applied to measure the prevalence of the study (Levin, 2006; Setia, 2016). This design is applicable to the study because data are collected based on different variables to determine the differences in age, gender, and educational attainment in accordance with knowledge, attitudes, and practices toward the use of face masks (Cherry, 2019). The study aimed to explore the correlations between knowledge, attitude, and practices regarding the use of face masks among adults in a selected barangay located in Silang, Cavite, in the Philippines.

Population and Sampling Techniques

The study was conducted in one selected barangay in Silang, Cavite, in the Philippines, using the method of purposive sampling. The method of purposive sampling is a type of non-probability sampling in which the study's researchers rely on their collective judgment when choosing participants to participate in their study (Crossman, 2020). The adult participants of the community are evaluated based on their age, gender, and educational attainment in relation to their KAP on the use of masks. The researchers send a link to the survey and distribute questionnaires to the adults in the community. All respondents come from a variety of backgrounds, and the study considers their age, gender, and educational attainment in accordance with their KAP on the use of face masks. The study comprises 201 adults in the community.

Instrumentation

The instrument of the study used a self-constructed questionnaire. The instrument is composed of two different parts. The first part of the questionnaire covers the respondents' demographic profile, including age, sex, and educational attainment. The second part of the questionnaire is divided into three different sections, the first measures knowledge about the use of face masks. The second part evaluates the attitude of the respondent, and the last part evaluates the practices of the respondents in using face masks. It was developed using the guidelines of both WHO and the Center for Disease Control and Prevention (CDC).

The knowledge section of the questionnaire consists of 16 true or false questions. The correct answers were validated and checked based on the guidelines given by the WHO and CDC. After the questions were validated by a statistician, experts, and laymen, the questions were revised based on the given and suggested recommendations. A pilot study was conducted, and the reliability revealed an Alpha Cronbach of .701. Nine items were retained and used in the actual data gathering. Here is an interpretation of knowledge on the use of face masks: 7-9 (high knowledge), 4-6 (average knowledge), and 0-3 (low knowledge).

The attitude questionnaire has 19 questions on a 5-point Likert scale, with 1 point for "strongly disagree" and 5 points for "strongly agree." After the questions were validated by a statistician,

experts, and laymen, recommendations were carried out and the questions were revised. A pilot study was conducted, and the reliability revealed an Alpha Cronbach of .802. Thirteen items were retained and used in the actual data gathering. Here is an interpretation of the attitude toward the use of face masks: 4.50-5.00 (very positive), 3.50-4.49 (positive), 4.50-3.49 (neutral), 1.50-2.49 (negative), and 1.00-1.49 (very negative).

The practices questionnaire, which has undergone a pilot study, consists of 21 questions with a 5-point Likert scale and is rated from "never" (1 point) to "always" (5 points). After the questions were validated by a statistician, experts, and laymen, recommendations were carried out and the questions were revised. A pilot study was conducted, and the reliability result showed an Alpha Cronbach of .905 validity. 18 items were retained and used in the actual data gathering. Here is an interpretation of the practices on the use of face masks: 4.50-5.00 (very good), 3.50-4.49 (good), 4.50-3.49 (satisfactory), 1.50-2.49 (poor), and 1.00-1.49 (very poor).

Pilot Study

The pilot study was conducted to check for and correct mistakes in the questionnaire made by the nursing researchers. The technique was used to see any point of dirt, thereby improving any method used after collecting the data from 50 participants in a selected barangay in Silang Cavite. The data was encoded in the Statistical Package for Social Sciences Software (SPSS) version 22.0. The results were run through reliability testing via Alpha Cronbach to see the validity of the questionnaire.

Data Gathering Procedures

Once the proposal was approved, the researchers sent a letter of validation to the experts to validate the self-constructed questionnaire. After the validation of the questionnaires, the researchers filed an application letter to the Ethics Review Board (ERB). The researchers sent a letter of validation to the barangay office before conducting the survey. After getting permission and approval, the researchers administered the pilot study. The gathered data from the pilot was noted and implemented, and a new set of questionnaires was established for the respondents. The actual collection of data was done as soon as the reliability testing was done.

The data gathered from the respondents was collected through an online form, where the researchers either sent links to the questionnaire to participants or distributed physical copies. The researchers then went on to explain the study's goals and objectives. Prior to the participants answering the survey questionnaires, the researchers assured an ethical consideration for the participants' privacy and confidentiality. All questionnaires gathered were kept sealed in an envelope, and retrieved online questionnaires were recorded and saved. The data gathered will only be shared between the two researchers. After the data was confidently recorded, the survey questionnaire was shredded and discarded.

Ethical Considerations

All participants were informed about the study's purpose and objectives. The information collected from the participants in this study was kept private and confidential. Information that was gathered was utilized to investigate the correlations between knowledge, attitudes, and practices regarding the use of face masks among adults in a selected barangay in Silang, Cavite. Hence, the university's terms and regulations were also stated on the consent form.

Analysis of Data

The data that was collected was encoded and analyzed using the SPSS version 22.0 and was used in multiple statistical tests, using both descriptive statistics and correlational statistics. Descriptive statistics summarize the collected data based on the characteristics of the respondents (Trochim, 2020). In determining the demographic profile of the respondent, descriptive statistics were used. Descriptive statistics of mean and standard deviation and descriptive statistics of frequency and percentage were used to assess the extent of the respondents' knowledge, attitude, and practices. In

addition, to determine if there were significant relationships between all independent and dependent variables of KAP among participants, Spearman's Correlation Coefficient was utilized. To determine if there were significant relationships among the dependent variable and moderating variables, the utilization of the Mann Whitney U test helped to distinguish age and sex because variables were not normally distributed. In addition, the Kruskal Wallis test was used to analyze educational attainment because it was not normally distributed. Dunn's pairwise test was utilized to determine differences among five groups of the variables. Finally, linear regression was used to determine which of the independent variables predict the practice of the use of face masks.

Findings/Results

Level of Knowledge on the use of Mask of Respondents

Table 1 shows the level of knowledge of the respondents. It reveals that the respondents have a high level of knowledge on the use of masks, $M = 8.32$ ($SD = 1.07$), while table 2 shows the knowledge questions and scores for each statement. It shows that all the respondents got a correct answer on item 1, "Wearing a mask helps protect oneself from becoming infected", ($M = 1.00$, $SD = .62$, 100%). The statement with the lowest percentage of correct answers is item 6, "Masks should not be worn during intense physical activity because wearing one can make it hard to breathe" ($M = .75$, $SD = .44$, 74.6%) and item 9, "If a face mask is not available, I can use a piece of cloth and fold it into two layers" ($M = .88$, $SD = .32$, 88.6%).

Table 1. *Level of Knowledge on the use of Mask of Respondents*

	N	Mean Score	SD	Qualitative Descriptor
Level of Knowledge	201	8.32	1.07	High Knowledge

0-3 low knowledge; 4-6 average knowledge; 7-9 high knowledge

Table 2. *Knowledge About the Use of Masks among Respondents*

No.	Questions	Mean	SD	Correct n	%	Incorrect n	%
1	Wearing a mask helps protect oneself from becoming infected.	1.00	0.00	201	100	0	0
2	I know that I need to wash my hands before putting on a face mask.	0.99	0.12	198	98.5	3	1.5
8	After the usage of a disposable medical face mask, it should be thrown away carefully by holding the ties of the mask and disposing it into a closed trash bin to prevent transmission of infection.	0.98	0.16	196	97.5	5	2.5
4	The correct way of wearing a mask should snugly fit the face without any gaps and completely cover the nose, mouth, and chin.	0.96	0.19	193	96.0	8	4.0
5	The purpose of the metal strip on a surgical mask is to fit on the nose.	0.95	0.23	190	94.5	11	5.5
7	In case of a lack of commercial face masks, home-made face masks with two layers of cloth may be used.	0.94	0.24	189	94.0	12	6.0
3	Cloth face masks should have 2-3 layers of washable, breathable fabric.	0.89	0.31	179	89.1	22	10.9
9	If a face mask is not available, I can use a piece of cloth and fold it into two layers.	0.88	0.32	178	88.6	23	11.4
6	Masks should not be worn during intense physical activity because wearing one can make it hard to breathe.	0.75	0.44	150	74.6	51	25.4

All items are True

Attitudes on the Use of Mask of Respondents

Table 3 shows a positive attitude toward the use of masks among adults, with an overall mean score of 4.03 ($SD = .53$). As shown in the table, the highest mean is on item 2 which stated, "I am concerned for others, so I use masks to help prevent other individuals from becoming infected" ($M = 4.8$, $SD = .58$) followed by item 8 which stated, "I believe that everyone, including people who do not have symptoms should wear face masks in public places." ($M = 4.71$, $SD = .65$) and item 1 which stated, "I believe that wearing a face mask is an effective way to protect myself." ($M = 4.7$, $SD = .53$). Next item number 4, 9, and 5 were placed on the third lowest attitude. Number 4 which stated, "I think that wearing a face mask is troublesome because I cannot communicate properly while wearing one." ($M = 3.90$, $SD = 1.25$) followed by item 9: "I think face masks disrupt my breathing." ($M = 3.57$, $SD = 1.23$) and the lowest mean is item 5, which stated, "I believe it is necessary to change the mask after wearing it for 8 hours" ($M = 1.43$, $SD = .75$). Attitude refers to the information we have gathered about something in which we have formed an opinion (Ajzen, 1997). As a result, attitude is the result of a complicated relationship between thoughts, feelings, and values.

Table 3. Attitudes of the Respondents on the Use of Mask

No.	Questions	Mean	SD	Scaled Response	Qualitative Descriptor
2	I am concerned for others, so I use masks to help prevent other individuals from becoming infected.	4.8	.54	Strongly Agree	Very Positive
1	I believe that wearing a face mask is an effective way to protect myself.	4.7	.53	Strongly Agree	Very Positive
8	I believe that everyone, including people who do not have symptoms should wear face masks in public places.	4.71	.65	Strongly Agree	Very Positive
13	I believe it is important to encourage others to wear masks when they do not.	4.68	.76	Strongly Agree	Very Positive
6	I think being careful when putting on and taking off a mask is necessary.	4.61	.75	Strongly Agree	Very Positive
7	I think wearing a mask does not work in preventing the transmission of sicknesses.	4.13	1.23	Agree	Positive
3	I feel embarrassed if I am the only person wearing a face mask in public places.	4.00	1.28	Agree	Positive
10	I believe I can reuse my face mask if it is not dirty.	3.98	1.26	Agree	Positive
11	I believe I can reuse my face mask if it is not wet.	3.97	1.27	Agree	Positive
12	I believe I can reuse my face mask if it is not torn.	3.93	1.267	Agree	Positive
4	I think that wearing a face mask is troublesome because I cannot communicate properly while wearing one.	3.90	1.25	Agree	Positive
9	I think face masks disrupt my breathing.	3.57	1.23	Agree	Positive
5	I believe it is necessary to change the mask after wearing it for 8 hours.	1.43	.75	Strongly Disagree	Very negative
Overall Attitude		4.03	.53	Agree	Positive

Legend: 4.50-5.00 strongly agree (**very positive**), 3.50-4.49 agree (**positive**), 2.50-3.49 neutral (**neutral**), 1.50-2.49 disagree (**negative**), 1.00-1.49 strongly disagree (**very negative**)

Extent of Practices on the Use of Mask of Respondents

Table 4 presents that the respondents' practices on the use of masks are very good, $M = 4.68$ ($SD = .34$). The highest is item 10, "I make sure the mask fully covers my nose, mouth, and chin" ($M = 4.93$, $SD = .54$), followed by item 2, which stated, "I wear a mask in crowded places to prevent the transmission of infection." ($M = 4.92$, $SD = .33$) and item 18, which stated, "I immediately replace my used mask once it gets wet or dirty." ($M = 4.89$, $SD = .34$). Next item number 14, 13, and 16 were placed on the third lowest. Item 14, which stated, "As I remove the used mask, I lean forward, and pull the mask away from my face." ($M = 4.57$, $SD = .68$) followed by item 13 which stated, "I remove the elastic bands, string, or straps of the mask behind my head or ears, without touching the front part of the mask." ($M = 4.43$, $SD = 1.07$) and the lowest is item 16, "I wrap my used mask in tissue and throw it away in an open trash can" ($M = 3.72$, $SD = 1.49$).

Table 4. *Extent of Practices on the Use of Mask among Respondents*

No.	Questions	Mean	SD	Scaled Response	Qualitative Descriptor
10	I make sure the mask fully covers my nose, mouth, and chin.	4.93	.26	Always	Very Good
2	I wear a mask in crowded places to prevent the transmission of infection.	4.92	.33	Always	Very Good
18	I immediately replace my used mask once it gets wet or dirty.	4.89	.36	Always	Very Good
6	I ensure that the part of the mask with the metal strip is on the upper side.	4.87	.41	Always	Very Good
8	I position the elastic band, strings, or straps properly around my ear.	4.85	.48	Always	Very Good
9	I pinch the metal strip, so it fits to the shape of my nose.	4.82	.58	Always	Very Good
3	I clean my hands with soap and water or an alcohol-based solution before touching the mask.	4.80	.51	Always	Very Good
11	I make sure that there are no gaps between my face and the mask.	4.74	.72	Always	Very Good
11	I make sure that there are no gaps between my face and the mask.	4.74	.72	Always	Very Good
15	I dispose my used mask and throw it away in a closed garbage bin	4.74	.68	Always	Very Good
17	I clean my hands after touching the used mask.	4.73	.63	Always	Very Good
12	I avoid frequent touching of face masks once it is on and secured.	4.72	.59	Always	Very Good
7	I ensure that the colored side of the face mask is facing outwards.	4.65	.89	Always	Very Good
1	I wear a mask when I have a fever, cough, or runny nose.	4.64	.82	Always	Very Good
5	I choose the appropriate size of face masks for myself.	4.60	.78	Always	Very Good
4	I inspect the mask for tears and holes.	4.59	.77	Always	Very Good
14	As I remove the used mask, I lean forward, and pull the mask away from my face.	4.57	.85	Always	Very Good
13	I remove the elastic bands, string, or straps of the mask behind my head or ears, without touching the front part of the mask.	4.43	1.07	Most of the time	Good

16	I wrap my used mask in tissue and throw it away in an open trash can.	3.72	1.49	Most of the time	Good
Overall Practices		4.68	.34	Always	Very Good

Legend: 4.50-5.00 always (**very good**), 3.50-4.49 most of the time (**good**), 2.50-3.49 sometimes (**satisfactory**), 1.50-2.49 rarely (**poor**), 1.00-1.49 never (**very poor**)

Relationship of Knowledge and Practices

Table 5 shows that there is a weak ($r = .150$) positive correlation ($p = <0.03$) between knowledge and practice. The data imply that as knowledge increases, the extent of practice in the use of masks among respondents also increases. Hence, the null hypothesis that there is no significant relationship between knowledge and practices is rejected.

Table 5. Relationship Between Knowledge and Practices on the Use of Mask

Variable	Components	Practice
Knowledge	Spearman's rho	.150**
	p-value	0.03
	N	201
	Verbal Interpretation	Significant

** significant at the 0.05 level

Relationship between Attitude and Practices

Table 6 shows that there is no significant relationship between attitude and practices in the use of masks by the respondents ($p = .371$). The findings show that attitudes toward the use of face masks have a positive correlation with practices on the use of masks, which means that having a greater positive attitude toward the use of masks does not always result in a very good practice of the respondents towards the use of masks. The result of the study accepted the null hypothesis which indicates that there is no significant relationship between attitude and the practices in the use of masks among the respondents.

Table 6. Relationship Between Attitude and Practices on the Use of Mask

Variable	Components	Practices
Attitude	Spearman's rho	.063**
	p-value	.371
	N	201
	Verbal Interpretation	Not Significant

**Correlation is significant at the 0.05 level (2-tailed)

Difference in the Practices on the Use of Mask of the Respondents Considering Age

In table 7, the Mann Whitney test revealed that there is no significant difference in the practice of use of masks between 18-35 (*Median* = 108.43) and 36-65 (*Median* = 93.93), $U = 9674$, $p = 0.76$. Thus, the null hypothesis which stated that there was no significant difference in the practice of the use of masks between 18-35 and 36-65 is accepted.

Table 7. Differences in Practices on the Use of Mask According to Age

	Age	N	Mean Rank	Mann-Whitney U	z	p-value	Interpretation
Practice	18-35	98	108.43	9674	-1.78	.076	Not Significant
	36-65	103	93.93				
	Total	201					

level of significance = 0.05

Difference in the Practices on the Use of Mask of the Respondents Considering Sex

In table 8, the Mann Whitney test revealed that there is no significant difference in the practice on the use of masks between male (*Median* = 96.54) and female (*Median* = 104.07), $U = 7916$, $p = 0.363$. Thus, the null hypothesis which stated that there was no significant difference between male and female respondents in their practice on the use of masks, is accepted.

Table 8. *Differences in Practices on the Use of Mask According to Sex*

	Gender	N	Mean Rank	Mann-Whitney U	z	p-value	Interpretation
Practice	Male	82	96.54	7916	-.910	.363	Not Significant

level of significance = 0.05

Difference in the Practices on the Use of Mask of the Respondents Considering Educational Attainment

The Kruskal Wallis test revealed in Table 9 that there is a significant difference in educational attainment in terms of their practice in the use of mask [$H(3) = 22.79$, $p = 0.001$], with a mean rank of 108.91 for elementary, *Median* = 117.73 for high school, *Median* = 104.29 for vocational, *Median* = 81.96 for College and *Median* = 63.35 for postgraduate. High school graduates make up the majority of those who wear masks. Thus, the null hypothesis is rejected. To determine the specific difference across five groups, Table 10 shows a post hoc analysis was conducted. Dunn's pairwise tests were used to compare two groups. There was strong evidence that there was a significant difference in the practice of the use of masks among respondents with postgraduate and high school degrees ($p < 0.001$, adjusted using the Bonferroni correction) and between respondents who have college and high school degrees ($p < 0.007$, adjusted using the Bonferroni correction). The median practice on the use of masks for the group with a college degree is 81.96, and for the group with a postgraduate degree is 63.35, compared to respondents with a high school degree, it is 117.73. This means that those who have high school degrees are frequently better at practicing the use of masks compared to respondents with college and postgraduate degrees.

Table 9. *Differences in Practices on the Use of Mask According to Educational Attainment*

	Educational Attainment	N	Mean Rank	H	p-value	Interpretation
Practice	Elementary	27	108.91	22.79	.001	Significant
	High School	88	117.73			
	Vocational	17	104.29			
	College	46	81.96			
	Postgraduate	23	63.35			
	Total	201				

Table 10. *Dunn-Bonferroni Post Hoc Analysis of Educational Attainment*

Sample 1 – Sample 2	Sig.	Adj. Sig.	Interpretation
Postgraduate – College	.206	1.000	Not Significant
Postgraduate – Vocational	.026	.264	Not Significant
Postgraduate – Elementary	.005	.054	Not Significant
Postgraduate – High School	.000	.001	Significant
College – Vocational	.172	1.000	Not Significant
College – Elementary	.054	.539	Not Significant
College – High School	.001	.007	Significant
Vocational – Elementary	.796	1.000	Not Significant
Vocational – High School	.379	1.000	Not Significant
Elementary – High School	.487	1.000	Not Significant

Discussion

Face masks are one tool used to stop the spread of disease and must be used properly. The researchers found that the result of the knowledge of the respondents in this study was relatively high. This study's findings are similar to the findings of Duong et al. (2021), Tadesse et al. (2021), and Abdel Wahed et al. (2020), showing that their research respondents had a high level of knowledge. In contrast, a study in Uganda found that most of its respondents had adequate knowledge about the usage of face masks to minimize the spread of COVID-19 (Sikakulya et al., 2021). According to the study by Driver et al. (2021), wearing a washable cloth face mask significantly reduced exercise time, maximal oxygen consumption, respiratory rate, maximal heart rate, and increased shortness of breath. However, in the study by Shaw et al. (2020), wearing a disposable or washable face mask while aggressively exercising had no negative impact on performance. In healthy, active persons, using a face mask during intense exercise has no impact on arterial or muscle oxygen levels, and it has no effect on exercise performance.

The implementation of a global face mask-wearing rule could lead to a severe scarcity of face masks. While cloth face coverings may not be as effective as surgical masks or respirators, they do offer some protection (Bhattacharjee et al., 2020). Nonetheless, anything is better than nothing, thus they may be used temporarily in closed, congested indoor and outdoor public venues during extremely contagious viral pandemics such as COVID-19. As a result, individuals must be informed that using a cloth face mask, in addition to hand washing, social distancing, respiratory etiquette, and not touching their nose, face, or mask without first cleaning their hands, is a good way to protect themselves from infection. (Sharma et al., 2020). The result of this study implies that the respondents have a high level of knowledge on how to use face masks. It appears that having a high level of knowledge aids in limiting the spread of the virus.

Many studies have suggested that healthy people wearing masks in public could be protective against COVID-19, especially when asymptomatic people are involved in the transmission (Feng, 2020). According to WHO recommendations, wearing masks during the COVID-19 pandemic is beneficial in reducing virus transmission by limiting the user from infecting others. The result of this is similar to the study of Ho (2012) and Linden et al. (2020), which found that people wear masks as a precaution to keep others from becoming infected rather than themselves. As shown by other studies, people are more willing to wear a face mask if they believe it will provide them with some level of protection (Sikakulya, 2021 & Zhang, 2021).

Face masks used incorrectly have the potential to transmit rather than prevent respiratory infections. To get the desired effect, a face mask should be applied properly. Similar to the result of the study in India, only 32.4% of the respondents were aware that a surgical mask can be worn for up to 8 hours. In contrast to the study of Kumar and colleagues (2020), 75.6% knew that a face mask can be worn for up to 8 hours. Apart from these, breathing difficulties were the most common issue participants encountered while wearing the mask (Chughtai, 2019 & E, V. et al., 2022). The result implies that the

respondents have a positive attitude toward the use of face masks. It seems that having a positive attitude toward using a face mask is directly associated with spreading the infection.

Many studies have enumerated specific points in relation to the practice of wearing and removing masks and its main function to prevent respiratory infections. It is vital to cover the nose, mouth, and chin to make its function effective. People with respiratory problems frequently have harmful microorganisms in their respiratory droplets, which can be deadly if disseminated. If people do not wear a face mask that covers both their mouth and nose, respiratory illnesses are more likely to spread. (Lee et al., 2020). In addition, the study also discusses five different situations in which people practice wearing masks in areas concerning other people. The first situation involves caring for sick family members who have fevers; the second involves caring for a family member who has a respiratory infection; the third and fourth involve visiting clinics or hospitals during the influenza outbreak; and the fifth involves experiencing respiratory problems themselves. In the first four situations, people primarily wear masks to protect themselves, while in the fifth situation, they use masks to protect others. Overall, the study as well as an article by Asri et al. (2021) suggest that the practice of wearing a mask around other individuals protects both the wearer and the people around them.

In support of item 18, "I immediately replace my used mask once it gets wet or dirty," a separate study by Lee et al. (2021) discusses prolonged use and practices of reusing facemasks and its effects on health. When a person wears a face mask for an extended period, secretions from their nose and mouth coat the inside surface. This moist coating eventually becomes a breeding place for microorganisms, contaminating the mask, thus leading to an increased health risk for users and providing a route for microorganisms to spread to other persons around them. The study suggests that once a mask becomes contaminated, it should be replaced or decontaminated before use to lessen the spread of infections. The result implies that the respondents have very good practices in applying, wearing, and removing face masks.

Higher knowledge scores were significantly associated with an increased probability of maintaining a positive attitude and good practices during the pandemic (Adesegun et al., 2020). The findings of good practices among individuals with good information clearly support the idea that providing information regarding COVID-19 will educate people with the knowledge to adopt good practices, thereby limiting the disease's spread. The proper practice of wearing face masks is significantly associated with educational status, police rank, and knowledge about face masks (Tadesse et al., 2020). A study conducted among healthcare professionals in Greece yielded similar results to this one. The knowledge score was significantly related to both the attitude score and the practice score, implying that the respondents to the study with a high level of knowledge had a more positive attitude towards preventive measures and would utilize them more often. (Papagiannis et al., 2020). In the study by Kumar et al. (2020) about healthcare workers in Pakistan, they showed a positive attitude but a moderate-to-poor level of knowledge and practice regarding face masks. The result implies that there is a positive relationship between knowledge and practices regarding the use of face masks. It demonstrates that as one's knowledge of mask use increases, so does one's ability to practice using masks properly.

According to Albarrak and colleagues (2021), the result of the relationship between attitude and practice on the use of masks is concerning, as it shows that poor practice might lead to the spread of the infection in the community and may increase the death rate and morbidity regardless of having a high positive attitude towards the use of masks. In this study, the respondents' relationship between attitudes and practices regarding the use of masks was significant. A study in Ethiopia conducted by Minyiwab & Shibesh (2021) also revealed that having a positive attitude has been significantly associated in practice with the use of face masks towards the prevention of COVID-19. The result implies that the components of the attitude toward the use of face masks were suitable for the respondents, which resulted in a very good practice among the community. Additionally, in the Social Learning Theory, it is discussed that attitude significantly impacts one's action. However, the result of our study shows that there is no significant relationship between attitude and practices regarding the

use of masks. Furthermore, a positive attitude towards the usage of face masks does not necessarily result in good practice.

This study showed that practices regarding the use of masks and age have no significant difference. The result is supported by Adesegun et al. (2020) where the practices on the use of masks had no significant difference across age, gender, occupation, and level of education. This study confirms the results of the study by Lee et al. (2020), which found that younger adults were more likely to have good practice in the use of masks than older adults. However, the aforementioned data contrasts with a Japanese study done by Wada et al. (2012), which found that elderly persons use masks more than younger age groups. The results showed that the demographic profile of the respondents in terms of age did not have an effect on the practices surrounding the use of masks. Considering age, the total number of respondents may have influenced the difference in practice. The result of the study is similar to the studies conducted by Guzek et al. (2020), Howard (2021), and Lee et al. (2020), which revealed that there was no statistically significant difference in the practice of using a mask when sex is considered. Thus, the result also showed that females wore masks correctly. The study by Cohen et al. (2021), Ganczak et al. (2021), and Siahaan et al. (2021), also showed that females tend to wear masks more properly and correctly compared to males.

The result of the study implies that sex did not have an effect on the practices surrounding the use of masks. The total number of respondents, as well as the distribution of males and females, are not equal, which may have influenced the study's findings. The result of the study is congruent with the studies done by Barcelo & Sheen (2020) and Wong et al. (2020), which found a significant relationship between the respondents' practices regarding the use of masks and their educational attainment. As studied by Islam and colleagues (2021), respondents with a higher level of education (secondary level), who are unmarried, and who have a high salary are more aware of the preventative measures of COVID-19. The implication of this result shows that an increase in education decreases the spread of infection, precisely because of the use of social media, which is used as a source to gather information about infectious diseases and their ways of prevention. In contrast to a study conducted in Saudi Arabia, which found a significant relationship between the practice and educational attainment of respondents, the results revealed that the postgraduate group is the highest group that uses face masks (Al-Hanawi et al., 2020).

The result of the present study implies that educational attainment affects the practices surrounding the use of face masks among adults in the community. The total number of respondents, as well as the distribution within each group, are not equal, which may have influenced the study's findings. However, health education may suggest improving practices on the use of masks at different levels of education.

Health Education Program on the Proper Use of Masks

According to the CDC, wearing a face mask helps protect oneself and others from getting infected by the virus. In light of the pandemic, WHO recommends wearing masks as part of the new normal while being around people. Additionally, to make masks as effective as possible, they must be used, stored, cleaned, and disposed of properly. According to them, wearing a face mask is integrated with cleaning the hands when wearing and removing it. These are the basic step of wearing a disposable face mask: Make sure to wash hands or use hand sanitizer.

Inspect face masks for damages (e.g., tears, holes) and cleanliness. Do not wear it if damaged or dirty. Check which side is top: usually the one with the metal strip.

Inspect which is the inside of the mask which is typically the white side.

Place the mask on your face covering your nose, chin, and mouth.

Make sure that there are no gaps between your face and mask.

Pinch the metal so that it molds in the nose.

Wear a Mask to Protect Yourself and Others

Wear a mask correctly for maximum protection.

Masks are not reusable and must be thrown away after one use.

Masks can only be worn for a maximum of 8 hours.

Avoid touching your face mask, and if you do, disinfect your hands by washing them or using hand sanitizer.

Do not wear a mask around the neck, on the forehead, and under the nose.

Always throw a used face mask in a closed bin. If the bin is open, wrap the mask in tissue before throwing.

Avoid wearing masks during intense physical activity. As a result, breathing could become difficult. Also, accumulation of sweat can make the mask wet, promoting the buildup of microorganisms.

Limitations and Implication

This study has certain limitations. The study was conducted in a selected barangay in Silang, Cavite, where 201 respondents participated in answering the survey questionnaire, which may not be a good representation of all the residents in the barangay. Additionally, considering the pandemic and increasing numbers of COVID-19 infections, no validated questionnaire was developed to assess the knowledge, attitude, and practices regarding the use of masks among adults in the community. We did, however, create our own questionnaire based on the CDC and WHO guidelines. Despite its limitations, this study provided insights about the knowledge, attitude, and practice of adults in the community regarding the use of face masks.

Conclusion

The purpose of this study was to investigate the relationship between knowledge, attitude, and practices regarding the use of masks among adults in a selected barangay in Silang, Cavite. It was found that the respondents have high knowledge, a positive attitude, and very good practice using masks. Further, the results revealed that there is a significant relationship between knowledge and practices; however, attitudes and practices show no significant relationship. Moreover, the result of the study indicates that there is no significant relationship between practices considering gender and sex among adults in the community, although the result of this study shows that there is a significant relationship between practices considering educational attainment. Thus, although the study showed good results, a health education program is still recommended to enhance their knowledge, attitude, and practices regarding the use of face masks. For future research, the researchers recommend conducting a similar study in various other community locations with larger populations to be able to observe a well-balanced representation of the community people regarding the knowledge, attitudes, and practices surrounding the use of masks.

References

- [1] Abdel Wahed, W. Y., Hefzy, E. M., Ahmed, M. I., & Hamed, N. S. (2020). Assessment of knowledge, attitudes, and perception of health care workers regarding covid-19, a cross-sectional study from Egypt. *Journal of Community Health*, 45(6), 1242–1251. <https://doi.org/10.1007/s10900-020-00882-0>
- [2] Adesegun, O. A., Binuyo, T., Adeyemi, O., Ehioghae, O., Rabor, D. F., Amusan, O., Akinboboye, O., Duke, O. F., Olafimihan, A. G., Ajose, O., Idowu, A. O., & Abiodun, O. (2020). The COVID-19 crisis in Sub-Saharan Africa: Knowledge, attitudes, and practices of the nigerian public. *The American Journal of Tropical Medicine and Hygiene*, 103(5), 1997–2004. <https://doi.org/10.4269/ajtmh.20-0461>
- [3] Ajzen, I., & Fishbein, M. (1977). Attitude-behavior relations: A theoretical analysis and review of empirical research. *Psychological Bulletin*, 84(5), 888–918. <https://doi.org/10.1037/0033-2909.84.5.888>

- [4] Al-Hanawi, M. K., Angawi, K., Alshareef, N., Qattan, A. M., Helmy, H. Z., Abudawood, Y., Alqurashi, M., Kattan, W. M., Kadasah, N. A., Chirwa, G. C., & Alsharqi, O. (2020). Knowledge, attitude and practice toward covid-19 among the public in the Kingdom of Saudi Arabia: A cross-sectional study. *Frontiers in Public Health*, 8. <https://doi.org/10.3389/fpubh.2020.00217>
- [5] Albarrak, A. I., Mohammed, R., Al Elayan, A., Al Fawaz, F., Al Masry, M., Al Shammari, M., & Miaygil, S. B. (2019). Middle East respiratory syndrome (MERS): Comparing the knowledge, attitude and practices of different health care workers. *Journal of Infection and Public Health*, 14(1), 89–96. <https://doi.org/10.1016/j.jiph.2019.06.029>
- [6] Asri, A., Asri, V., Renerte, B., Föllmi-Heusi, F., Leuppi, J. D., Muser, J., Nüesch, R., Schuler, D., & Fischbacher, U. (2021). Wearing a mask—for yourself or for others? behavioral correlates of mask wearing among COVID-19 frontline workers. *PLOS ONE*, 16(7). <https://doi.org/10.1371/journal.pone.0253621>
- [7] Bai, N. (2020, June 26). *Still confused about masks? here's the science behind how face masks prevent coronavirus*. Still Confused About Masks? Here's the Science Behind How Face Masks Prevent Coronavirus | UC San Francisco. Retrieved October 12, 2020, from <https://www.ucsf.edu/news/2020/06/417906/still-confused-about-masks-heres-science-behind-how-face-masks-prevent>
- [8] Barceló, J., & Sheen, G. C.-H. (2020). Voluntary adoption of social welfare-enhancing behavior: Mask-wearing in Spain during the COVID-19 Outbreak. *PLOS ONE*, 15(12). <https://doi.org/10.1371/journal.pone.0242764>
- [9] Bhattacharjee, S., Bahl, P., Chughtai, A. A., & MacIntyre, C. R. (2020). Last-resort strategies during mask shortages: Optimal design features of cloth masks and decontamination of disposable masks during the COVID-19 pandemic. *BMJ Open Respiratory Research*, 7(1). <https://doi.org/10.1136/bmjresp-2020-000698>
- [10] Cherry, K. (2019, October 10). *What is a cross-sectional study?* Verywell Mind. Retrieved October 12, 2020, from <https://www.verywellmind.com/what-is-a-cross-sectional-study-2794978>
- [11] Chughtai, A. A., Stelzer-Braid, S., Rawlinson, W., Pontivivo, G., Wang, Q., Pan, Y., Zhang, D., Zhang, Y., Li, L., & MacIntyre, C. R. (2019). Contamination by respiratory viruses on outer surface of medical masks used by hospital healthcare workers. *BMC Infectious Diseases*, 19(1). <https://doi.org/10.1186/s12879-019-4109-x>
- [12] Cohen, D. A., Talarowski, M., Awomolo, O., Han, B., Williamson, S., & McKenzie, T. L. (2021). Systematic observation of mask adherence and distancing (SOMAD): Findings from Philadelphia. *Preventive Medicine Reports*, 23, 101449. <https://doi.org/10.1016/j.pmedr.2021.101449>
- [13] Crossman, A. (2020, March 19). *What you need to understand about purposive sampling*. ThoughtCo. Retrieved October 14, 2020, from <https://www.thoughtco.com/purposive-sampling-3026727>
- [14] Davies, A., Thompson, K.-A., Giri, K., Kafatos, G., Walker, J., & Bennett, A. (2013). Testing the efficacy of homemade masks: Would they protect in an influenza pandemic? *Disaster Medicine and Public Health Preparedness*, 7(4), 413–418. <https://doi.org/10.1017/dmp.2013.43>
- [15] Driver, S., Reynolds, M., Brown, K., Vingren, J. L., Hill, D. W., Bennett, M., Gilliland, T., McShan, E., Callender, L., Reynolds, E., Borunda, N., Mosolf, J., Cates, C., & Jones, A. (2021). Effects of wearing a cloth face mask on performance, physiological and perceptual responses during a graded treadmill running exercise test. *British Journal of Sports Medicine*, 56(2), 107–113. <https://doi.org/10.1136/bjsports-2020-103758>
- [16] Duong, M. C., Nguyen, H. T., & Duong, B. T. (2021). A cross-sectional study of knowledge, attitude, and practice towards face mask use amid the COVID-19 pandemic amongst

- university students in Vietnam. *Journal of Community Health*, 46(5), 975–981.
<https://doi.org/10.1007/s10900-021-00981-6>
- [17]Feng, S., Shen, C., Xia, N., Song, W., Fan, M., & Cowling, B. J. (2020). Rational use of face masks in the COVID-19 pandemic. *The Lancet Respiratory Medicine*, 8(5), 434–436.
[https://doi.org/10.1016/s2213-2600\(20\)30134](https://doi.org/10.1016/s2213-2600(20)30134)
- [18]Ganczak, M., Pasek, O., Duda – Duma, Ł., Świstara, D., & Korzeń, M. (2021). Use of masks in public places in Poland during SARS-COV-2 epidemic: A covert observational study. *BMC Public Health*, 21(1). <https://doi.org/10.1186/s12889-021-10418-3>
- [19]Garcia, L. P., & Duarte, E. (2020). Nonpharmaceutical interventions for tackling the COVID-19 epidemic in Brazil. *Epidemiologia e Serviços De Saúde*, 29(2).
<https://doi.org/10.5123/s1679-49742020000200009>
- [20]Guzek, D., Skolmowska, D., & Głąbska, D. (2020). Analysis of gender-dependent personal protective behaviors in a national sample: Polish adolescents' covid-19 experience (place-19) study. *International Journal of Environmental Research and Public Health*, 17(16), 5770.
<https://doi.org/10.3390/ijerph17165770>
- [21]Ho, H. S. W. (2012). Use of face masks in a primary care outpatient setting in Hong Kong: Knowledge, attitudes and practices. *Public Health*, 126(12), 1001–1006.
<https://doi.org/10.1016/j.puhe.2012.09.010>
- [22]Howard, M. C. (2021). Gender, face mask perceptions, and face mask wearing: Are men being dangerous during the COVID-19 pandemic? *Personality and Individual Differences*, 170, 110417. <https://doi.org/10.1016/j.paid.2020.110417>
- [23]Islam, S., Emran, G. I., Rahman, E., Banik, R., Sikder, T., Smith, L., & Hossain, S. (2021). Knowledge, attitudes and practices associated with the COVID-19 among slum dwellers resided in Dhaka City: A Bangladeshi interview-based survey. *Journal of Public Health*, 43(1), 13–25. <https://doi.org/10.1093/pubmed/fdaa182>
- [24]Kumar, J., Katto, M. S., Siddiqui, A., Sahito, B., Jamil, M., Rasheed, N., & Ali, M. (2020). Knowledge, attitude, and practices of healthcare workers regarding the use of face mask to limit the spread of the new coronavirus disease (covid-19). *Cureus*.
<https://doi.org/10.7759/cureus.7737>
- [25]Larson, J. (2021, November 22). *Coronavirus transmission: How does the 2019 coronavirus spread?* Healthline. Retrieved February 14, 2022, from
<https://www.healthline.com/health/coronavirus-transmission>
- [26]Lauer, S. A., Grantz, K. H., Bi, Q., Jones, F. K., Zheng, Q., Meredith, H. R., Azman, A. S., Reich, N. G., & Lessler, J. (2020). The incubation period of Coronavirus Disease 2019 (COVID-19) from publicly reported confirmed cases: Estimation and application. *Annals of Internal Medicine*, 172(9), 577–582. <https://doi.org/10.7326/m20-0504>
- [27]Lee, L. Y.-king, Chan, I. C.-wing, Wong, O. P.-man, Ng, Y. H.-ying, Ng, C. K.-ying, Chan, M. H.-wa, Ng, J. K.-chun, Koo, H. H.-tung, Lam, S.-ting, Chu, A. C.-wai, Wong, R. Y.-shan, Leung, H. P.-ying, & Pun, A. L.-ching. (2021). Reuse of face masks among adults in Hong Kong during the COVID-19 pandemic. *BMC Public Health*, 21(1). <https://doi.org/10.1186/s12889-021-11346-y>
- [28]Lee, L. Y.-king, Lam, E. P.-wah, Chan, C.-kiu, Chan, S.-yi, Chiu, M.-ki, Chong, W.-hei, Chu, K.-wai, Hon, M.-sze, Kwan, L.-ki, Tsang, K.-lam, Tsoi, S.-lai, & Wu, C.-wai. (2020). Practice and technique of using face mask amongst adults in the community: A cross-sectional descriptive study. *BMC Public Health*, 20(1). <https://doi.org/10.1186/s12889-020-09087-5>
- [29]Levin, K. A. (2006). Study design III: Cross-sectional studies. *Evidence-Based Dentistry*, 7(1), 24–25. <https://doi.org/10.1038/sj.ebd.6400375>
- [30]MacIntyre, C. R., & Chughtai, A. A. (2020). A rapid systematic review of the efficacy of face masks and respirators against coronaviruses and other respiratory transmissible viruses for the community, healthcare workers and sick patients. *International Journal of Nursing Studies*, 108, 103629. <https://doi.org/10.1016/j.ijnurstu.2020.103629>

- [31]MacIntyre, C. R., Chughtai, A. A., Rahman, B., Peng, Y., Zhang, Y., Seale, H., Wang, X., & Wang, Q. (2017). The efficacy of medical masks and respirators against respiratory infection in healthcare workers. *Influenza and Other Respiratory Viruses*, 11(6), 511–517. <https://doi.org/10.1111/irv.12474>
- [32]Minyiwab, G. W., & Shibesh, B. F. (2021). Communitys Mask Wearing Practice and Its Associated Factors for COVID-19 prevention in Metropolitan city, Northwest, Ethiopia, 11(7). Retrieved from <https://www.iomcworld.org/open-access/communitys-mask-wearing-practice-and-its-associated-factors-for-covid19-prevention-in-metropolitan-city-northwest-ethiopia-82460.html>.
- [33]Papagiannis, D., Malli, F., Raptis, D. G., Papathanasiou, I. V., Fradelos, E. C., Daniil, Z., Rachiotis, G., & Gourgoulialis, K. I. (2020). Assessment of knowledge, attitudes, and practices towards new coronavirus (SARS-COV-2) of health care professionals in Greece before the outbreak period. *International Journal of Environmental Research and Public Health*, 17(14), 4925. <https://doi.org/10.3390/ijerph17144925>
- [34]Parrocha, A. (2020, April 2). *Use of face masks now required in all areas under ECQ*. Philippine News Agency. Retrieved February 14, 2022, from <https://www.pna.gov.ph/articles/1098595>
- [35]Ravelo, J., & Jerving, S. (2020). COVID-19 — a timeline of the coronavirus outbreak. *Devex*. Retrieved 2020, from <https://www.devex.com/news/covid-19-a-timeline-of-the-coronavirus-outbreak-96396>.
- [36]Sauer, L. (2020). *What is coronavirus?* Johns Hopkins Medicine. Retrieved October 12, 2020, from <https://www.hopkinsmedicine.org/health/conditions-and-diseases/coronavirus>
- [37]Setia, M. S. (2016). Methodology series module 3: Cross-sectional studies. *Indian Journal of Dermatology*, 61(3), 261. <https://doi.org/10.4103/0019-5154.182410>
- [38]Sharma, S. K., Mishra, M., & Mudgal, S. K. (2020). Efficacy of cloth face mask in prevention of novel Coronavirus Infection Transmission: A systematic review and meta-analysis. *Journal of Education and Health Promotion*, 9(1), 192. https://doi.org/10.4103/jehp.jehp_533_20
- [39]Shaw, K., Butcher, S., Ko, J., Zello, G. A., & Chilibeck, P. D. (2020). Wearing of cloth or disposable surgical face masks has no effect on vigorous exercise performance in healthy individuals. *International Journal of Environmental Research and Public Health*, 17(21), 8110. <https://doi.org/10.3390/ijerph17218110>
- [40]Sikakulya, F. K., Ssebuufu, R., Mambo, S. B., Pius, T., Kabanyoro, A., Kamahoro, E., Mulumba, Y., Muhongya, J. K., & Kyamanywa, P. (2021). Use of face masks to limit the spread of the COVID-19 among Western Ugandans: Knowledge, attitude and practices. *PLOS ONE*, 16(3). <https://doi.org/10.1371/journal.pone.0248706>
- [41]Stewart, K., Connelly, D., & Robinson, J. (2021). Everything you should know about the coronavirus pandemic. *Pharmaceutical Journal*. <https://doi.org/10.1211/pj.2021.20207629>
- [42]Tadesse, A. W., Abebe, N. M., Tadesse3, S. E., Wube, M. C., & Abate, A. A. (2021). Preventive practice and associated factors towards COVID-19 among college students in Amhara Region, Ethiopia: A cross- Sectional study. *Ethiopian Journal of Health Sciences*, 31(1). <https://doi.org/10.4314/ejhs.v31i1.2>
- [43]Tadesse, T., Tesfaye, T., Alemu, T., & Haileselassie, W. (2020). Healthcare Worker's Knowledge, Attitude, and Practice of Proper Face Mask Utilization, and Associated Factors in Police Health Facilities of Addis Ababa, Ethiopia. *Journal of Multidisciplinary Healthcare, Volume 13*, 1203–1213. <https://doi.org/10.2147/jmdh.s277133>
- [44]Trochim, P. W. M. K. (2020). *Descriptive statistics*. Research Methods Knowledge Base. Retrieved October 14, 2020, from <https://conjointly.com/kb/descriptive-statistics/>
- [45]Wada, K., Oka-Ezoe, K., & Smith, D. R. (2012). Wearing face masks in public during the influenza season may reflect other positive hygiene practices in Japan. *BMC Public Health*, 12(1). <https://doi.org/10.1186/1471-2458-12-1065>

- [46]Wong, C. L., Chen, J., Chow, K. M., Law, B. M. H., Chan, D. N. S., So, W. K. W., Leung, A. W. Y., & Chan, C. W. H. (2020). Knowledge, attitudes and practices towards covid-19 amongst ethnic minorities in Hong Kong. *International Journal of Environmental Research and Public Health*, 17(21), 7878. <https://doi.org/10.3390/ijerph17217878>
- [47]World Health Organization. (2020). *Advice for the public on covid-19*. World Health Organization. Retrieved October 2020, from <https://www.who.int/emergencies/diseases/novel-coronavirus-2019/advice-for-public>
- [48]World Health Organization. (2020). *Listings of who's response to covid-19*. World Health Organization. Retrieved September 14, 2020, from <https://www.who.int/news-room/detail/29-06-2020-covidtimeline>
- [49]Zhang, B., Li, Z., & Jiang, L. (2021). The intentions to wear face masks and the differences in preventive behaviors between urban and rural areas during COVID-19: An analysis based on the technology acceptance model. *International Journal of Environmental Research and Public Health*, 18(19), 9988. <https://doi.org/10.3390/ijerph18199988>

A Comparative Study of Active Lifestyle Among AIU Students and Alumni Pre and Post Health and Fitness Class

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Abstract: While research suggests that fitness university courses contribute to continued physical activity, there is limited research on the effectiveness of these courses in increasing motivation and lifetime physical activity habits of current university students and alumni. This study aims to examine the impact of a university Health and Fitness (HF) course on the motivation and levels of physical activity of AIU students and alumni. Participants included 77 university students (N = 33) and alumni (N = 44) who enrolled in the Health and Fitness course at AIU. Quantitative data was collected from the Behavioral Regulation in Exercise Questionnaire, Weekly Leisure Time Exercise Questionnaire, and Physical Activity Stages of Change Questionnaire. An ANOVA, descriptive, and paired sample t-test analysis indicated that there was a significant difference in the exercise intensity and motivation of AIU students and alumni before and after the Health and Fitness course ($P = .550$). Through physical education courses, students will gain knowledge about health and fitness as well as improve their motivation, attitudes, and behaviors towards physical activity during the semester of course enrolment and beyond.

Keywords: *physical activity, health and fitness, motivation, university, alumni*

Introduction

According to research, the level of physical activity (PA) among adolescents declines as they enter young adulthood (Tracy, 2015). The reason behind this is that young adults must juggle their way to adulthood. They have multiple responsibilities such as school, work, and family which contribute to the decline of PA (Tracy, 2015). A college is a place that offers opportunities for students to develop their PA behaviors. Besides, when students develop their behaviors during their college years, they can maintain the same behavior relating to PA in their adulthood. There is a long-term impact on an active lifestyle when PA is being maintained (Keating et al., 2005, as cited in Tracy, 2015).

Colleges and universities around the globe offer health and wellness courses in hopes of influencing students to maintain or improve their health (Tracy, 2015). In smaller institutions, it is frequently a requirement. At Asia-Pacific International University (AIU), Health and Fitness is a course that is required for each student to take. It is considered a general education course, which means that all AIU students must take this course to graduate. Health and Fitness course is designed to incorporate in-class lectures and out-of-class PA. The goal is to combine theory and practice to influence students to adopt a healthy lifestyle their whole life and not just during the span of the course.

Everyone has a unique and different outlook on PA and overall health. To recognize these outlooks, it is imperative to understand the factors that motivate them. There are two forms of motivation: intrinsic and extrinsic. Extrinsic motivation is when we are motivated to perform a behavior because we want to earn a reward or avoid any form of punishment. On the other hand, intrinsic motivation is when we perform a behavior because we find it rewarding (Cherry, 2020). Researchers have discovered that each type of motivation has a different effect on a person's behavior and pursuit of goals. According to Cherry (2020), "both extrinsic and intrinsic motivation plays a significant role in learning" (para. 17). Physical activity is motivated by both extrinsic and intrinsic motivation, and it is determined by an individual's attraction to the type of activity (Little et al., 2017).

A study that was focused on intrinsic motivation and exercise adherence claimed that individuals were more likely to stay motivated in an exercise class if there was a higher level of enjoyment and competence (intrinsic motivation) compared to individuals who were motivated based

on body image and good results at the end of the class (extrinsic motivation). Ultimately, the behavior based on extrinsic motivation did not last (Little et al., 2017).

Theoretical Framework

In this study, the first theory applied is the Self-Determination Theory (SDT). This theory discovers the causes and consequences of self-determined behaviors, that is, how people act and comply out of interest with their activities (Zanetti, 2017). According to Deci and Ryan (1985), SDT suggests that meeting an individual's basic physiological needs (BPN) can lead to an increase in well-being sensations. In the context of physical activity (PA) among college students, SDT takes into account the motivation, mediation, and environment provided by the teacher. According to Ryan and Deci (2000), Self-Determination Theory consists of intrinsic motivation and several forms of extrinsic motivation. Intrinsic motivation is evident when an individual engages in an activity for the pleasure of the experience, without expecting a reward or trying to avoid punishment. Self-Determination Theory consists of five types of motivation, which are:

Intrinsic motivation (motivation to experience pleasure, expect a reward, or avoid punishment)

External regulation (motivation to obtain rewards or avoid punishment)

Introjected regulation (motivation to avoid guilt and shame or to improve the ego or pride)

Identified regulation (motivation when action is personally important)

Integrated regulation (motivation when actions have been identified, evaluated, and assimilated).

The second theory is the Transtheoretical theory, specifically the stages of change dimension which has been applied in the health field because it is used to track changes in behavior over time. This approach claims that because individuals vary in their readiness to make a change, behavior change requires both time and motivation. There are five stages through which individuals progress in order to change behavior (DiClemente, 1993). These stages are:

1. Precontemplation - there is no indication that change will be made
2. Contemplation - individuals tend to make changes within the next six months
3. Preparation - individuals plan to change their behavior within the next month
4. Action – the individual is actively engaged in the new behavior
5. Maintenance – the individual has sustained the behavior for a period exceeding six months.

The third is not a theory but a scale called the self-efficacy scale that is derived from the Transtheoretical theory. Self-efficacy is an individual's belief or knowledge of his or her own ability to accomplish a mission or a certain task (Bandura, 1982). In this case, self-efficacy is the belief that one can overcome obstacles to participate in the exercise. Bandura (1982) proposed that expectations of outcome and cognitions about self-efficacy motivate an individual to perform a certain behavior. From the precontemplation to the maintenance stage of change, self-efficacy rises dramatically. Individuals who have poor self-confidence in their ability to exercise are more likely to be inactive than those who have high self-confidence. Moreover, being physically active and adhering to physical activities have repeatedly been linked to self-efficacy.

Literature Review

An investigation on a PA program course among university students was conducted by Hill, Goldfine, Porter, and Zeong (2020). The team studied the impact of enrollment on the PA level and enjoyment level of students. For this research, Hill et al. selected students from two universities in the United States of America. For the treatment group, there were 499 students chosen from any class level who were already enrolled in a PA program such as volleyball, tennis, or aerobics. On the other hand, 180 students were part of the control group and were not presently enrolled in any PA program. They tested for the physical activity level and the enjoyment of physical activity among students. The team conducted a pre-test and post-test using the Godin-Shephard Leisure-Time Physical Activity Questionnaire and the Physical Activity Enjoyment Scale (PACES). The Godin questionnaire measures how many times an individual performed strenuous (running or jogging), moderate (fast walking or

tennis), and mild (yoga or golf) physical activity during a 7-day period for more than 15 minutes. The other instrument, PACES, was used to examine the impact and enjoyment of an exercise program.

At the beginning of the semester, all participating (both treatment and control groups) students received the pre-test. After the PA program ended, the post-test was sent out to the same participants. The results were analyzed and the team learned that there was no difference in physical activity level and PACE scores during the pre-test between the treatment and control groups. This is because the PA class had just begun, and the students hadn't learned anything yet. However, there was a significant increase in the PA level in the treatment group than in the control group in the post-test. The study participants in the treatment group displayed higher levels of physical activity enjoyment than the participants in the control group at the post-test. They discovered that enrollment in PA programs had a great impact on students who initially reported a low enjoyment level for PA. Regardless of the setting or class schedule, the treatment groups in both universities experienced a significant increase in PA level and enjoyment at the post-test (Hill et al., 2020).

Beck and Diehr (2017) studied the effects of teaching fitness in an autonomy-supportive style among college students. At a Midwestern university, 130 undergraduate college students who were enrolled in a PA course agreed to participate in a research study. The study conducted an intervention that was an autonomy-supportive motivational style of teaching PA, as compared to the traditional style of simply providing information through lectures. Several questionnaires were distributed among the participants to measure their current PA level (via the Physical Activity Vital Sign), perceived competence (Perceived Competence Scale), motivation (Treatment Self-Regulation Questionnaire), and teaching environment (Health Care Climate Questionnaire). The results determined that students' perceptions of autonomous motivation and controlled motivation increased from pre-test to post-test. There was no significant difference between the two types of teaching in terms of motivation. Overall, the results suggest that the students were motivated to partake in exercise, even if it wasn't intrinsically based. The participants of this study were moving positively along the continuum of motivation, which suggests that motivation for exercise might persist for some years among the 130 students.

Williams, Greene, Fry, Neuberger, and Satinsky (2018) did a study on the effects of conceptually based physical education (CPE) compared to the traditional activity-and-skills-based physical education (ASPE). The CPE was a required wellness course while ASPE was an elective aerobic fitness course. In a Midwestern university, two groups were formed, and students were selected to participate in the intervention. Intervention group one had 27 participants who participated in a CPE course that consisted of a lecture class and a laboratory exercise activity. Contrastingly, intervention group two had 29 participants who participated in only an ASPE activity course which was an elective aerobics class. Each student was measured based on their cardiorespiratory endurance, muscular endurance, body composition, and flexibility. A fitness pre-test at the beginning and a post-test at the end of the semester were completed for each course.

Intervention 1 enrolled in a course that compromised a 14-week lecture and a 10-week lab focusing on aerobic fitness. The lectures followed a fitness-and health-based curriculum including behavioral change, nutrition, body composition, weight management, and others (Williams et al., 2018). For the lab section, aerobic fitness was chosen as the main topic. Alternatively, intervention group 2 followed an ASPE course that focused on aerobic fitness. Pre-test and post-test questionnaires were administered for both intervention groups.

A close examination of the difference in the health-related fitness curriculum revealed that intervention group 1 experienced greater improvements in muscular endurance and body composition, whereas intervention group 2 saw a greater improvement in cardiorespiratory endurance and flexibility. According to the collected data, each group of students experienced gains in their fitness levels. Both groups in this study experienced significant gains, regardless of the group they joined. However, no data supported the notion that the CPE program demonstrated greater positive improvements in physical fitness compared to the traditional ASPE course (Williams et al., 2018).

Another study in 2021 led by Turner, Moris, Hudson, and Koh examined the relationship between body composition, exercise participation, and perception of a PA class in college students. The study analyzed the importance of PA classes based on the personal well-being motivation and sex-specific goals of students to promote engagement. Thirty-eight college students were recruited from a university in Texas, USA. All participants attended a session at the beginning of the semester and were given a survey to complete, followed by an assessment of anthropometric variables (height, weight, and waist-to-hip ratio) and body composition. After collecting and interpreting the results, Turner et al. (2021) claimed that 57.9% of participants reported they participated in a PA class because it was a requirement by the university. Furthermore, most males (65%) and females (77%) reported personal wellbeing as their main motivation to participate in PA rather than personal achievement motivation (35% males and 23% females). All in all, the study suggests that motivation is an important determinant of the frequency that students exercise. Additionally, when evaluating males, their personal wellbeing motivation domain might be more distributed toward actual physical performance and maintenance. Contrarily, much of the personal well-being motivation in females was related to their interest in socializing and improving their mental health and relaxation. Hence, it is essential to better understand what motivates students to exercise to develop a curriculum that can engage students and motivate them to maintain an active lifestyle after the semester is over. The curriculum should cater to unique needs, goals, and personal achievement motivation that males and females may have to promote PA class engagement.

The study done by Williams et al. (2018) suggests that according to SDT, participants will be more likely to participate in exercise activities when these psychological needs are met. These studies compared two groups which are both intervention groups. However, there are not enough studies that include a control group that does not participate in any PA program. That way, the control group can be used to compare with the treatment group. Having a control group can help indicate more clearly the benefits of the study and establish causal inferences. Also, when comparing the first two studies, study one included students from all levels while study two did not. In the second study, over half of the students were freshmen, and the impact of the intervention could vary with a change in the level of education. Future studies should purposefully sample students from various educational levels to determine any possible differences (Beck & Diehr, 2017). Hill et al. (2020) emphasized that it would also appear to be important to track students during their post-college years to determine whether there are long-term benefits of enrollment in a PA course. Furthermore, most studies on PA activity among college students do not address the behavioral change that follows the PA program. Exploring the behavioral changes that continued beyond PA programs is something that is lacking in the field of research (Tracy, Taliaferro, & Kristjansson, 2017).

Additionally, it is important to further study what motivates individuals to exercise. Specifically, it is imperative to determine what factors lead to sustained adherence to exercise, ideally over a lifetime (Little et al., 2017). Although research may have already been conducted, this study aims to uncover the continued behavioural changes after individuals have participated in a fitness-type course. This research will provide vital information on the impacts of physical activity post-university and will add to the body of research regarding the relationship between physical activity programs and maintaining behaviour at universities. The goal of this study is to lessen the gap in research about the effects of a university HF course as it pertains to alumni.

Aims/Objectives

Understanding motivation and how to increase an individual's motivation towards regular and consistent PA is critical for successful university fitness courses. The primary aim of this study is to examine university students' motivations to be physically active by merging the perspectives of the self-determination theory and the transtheoretical model. The secondary aim is to examine the effects of the HF course on AIU students' levels of physical activity post HF. During this research pursuit, four key research objectives will be addressed:

To investigate the factors that impact intrinsic and extrinsic motivation in PA engagement using the Behavior Regulation in Exercise Questionnaire (BREQ) among AIU students and alumni

To examine how self-efficacy, self-determination, and stage of change might contribute to exercise motivation and behavioral frequencies

To analyze the relationship between the reasons for exercise and its reported weekly frequency among AIU students and alumni

To examine differences in self-determined motivation, physical activity competence, and physical activity behavior between students and alumni of AIU

Questions & Hypothesis

The research questions of this study and hypotheses revolve around the following:

Q1: Is there a difference in the active lifestyle among AIU students and alumni post-Health and Fitness class?

H1: There is a difference in the active lifestyle among AIU students and alumni post-Health and Fitness class.

H₀: There is no difference in the active lifestyle among AIU students and alumni post-Health and Fitness class.

Q2: Is there a significant difference in the exercise intensity of AIU students and alumni before and after Health and Fitness class?

H2: There is a significant difference in the exercise intensity of AIU students and alumni before and after Health and Fitness class.

H₀: There is no significant difference in the exercise intensity of AIU students and alumni before and after Health and Fitness class.

Q3: Is there an immediate difference between the type of motivation (intrinsic or extrinsic) before and after Health and Fitness class among AIU students and alumni?

H3: There is an immediate difference between the type of motivation (intrinsic or extrinsic) before and after Health and Fitness class among AIU students and alumni.

H₀: There is no immediate difference between the type of motivation (intrinsic or extrinsic) before and after Health and Fitness class among AIU students and alumni.

Methodology

Participants

Asia-Pacific International University is a Seventh-day Adventist institution of higher education in Muak Lek, Saraburi, Thailand. There are 931 students who are currently enrolled in AIU (Asia-Pacific International University, 2021). The registrar's office provided a list of student enrollment over the last ten years. Using a confidence level of 95%, a margin of error of 5%, and a population proportion of 90%, a sample size of 140 participants was calculated for the study. This sample size was divided into two groups of 70 each, AIU students and alumni. To ensure the sample size was met, over 800 questionnaires were sent to both current students and alumni, resulting in 77 participants who consented to participate in the study, which was approved by the Asia-Pacific International University Institutional Review Board (IRB).

Procedure

This study is an observational study that consisted of current AIU students and alumni. Once consented to participate in the study, participants were invited to answer an online questionnaire that consisted of 34 questions in Google Forms. Institutional permission was obtained to conduct the study. Due to the current COVID-19 pandemic, online surveys will be sent directly to the individuals through their email addresses that were provided by the registrar's office. Individuals had the right to decide whether they will partake in this research or not. One week after the survey is sent, a follow-up text was sent to either thank those who completed the forms or to remind those who have not yet

completed their forms. The survey questionnaires were disseminated online which required no fee. Therefore, this study did not require any budget.

Measures

Demographics

The participants self-reported their age, gender, major, and academic year. They also self-reported the semester and year they first enrolled in college, their class standing when they took the Health and Fitness (HF) class, the semester and year they completed the class, and their class standing when they took the HF class. Additionally, they indicated their lifestyle, detailing how long they maintained physical activity (PA) after the HF class. They described the most practical and beneficial thing they learned during the class and their intentions to continue exercising. There was a total of ten demographic questions.

Behavioral Regulation in Exercise Questionnaire (BREQ)

Four instruments were used in this study to assess self-reported levels of self-efficacy, motivation, stage of change, and leisure-time exercise levels. First, the Behavioral Regulation in Exercise Questionnaire (BREQ) was applied in this study. The BREQ questionnaire was utilized to assess levels of self-determination to be physically active (Mullan & Markland, 1997). This questionnaire is a fifteen-item questionnaire that measures extrinsic and intrinsic motivation behind exercising. This questionnaire is comprised of items on external, introjected, identified, and intrinsic regulation as it pertains to exercise. The participants were asked questions relating to why they engage in PA and exercise. Their responses were measured on a five-point Likert-type scale ranging from 1 (not true for me) to 5 (very true for me). The scale is comprised of five subscales measuring five types of exercise regulation. The scale consists of integrated regulation, identified regulation, introjected regulation, external regulation, and intrinsic motivation. BREQ is composed of fifteen items in total.

Godin Leisure-Time Exercise Questionnaire (Weekly Leisure Time Exercise)

The Weekly Leisure Time Exercise is a self-report measure developed by Godin and Shephard (1985). The participants will report how many times during a 7-day period one performs strenuously (running or jogging), moderate (fast walking or tennis), and mild (yoga or golf) PA for more than 15 minutes. There was a total of four questions for the Weekly Leisure Time Exercise questionnaire. The mean daily duration for each intensity category was calculated using activity frequencies and the amount of time spent in each activity was presented as times per week. To calculate the total leisure activity score, I multiplied the reported times per week and frequency per week of each activity category.

Physical Activity Stages of Change Questionnaire (PASCQ)

Finally, the Physical Activity Stages of Change Questionnaire (PASCQ) is a questionnaire that is based on the five stages of change in the transtheoretical model. The PASQ was used as a measurement to assess self-efficacy and exercise (Mullan & Markland, 1997). The PASQ is a four-item scale that is measured with two options: yes or no. This questionnaire asked participants to self-report their current exercise habits. PA or exercise includes activities such as walking briskly, jogging, bicycling, swimming, or any other activity as intense as these activities. The four items were scored and measured using the PASCQ scoring table. The responses were categorized into five stages according to the Stages of Change theory (Pre-contemplation, Contemplation, Preparation, Decision/action, and Maintenance; see Appendix).

Statistical Analysis

The first hypothesis was tested using a Paired sample t-test, which is composed of four questions from the Physical Activity Stages of Change Questionnaire (PASCQ). This instrument was used to assess the

active lifestyle of participants and whether there are any differences among AIU students and alumni post-Health and Fitness class (Mullan & Markland, 1997). The four questions are the following:

I am currently physically active.

I intend to become more physically active in the next 6 months.

I currently engage in regular physical activity.

I have been regularly physically active for the past 6 months.

The PASCQ was first computed, coded, then analyzed using the Stages of Change scale (DiClemente, 1993). The five components of the scale can be seen in Figure 1.

Figure 1. Stages of Change Scale (Scoring)

If question 1=0 and question 2=0	Pre-contemplation (Stage 1)
If question 1=0 and question 2=1	Contemplation (Stage 2)
If question 1=1 and question 3=0	Preparation (Stage 3)
If question 1=1 and question 3=1, and question 4=0	Decision/Action (Stage 4)
If question 1=1 and question 3=1, and question 4=1	Maintenance (Stage 5)

Note. Pre-contemplation, Contemplation, Preparation, Decision/action, and Maintenance are the five Stages of Change.

To test the second hypothesis, the differences in the exercise intensity over a week before and after the Health and Fitness class among AIU students and alumni were assessed. The Weekly Leisure Time Exercise questionnaire was provided and the paired sample t-test was used to analyze the results (Godin & Shephard, 1985). Participants were asked about their weekly participation in strenuous, moderate, and mild exercise. The questionnaire consisted of four questions:

Strenuous Exercise (Heart beats rapidly) e.g., running, jogging, football, soccer, basketball, vigorous long-distance bicycling

Moderate Exercise (Not Exhausting) e.g., fast walking, baseball, tennis, easy bicycling, volleyball, badminton, easy swimming, popular dancing

Mild Exercise (Minimal Effort) e.g., yoga, archery, fishing, bowling, golf, horseshoes, easy walking

The results were calculated with the Weekly leisure activity score, which was obtained by:

Weekly leisure activity score = (9 x Strenuous) + (5 x Moderate) + (3 x Light)

The total score for each subject was then coded and interpreted using the Godin Scale Score, as seen in Figure 2 (Godin & Shephard, 1985). Responses were coded by using three numbers: 1.0 for Active (24 units or more), 2.0 for Moderately Active (14-23 units), and 3.0 for Insufficiently Active/Sedentary (less than 14 units).

Figure 2. Godin Scale Score

Godin Scale Score	Interpretation
24 units or more	Active
14 -23 units	Moderately Active
Less than 14 unite	Insufficiently Active/Sedentary

Note. Active, Moderately Active, and Insufficiently Active/Sedentary are the three components of the Godin Scale Score.

Finally, the third hypothesis was tested using a Paired sample t-test, which is composed of fifteen questions from the Behavioral Regulation in Exercise Questionnaire (BREQ). Their responses were measured on a five-point Likert-type scale ranging from 1 (not true for me) to 5 (very true for me). The set of questions was used to assess the differences in the type of motivation (extrinsic or intrinsic) before and after the Health and Fitness class among AIU students and alumni. Some of the questions included the following:

Before Health and Fitness, I feel guilty when I don't exercise.

After Health and Fitness, I take part in exercise because my friends/family/spouse say I should.

Before Health and Fitness, it was important to me to exercise regularly.

Results

Table 1 shows that there are 44 female respondents (57.1%) and 33 male respondents (42.9%). In total, there were 77 respondents in this study. Among the participants, there are 33 current students (42.9%) who participated in this study and 44 alumni (57.1%), as shown in Table 2. In this study, there are more alumni participants in this study than current students. This table breaks down the number of current students and alumni who participated in the study by their respective faculties. As seen in Table 3, there are 10 participants coming from arts and humanities, 20 from business administration, 20 from education, 4 from information technology (IT), 13 from religious studies, and 10 from science with a total of 77 participants.

Table 1. *Participant gender*

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Female	44	57.1	57.1	57.1
	Male	33	42.9	42.9	100.0
	Total	77	100.0	100.0	

Note. There are 44 female respondents (57.1%) and 33 male respondents (42.9%).

Table 2. *Participant status (current students and alumni)*

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Current students	33	42.9	42.9	42.9
	Alumni	44	57.1	57.1	100.0
	Total	77	100.0	100.0	

Note. There are 33 current students (42.9%) who participated in this study and 44 alumni (57.1%).

Table 3. *Major in college (current students and alumni)*

		Arts and Humanities	Business Administration	Education	IT	Religious Studies	Science	Total
Status	Current students	3	7	9	4	7	3	33
	Alumni	7	13	11	0	6	7	44
Total		10	20	20	4	13	10	77

Note. there are 10 participants coming from arts and humanities, 20 from business administration, 20 from education, 4 from information technology (IT), 13 from religious studies, and 10 from science with a total of 77 participants.

Physical Activity Stages of Change Questionnaire (PASCQ)

The ANOVA result for the stage of change among current students indicated a mean of 3.6061, which implies that current students are in between the Preparation and Action stages. Meanwhile, the result among alumni indicated a mean of 3.7955, suggesting that alumni are more towards the Action stage than the Preparation stage. The ANOVA result for the current state of exercise considering the respondent's status, whether alumni or current students, has a p-value of .550, as seen in Table 4 and Table 5.

Table 4. PASCQ Descriptive

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Current students	33	3.6061	1.39058	.24207	3.1130	4.0991	2.00	5.00
Alumni	44	3.7955	1.35680	.20455	3.3829	4.2080	1.00	5.00
Total	77	3.7143	1.36553	.15562	3.4043	4.0242	1.00	5.00

Note. Current students are between the Preparation and Action stage while alumni are leaning towards the Action stage.

Alumni	44	3.7955	1.35680	.20455	3.3829	4.2080	1.00	5.00
Total	77	3.7143	1.36553	.15562	3.4043	4.0242	1.00	5.00

Note. Current students are between the Preparation and Action stage while alumni are leaning towards the Action stage.

Table 5. PASCQ ANOVA

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.676	1	.676	.360	.550
Within Groups	141.038	75	1.881		
Total	141.714	76			

Note. The ANOVA result for the current state of exercise has a p-value of .550.

Godin Leisure-Time Exercise Questionnaire (Weekly Leisure Time Exercise)

The paired sample t-test indicated that the exercise intensity of the respondents before and after the Health and Fitness class have a p-value of <.001, suggesting that there is a significant difference between current students and alumni, as shown in Tables 6 and 7. Furthermore, the results indicate that before taking the Health and Fitness class, the respondents were in a sedentary stage/inactive stage, as demonstrated by the mean of 1.4531. Conversely, after completing the class, they were in an active stage, with a mean of 1.1406.

Table 6. Weekly Exercise - Paired Samples Statistics

	Mean	N	Std. Deviation	Std. Error Mean
Pair 1 Weekly exercise pre-HF class	1.4531	64	.71113	.08889
Weekly exercise post-HF class	1.1406	64	.43158	.05395

Note. Before enrolling in the Health and Fitness class, the respondents were in the sedentary stage/inactive (1.4531), while the rest who completed the class were in an active stage (1.1406).
October 25-26, 2022

Table 7. Weekly Exercise - Paired Samples Correlations

		N	Correlation	Significance	
				One-Sided p	Two-Sided p
Pair 1	Weekly exercise pre & post HF class	64	.565	<.001	<.001

Note. The pre and post-Health and Fitness class exercise intensity of the respondents have a p-value of <.001.

Behavioral Regulation in Exercise Questionnaire (BREQ)

The paired sample t-test indicated that the extrinsic and intrinsic motivation pre and post-Health and Fitness of the respondents have a p-value of <.001. There is a significant difference in motivation before and after taking Health and Fitness class. Thus, before enrolling in the Health and Fitness class, the respondent's extrinsic motivation mean (\bar{x} =2.1981) and intrinsic motivation mean (\bar{x} =3.4643) were significantly lower than the extrinsic motivation (\bar{x} =2.2175) and intrinsic motivation (\bar{x} =4.0584) after they have completed the class, which are shown in Tables 8 and 9.

Table 8. BREQ Paired samples statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Extrinsic motivation (Pre)	2.1981	77	.93219	.10623
	Extrinsic motivation (Post)	2.2175	77	.96344	.10979
Pair 2	Intrinsic motivation (Pre)	3.4643	77	1.15687	.13184
	Intrinsic motivation (Post)	4.0584	77	.84575	.09638

Note. Before enrolling in the Health and Fitness class, the respondent's extrinsic motivation mean (\bar{x} =2.1981) and intrinsic motivation mean (\bar{x} =3.4643) were significantly lower than the extrinsic motivation (\bar{x} =2.2175) and intrinsic motivation (\bar{x} =4.0584) after they have completed the class.

Table 9. BREQ Paired samples correlations

			Correlation	Significance	
N				One-Sided p	Two-Sided p
Pair 1	Extrinsic motivation (Pre and Post)	77	.653	<.001	<.001
Pair 2	Intrinsic motivation (Pre and Post)	77	.632	<.001	<.001

Note. The extrinsic and intrinsic motivation pre and post-Health and Fitness of the respondents have a p-value of <.001.

Discussion

The results indicated that the instruments used were effective in answering the research question and testing the hypotheses. The results from PASCQ showed that there was no significant difference in the current state of exercise between the alumni group and the current student group, which is a positive sign that alumni are still trying to stay active after leaving university. The PA levels show only minor fluctuations, indicating that alumni have consistently maintained the value of PA. This aligns with the Transtheoretical theory (stages of change) used to track changes in behavior over time. The hypothesis that there would be a difference in the active lifestyle of AIU students and alumni post-Health and Fitness class was proven to be correct. This led to the conclusion that alumni can maintain PA and exercise on a regular basis over time.

The results from the Weekly Leisure Time questionnaire showed that there is a significant difference between the level of physical activity (PA) among current students and alumni. It was found that

before enrolling in the Health and Fitness (HF) class, the respondents were inactive on a weekly basis and had less value for PA. However, after completing the class, there was a shift from inactive to active levels of PA in a week. The HF class teaches students how to incorporate and maintain regular PA in their lifestyle. The hypothesis that there would be a significant difference in the exercise intensity of AIU students and alumni before and after the HF class was proven to be correct.

Lastly, the BREQ indicated that there is a significant difference in motivation before and after taking HF class. Surprisingly, intrinsic motivation was always higher in both groups, with a mean of 3.4643 prior to the class and 4.0584 after the class. It was found that students were intrinsically motivated to exercise due to enjoyment, happiness, or pleasure, particularly after taking the class. The hypothesis that there would be an immediate difference between intrinsic and extrinsic motivation before and after the Health and Fitness class was proven to be correct. This conclusion is consistent with the findings of Turner et al. (2021) who conducted a similar study on intrinsic and extrinsic motivation among university students. The results of their study showed that 65% of male university students and 77% of female university students reported that personal well-being was their primary motivation for participating in physical activity rather than personal achievement motivation (35% for males and 23% for females).

The overall findings suggest that motivation plays a crucial role in determining how frequently students exercise. It is crucial to have a better understanding of the type of motivation in order to create an educational program that will engage students and encourage them to maintain an active lifestyle beyond their university years.

Limitations and Future Directions

There are a few limitations within the current study that should be considered. First, the study was limited to only 77 participants. The study would have given better results if there was a larger number of participants with at least 200 and above of them. Second, most email addresses that we collected were old email addresses, and the participants no longer use them. However, this is the first study to report the results of PASCQ, Weekly Leisure Time Exercise questionnaire, and BREQ in Asia-Pacific International University and possibly in the 21st century. While this study provides evidence of an active lifestyle among current students and alumni, it appears reasonable to suggest that the evidence is short on participants and requires further attention. It would be most desirable to have 300 or more responses to provide a more extensive study on this topic. Based on the present study, future research in this area may wish to determine what motivates individuals to exercise. More specifically, it is crucial to discern what factors lead to an extended adherence to exercise. Finally, it is recommended that future research replicate this study in other universities around the world to determine the accuracy of the study.

Conclusions

In summary, the purpose of this study was to provide evidence informing the exercise behaviors of current university students and alumni before and after an HF class, as well as examine the motivation behind participating in PA. The findings were made possible by a set of PA-related instruments which are PASCQ, Weekly Leisure Time Questionnaire Exercise questionnaire, and BREQ. The results of this investigation partially support the construct validity of these instruments given the observation that a stronger sense of exercise identity is associated with personal wellbeing and more frequent exercise participation across a typical week.

Hopefully, this research will be used to empower today's leaders and upcoming trailblazers who embrace the value of healthy living through consistent PA behaviors. It is expected that this study will heighten awareness about PA and its relationship to fitness courses for university students.

Research Timeline

ACTIVITY	DURATION
Sort through student enrollment in the past seven years	October 2021
Prepare the draft of survey and have experts review	November - December 2021
Surveys will be disseminated	January 2022
Send follow-up reminders to nonrespondents; process and analyze data	February 2022
First and second draft of the research paper will be written	March – April 2022
Complete research presentation and research report; present research paper and results	April - May 2022

References

- [1] Asia-Pacific International University. (2021, April 8). Quick Facts. Retrieved from <https://www.apiu.edu/quick-facts/>
- [2] Bandura, A. (1982). Self-efficacy mechanism in human agency. *American Psychologist*, 87, 122-147. <https://doi.org/10.1037/0003-066X.37.2.122>
- [3] Beck, A. M., & Diehr, A. J. (2017). The Effects of Teaching Fitness in an Autonomy-Supportive Style. *American Journal of Health Studies*, 32(4), 201–207. Retrieved from <https://www.amjhealthstudies.com/index.php/ajhs/article/view/78>
- [4] Brown, S.A. (2005). Measuring perceived benefits and perceived barriers for physical activity. *American Journal of Health Behavior*, 29(2), 107-116. DOI: 10.5993/ajhb.29.2.2
- [5] Cherry, K. (2020, January 15). Extrinsic vs. Intrinsic Motivation: What's the Difference? Retrieved from <https://www.verywellmind.com/differences-between-extrinsic-and-intrinsic-motivation-2795384>
- [6] Deci, E. L, and Ryan, R. M. (1985). Intrinsic motivation and self-determination in human behaviour. *New York: Plenum Press*. <http://dx.doi.org/10.1007/978-1-4899-2271-7>
- [7] DiClemente, C.C. (1993). Changing addictive behaviors: A processes perspective. *Current Directions in Psychological Science*, 2, 101-106. <https://doi.org/10.1111/1467-8721.ep10772571>
- [8] Godin, G., & Shepard, R.J. (1985). A simple method to assess exercise behavior in the community. *Canadian Journal of Applied Sport Sciences*, 10, 141-146. Retrieved from <https://pubmed.ncbi.nlm.nih.gov/4053261/>
- [9] Hill, G. M., Goldfine, B. D., Porter, K. J., & Zenong Yin. (2020). The Impact of Enrollment in an Instructional Physical Activity Program Course on the Physical Activity Level and Enjoyment of Physical Activity of University Students. *American Journal of Health Studies*, 33(3).

- Retrieved from <https://www.amjhealthstudies.com/index.php/ajhs/article/view/64>
- [10] Little, E., Neidert, N., Rogers, J., Matysiak, L., and Osburn, J. (2017). Exercise Motivation in College Students. Retrieved from <https://kb.gcsu.edu/thecorinthian/vol18/iss1/8>
- [11] Mullan, E., & Markland, D. (1997). Variations in self-determination across the stages of change for exercise in adults. *Motivation and Emotion*, 21, 349-362. <https://doi.org/10.1023/A:1024436423492>
- [12] Mullan, E., Markland, D., & Ingledew, D. K. (1997). A graded conceptualisation of self-determination in the regulation of exercise behaviour: Development of a measure using confirmatory factor analytic procedures. *Personality and individual differences*, 23(5), 745-752.
- [13] Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American psychologist*, 55(1), 68.
- [14] Tracy, J. F. (2015). The Impact of Choice: Exercise Motivation and Physical Activity in College Students Enrolled in Fitness for Life. Retrieved from <https://researchrepository.wvu.edu/etd/6825>
- [15] Tracy, J. F., Taliaferro, A., & Kristjansson, A. (2017). The Impact of Choice on Exercise Motivation and Physical Activity in College Students. *Building Healthy Academic Communities Journal*, 1(1), 6. <https://doi.org/10.18061/bhac.v1i1.5559>
- [16] Turner, H. A., Moris J.M., Hudson H., Koh Y (2021). The Relationship among Body Composition, Exercise Participation, and Perception towards a Lifetime Fitness Class in College Students. *Journal of Sports Research*, 8(2): 49-63. DOI: 10.18488/journal.90.2021.82.49.63
- [17] Williams, S. E., Greene, J. L., Fry, A., Neuberger, J., & Satinsky, S. (2018). A Study of Conceptually Based Physical Education in Higher Education. *Physical Educator*, 75(3), 471–497. <https://doi.org/10.18666/TPE-2018-V75-I3-7929>
- [18] Zanetti, M. C., Feltran, G. N., Polito, L. F. T., Dias, H. M., Neves, A. N., & Brandão, M. R. F. (2017). An intervention program on motivation and psychological needs in physical education. *Revista de Psicologia Del Deporte*, 26. Retrieved from https://www.researchgate.net/publication/318323498_An_intervention_program_on_motivation_and_psychological_needs_in_physical_education

APPENDIX

Consent Form

- Study Title:** The Impact of a Health and Fitness Class on Physical Activity Post Instruction for AIU Students
- Performance Site:** Asia-Pacific International University
- Investigator:** Ryan Jonathan Sitanggang, +66 802363315, ryanjonathansitanggang@gmail.com
- Purpose of the Study:** The primary purpose of this study is to examine university students' motivations to be physically active by merging the perspectives of the self-determination theory and the transtheoretical model. The secondary purpose is to examine the effects of the Health and Fitness (HF) course on AIU students' levels of physical activity.
- Subject Inclusion:** AIU students and alumni who enrolled in Health and Fitness class
- Study Procedures:** A mass Facebook Messenger text will be sent to each student and alumni to implore them to fill out the web-based surveys. Data collection will occur during the months of August and September. Follow-ups will occur in September as a reminder for those who have not filled out the survey.
- Benefits:** The subjects will receive no benefits from participation.
- Right to Refuse:** Students may choose not to participate in the study without penalty or loss of any benefit to which they might otherwise be entitled.
- Privacy:** Subjects' identity will remain confidential unless the law requires disclosure but

subjects do agree to the researcher having full disclosure to fitness records if available.

10. Signatures:

If I have any questions or concerns about this study, I may contact the investigator with the above contact information. I have read and agree to participate in the study as described above.

____ YES ____ NO

***THIS SURVEY WILL TAKE YOU NO LONGER THAN 15 MINUTES OF YOUR TIME**

Thank you so much for your time! God bless!

Demographic Information

Name: _____

Age: Male / Female

What semester and year did you first enroll in college? _____

What is your classification now? _____

Have you completed the Health and Fitness course at AIU? Yes / No

If so, what semester and year did you complete it? _____

Who was your instructor? _____

What was your class standing at that time? Freshmen / Sophomore / Junior / Senior

Since the completion of the Health and Fitness course, what influence has the class had on your physical activity levels?

Do you think the course helped prepare and influence you for a lifetime of physical activity? Yes / No

Did you make any behavior changes that continued beyond Health and Fitness course? Yes / No

What was the behavior?

How long did you maintain it?

Less than 3 months

Less than 6 months

Less than a year

Less than 1-2years

Less than 3-4 years

Less than 5-6 years

Less than 7 years

In Health and Fitness course, I learned something practical about... (select all that apply)

Exercise

Diet

Sleep

Stress

What was most beneficial about the course?

Was it your intention to keep exercising? Yes / No

Behavior Regulation in Exercise Questionnaire

The following is a list of reasons why you might choose to exercise. Respond to each statement using the scale given on the basis of how true that response is for you.

1 - not true for me

2 - hardly ever true for me

3 - somewhat true for me

4- true for me

5- very true for me

Why do you exercise?

- ___ 1. I exercise because other people say I should.
- ___ 2. I feel guilty when I don't exercise.
- ___ 3. I value the benefits of exercise.
- ___ 4. I exercise because it's fun.
- ___ 5. I take part in exercise because my friends/family/spouse say I should.
- ___ 6. I feel ashamed when I miss an exercise session.
- ___ 7. It's important to me to exercise regularly.
- ___ 8. I enjoy my exercise sessions.
- ___ 9. I exercise because others will not be pleased with me if I don't.
- ___ 10. I feel like a failure when I haven't exercised in a while.
- ___ 11. I think it is important to make the effort to exercise regularly.
- ___ 12. I find exercise a pleasurable activity.
- ___ 13. I feel under pressure from friends/family to exercise.
- ___ 14. I get restless if I don't exercise regularly.
- ___ 15. I get pleasure and satisfaction from participating in exercise.

Physical Activity Stages of Change Questionnaire

For each of the following questions, please circle Yes or No. Please be sure to read the questions carefully.

Physical activity or exercise includes activities such as walking briskly, jogging, bicycling, swimming, or any other activity in which the exertion is at least as intense as these activities.

- 1.) I am currently physically active. NO YES
- 2.) I intend to become more physically active in the next 6 months. NO YES

For activity to be regular, it must add up to a total of 30 minutes or more per day and be done at least 3-5 days per week. For example, you could take one 30-minute walk or take three 10-minute walks for a daily total of 30 minutes.

- 3.) I currently engage in regular physical activity. NO YES
- 4.) I have been regularly physically active for the past 6 months. NO YES

Physical Exercise Self-Efficacy Scale

Please respond to the following questions using this response format:

(1) very uncertain (2) rather uncertain (3) rather certain (4) very certain

How certain are you that you could overcome the following barriers?

I can manage to carry out my exercise intentions,

- ___ 1. ... even when I have worries and problems.
- ___ 2.... even if I feel depressed.
- ___ 3. ... even when I feel tense.
- ___ 4. even when I am tired.
- ___ 5. even when I am busy.

Godin Leisure-Time Exercise Questionnaire

1. During a typical 7-Day period (a week), how many times on the average do you do the following kinds of exercise for more than 15 minutes during your free time (write on each line the appropriate number).

Times per week

A). Strenuous Exercise _____

(HEART BEATS RAPIDLY)

(e.g., running, jogging, football, soccer,
basketball, vigorous swimming,
vigorous long-distance bicycling)

B). Moderate Exercise _____

(Not Exhausting)

(e.g., fast walking, baseball, tennis,
easy bicycling, volleyball, badminton,
easy swimming, popular dancing)

C). Mild Exercise _____

(Minimal Effort)

(e.g., yoga, archery, fishing, bowling,
golf, horseshoes, easy walking)

2. During a typical 7-Day period (a week), in your leisure time, how often do you engage in any regular activity long enough to work up a sweat (heart beats rapidly)?

Often _____

Sometimes _____

Never/Rarely _____

Dialysis Clients Acquiring Healthcare Services During COVID-19 Pandemic: A Phenomenological Study

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Abstract: Hemodialysis during the COVID-19 Pandemic has caused changes in the life of patients with end-stage renal failure. Acquiring dialysis is a lifetime procedure that should continue even during the pandemic, which led the researchers to explore the experiences and challenges encountered by dialysis patients while receiving healthcare services when the pandemic occurred. A qualitative phenomenological design was used to analyze four dialysis clients aged 30-59 years old who were selected using a snowball sampling technique. The lived experiences of the informants were gathered through face-to-face interviews and on an online platform with questions guided by a semi-structured and open-ended questionnaire. Using Collaizi's method in collecting and analyzing the data, the themes that emerged for the experiences of the dialysis clients when they acquire healthcare services were constant hospital exposure, haunting fear of acquiring Covid-19, scared of being positive for Covid-19, the anxiety of continuous swabbing, and praying for God's provision. While for their challenges, the themes that emerged were increased exposure to Covid-19, being Covid positive, difficulty obtaining transportation, lost source of income, paying for caregiver's personal protective equipment (PPE), not allowing companion, and wearing personal protective equipment (PPE).

Keywords: *dialysis clients during the Covid pandemic, pandemic healthcare services of dialysis patients, pandemic and dialysis patients, dialysis in the new normal*

Introduction & Literature Review

This study will determine the experiences and challenges of hemodialysis clients in acquiring primary healthcare services during the Covid-19 pandemic. In any community, people become ill and require access to healthcare facilities and treatment. Regardless of the nature of the health issue, the health outcomes depend primarily on individuals' ability to access healthcare services (WHO, 2019). Although hemodialysis prolongs the life of patients, it also imposes many restrictions on them that may lead to physical, psychological, social, and economic complications. It can also be the leading cause of depression, anxiety, low self-esteem, impaired mental impression, and hopelessness for the patients (Iran, J., 2015). The World Health Organization has recognized the pandemic nature of the coronavirus disease 19 (COVID-19) outbreak. Most governments have recommended social separation and severe measures to prevent the further spreading of the epidemic (Meijers, B., Messa, P., * Ronco, C., 2020). The impact was felt almost immediately by patients on dialysis. Public and private transports were shut down, which prevented patients from reaching dialysis centers (Prasad, N, Bhatt, M & et al., 2020). Because hemodialysis (HD) patients need to access hospital and dialysis center facilities three times a week, this category of patients requires special attention (Meijers, B., Messa, P., * Ronco, C., 2020). Reports of dialysis patients suffering extreme adversity and even death were reported in the lay press (Prasad, N, Bhatt, M & et al., 2020). The researchers show interest in those clients seeking essential healthcare services amid the pandemic.

Methodology

Phenomenology is a research method that aims to explain the nature of a phenomenon by looking from the perspective of those who have experienced it. Phenomenology aims to explain the significance of this experience, both in terms of what happened and how it happened. A qualitative phenomenological research design was used to explore the experiences and challenges encountered by dialysis patients in and while acquiring healthcare services during this pandemic. A phenomenologic

qualitative design was adopted because the point of qualitative research is to increase the information that could aid in informing the nursing practice generally and comprehensively, considering that knowledge is ever-changing and circumstantial, which means qualitative design or method will not concentrate on controlling components to detach explicit parts of a marvel.

This study being qualitative in design, used interviews to gain information from the informants. Qualitative research focuses on understanding a research query as a humanistic or idealistic approach.

Findings were gained through online interviews of the informants about their current situation in seeking healthcare services during this pandemic. Qualitative research techniques include 'small-group discussions' for investigating beliefs, attitudes, and concepts of normative behavior; 'semi-structured interviews to seek views on a focused topic or, with key informants, for background information or an institutional perspective; 'in-depth interviews' to understand a condition, experience, or event from a personal perspective; and 'analysis of texts and documents,' such as government reports, media articles, websites or diaries, to learn about distributed or private knowledge (Hammarberg & Lacey, 2016).

The researchers used purposive and snowball sampling techniques. Snowball sampling was used after gathering information from the informants. The researchers asked the informants to refer other individuals to be potential candidates for the research study. As utilized in qualitative and mixed methods research, purposive sampling involves an iterative process of selecting research subjects rather than starting with a predetermined sampling frame. The selection process involves identifying themes, concepts, and indicators through observation and reflection (Schutt, 2006). Snowball sampling is where research informants recruit other participants for a test or study. It is used where potential informants are hard to find. It is called snowball sampling because (in theory) once you have the ball rolling, it picks up more "snow" along the way and becomes larger and larger. Snowball sampling is a non-probability sampling method. It does not have the probability involved with simple random sampling (where the odds are the same for any particular informants being chosen). Instead, the researchers used their judgment to choose informants. Data saturation is reached when there is enough information to replicate the study, when the ability to obtain additional new information has been attained, and when further coding is no longer feasible.

This study utilized four patients for dialysis ages 30-59 years old, male or female, regardless of educational attainment or religion, who are conversant, mentally stable, and without postural discomforts. The researchers selected the informants. They were selected if they were dialysis patients who were undergoing dialysis sessions in hospitals. The interview was online, like a one-to-one synchronous interview via zoom or face-to-face if allowed.

Colaizzi's (1978) method of data analysis is rigorous and robust and, therefore, a qualitative method that ensures the credibility and reliability of its results. It allows researchers to reveal emergent themes and their interwoven relationships. Researchers using a descriptive phenomenological approach should consider this method as a clear and logical process through which the fundamental structure of an experience can be explored (Wirihana, et al. 2017). According to Morrow (2015), Colaizzi's method has the following steps: Transcribing and Translating interviewers, analyzing the informants' experiences, and making sure that the correct concepts were taken from the informants. 1) Extortion of critical remarks Acknowledging the terms and keeping their relevance to the research. 2) Forming relevant statements, using the informants' explanations, and bringing life to them. 3) Putting the statements on theme clusters and organizing the remarks in clusters that were easy to understand. 4) Writing a detailed description of the phenomenon and getting articles and other research to support the information gathered from the informants. 5) Identifying the fundamental structure. Reviewing the detailed description, then re-arranged into an explanation of the phenomenon that was insightful of the informants' descriptions of their experiences. 6) Validating the detailed description with each informant and confirming the detailed description with each informant if it reflects their experiences.

First, the researchers will have a questionnaire for the informants. Secondly, It will be distributed to the chosen informants who are potentially appropriate for the study. Thirdly, the researchers will provide informed consent forms for the informants as a contract if they agree to participate in the study. Fourth, the informants who voluntarily agreed will be informed about the purpose of the study. A date and time will be established for the initial interview via zoom or any online application available for researchers and informants. Fifth, the interview will be a one-on-one interview. The researcher may ask follow-up questions to have a more profound knowledge of the information the informants provide. Last, any information will be confidential, and their privacy will be respected. Any data collected will be treated confidentially; the respondent's profile, recordings of the interview, and conversations online will be deleted for the participant's privacy.

Findings, Results & Discussion

Based on the result and the discussion about the experiences and challenges of hemodialysis clients acquiring healthcare services during the Covid-19 pandemic. Upon interview of the informants, the researchers transcribed, analyzed, and described the themes of the information given. The following are the themes that emerged, describing their experiences and challenges.

The Experiences of Hemodialysis Clients During the Covid-19 Pandemic

Constant hospital exposure. Informants have their dialysis treatment three times a week in the hospital. Being in the hospital increases their risk of acquiring Covid-19 during this pandemic by being exposed to healthcare workers who might have been exposed. COVID-19 was declared a pandemic by the World Health Organization (WHO) on March 11, 2020. Since then, evidence has accumulated that SARS-CoV-2, the virus that causes COVID-19, can be transmitted not only by symptomatic patients but also by asymptomatic carriers. SARS-COV-2 illness is particularly contagious among healthcare workers' families. 2–4 Interventions to reduce transmission have been implemented worldwide, including social distancing, travel bans, stay-at-home orders, and school and non-essential business closures (Lan et al., 2020).

The following are the informants' statements showing their experiences of constant exposure to Covid-19.

Informant 1: *"3 times dialysis treatment in a week) (Tatlong beses po sa isang lingo). Yes they did think that we have covid, and also there are cases of covid here in the dialysis unit. ("Oo naisip nila mamaya kami aymay covid..tsaka tapos nagkakaroon ng covid dito sa dialysis unit."kami ay palaging nasa ospital")*

Informant 2: *"3 times dialysis treatment in a week" (Tatlong beses po)*

Informant 3: *3 times dialysis treatment in a week" (Tatlong beses po)*

Informant 4: *"2 times in a week" (Dalawag beses sa isang lingo)*

Haunting fear of acquiring Covid. The coronavirus outbreak (COVID-19) is prompting significant worry and concern. Increased fear was linked to concerns about loved ones' safety and health. Regular and social media use was also linked to increased worry (Mertens et al., 2020). The COVID-19 Pandemic has had a considerable influence on people's lives. Many people face stressful and disturbing challenges that cause strong emotions in adults and children. Public health measures such as social separation are necessary to prevent COVID-19 from spreading, but they can make people feel isolated and lonely and cause tension and worry. The COVID-19 outbreak is rapidly spreading worldwide and will have devastating consequences for both societies and individuals (Seçer et al., 2020).

The following are statements showing how informants experienced haunting fear of getting Covid 19 while acquiring healthcare services for their dialysis:

Informant 1: *"Our relatives are worried of us because we came from the hospital. Yes, they did think that we have covid, and also there are cases of covid here in the dialysis unit" ("parang natatakot din*

ung mga kasama namin na galing kami ng ospital.. Oo naisip nila mamaya kami ay may covid..tsaka tapos nagkakaroon ng covid dito sa dialysis.” “Yes, even the driver of the car is wearing face-mask and face shield. It is really stressful.” (“Oo lalo na ung naghahatid sa kotse, naka face-mask talaga at face shield. Nakaka-stress talaga.”)

Informant 2: *“Afraid but also glad that it is just that, I did not feel anything”. (“Natakot tapos masaya na yan na ganon lang wala naman naramdaman”) . “Of course, because of pandemic, I am scared” (“Syempre gawa ng pandemic natatakot ka minsan yung ano e...ayon”). Because of pandemic I am sometimes afraid. I am used to it, before it is difficult but now I am fine with it. (“Gawa ng pandemic natatakot ka minsan. Nasanay na e, sa una nylon pero nasanay na.”).*

Scared of being Positive (Covid-19). For nearly a year, the COVID-19 pandemic has been raging. That fact alone is enough to drive most healthy people into a state of tension. People's health is one of many influencing elements in this new standard. Several lives have been flipped upside down, even if only one individual and the loved ones have not been infected. So, if one obtains positive results, one could be at a loss with what to do (Mentally Coping with Anxiety of a COVID-19 Diagnosis, Banner, n.d.). Even without personally knowing someone who has had severe symptoms or died due to COVID-19, the media's focus on the disease's frightening qualities may be pretty frightening. The more one focuses on a topic's worst-case scenarios or destructive features, the more concerned they become. This is true for individuals on a local level as well as cities and countries at a macro level, and it applies to any issue, not just COVID-19 (Goodman, 2020).

The informants were not exempted from this experience of fear from becoming positive of Covid 19. The statements to follow are experiences of the informant (s) to show that they were scared of being positive:

Informant 2: *“I have been positive” (“nag positive ako”). “Afraid but also glad that it is just that, I didn’t feel anything” (“Natakot tapos masaya na yan na ganon lang wala naman naramdaman”). “Of course, because of pandemic, I am scared”. (“Syempre gawa ng pandemic natatakot ka minsan yung ano e...ayon”)*

Anxious about constant swabbing. Swabbing is one of the health protocols required among people suspected of being exposed to Covid- 19 virus. Anxiety is a natural reaction to things that threaten one's safety or emotions of uncertainty. While worry is a natural reaction to the COVID-19 epidemic, excessive anxiety might be harmful or have a negative impact on a person's daily life. Getting a COVID-19 test can be stressful, and waiting for the results can be much more stressful. It is understandable how difficult it is to wait, especially when circumstances seem out of one's control (Nicomedes & Avila, 2020).

The informants, regular recipients of health services for their dialysis, are not exempted from this required swabbing. The following statement showed how the informants experienced the anxiety of this constant swabbing.

Informant 1: *“We are stressed, because all of us are being swabbed here, especially if someone has been positive”. (“nai-stress kami dahil sina-swab kami palagi dito lahat. . lalo na pag may nag positive”)*

Praying for God's provision. On top of the challenges the clients face being dialysis patients, they still have other concerns that may overwhelm them. However, their knowledge of God and what He can do in their lives made the informants cling to Him. "Spending time praying and being with God is comforting," according to Goodman (2020). Religion and belief are now recognized as important ways to cope with trauma and distress by many researchers and clinicians, and how people experience and express their faith has implications for their well-being and health.

In the following statements, it can be seen how the informants have experienced praying to God for provision in this time of the pandemic.

Informant 1: *I am praying, I am just praying. With the mercy of God my needs are being provided. ("Eh ako na laang ay nagdadasal, nagpra-pray na lang. Sa awa ng Diyos binibiyaan ang aking pangangailangan.")*

The Challenges of Hemodialysis Clients During the Covid-19 Pandemic

Increased exposure to Covid 19. Since informants acquire dialysis three times a week in the hospital, it also increases their exposure to Covid-19. The informant's home relatives are anxious about frequent hospital visitations due to the increased risk of acquiring Covid-19. In the dialysis unit, it can be seen that patients are acquiring hemodialysis with other patients simultaneously. These patients need to be dialyzed at least three or more times a week, putting them at a high risk of being exposed to the virus. Furthermore, dialysis patients are at more high risk of developing a severe manifestation of COVID-19 as they are considered immunocompromised. According to Tofighi et al. (2021), Cases of COVID-19 inside the dialysis unit are increasing almost twice than those who are acquiring hemodialysis at home or what we call in-home dialysis care. As the patients need to stay for four hours routinely, this can contribute to a high possibility of exposure to the virus. They are not the only ones at risk of acquiring the virus; their companions accompanying them during every dialysis session are also at risk—those people who are with them inside their household.

The following are statements of the participations showing their experiences of their increased exposure to Covid 19.

Informant 1: *"It's harder now because we are always at the hospital and the people who are with us are getting scared that they are being exposed to us." (mas mahirap ngayon..dahil katulad namin kami ay palaging nasa ospital parang natatakot din ung mga kasama naming na galing kami ng ospital.) "They're thinking that we are positive with covid", and the dialysis unit are having covid patients". (Oo naisip nila mamaya kami ay may covid..tsaka tapos nagkakaroon ng covid dito sa dialysis unit.) "Yes, especially the one who drives us, they are wearing mask and face shield. It's so stressful." (Oo lalo na ung naghahatid sa kotse, naka face-mask talaga at face shield. Nakaka-stress talaga.)*

Informant 2: *"3 times a week."* (3 beses po) (Dialysis treatment in a week)

Informant 3: *"3 times a week."* (3 beses po) (Dialysis treatment in a week)

Informant 4: *"2x times a week"* (Dalawang beses) (Dialysis treatment in a week)

Being Covid Positive. Aside from their constant hospital exposure, dialysis clients being immunocompromised have a higher chance of becoming positive, and some of them turned out to be one. It is challenging for the participants to become positive for Covid-19. Being a positive individual of Covid-19 has given them numerous problematic situations. According to the Center for Infectious Disease Research and Policy (CIDRAP), dialysis patients are nearly four times at risk of acquiring COVID-19. According to Taji, L. (2021), out of 501 dialysis patients, 187 (1.5%) were diagnosed as COVID positive. The risk factors of acquiring the virus are more likely to include receiving dialysis in the dialysis center versus having it at home.

Herewith are the statements showing how some informants considered being covid positive a challenge:

Informant 2: *I was tested positive with covid, but I was asymptomatic." (Nag positive ako nung noon (covid) pero kwan naman siya asymptomatic) "I was scared but I was glad that I am asymptomatic." (Natakot tapos masaya na yan na ganon lang wala naman naramdaman.)*

Informant 3: *"I was tested positive". ("dahil ako nag positive naman ako e")*

Difficulty in acquiring transportation. Participants have difficulty with their mode of transportation during the pandemic. There have been few public transportation options available during the pandemic, which left them the only option of acquiring private transportation. Participants also faced difficulty entering their hospitals' locations as checkpoints were set up to control the entering of the transportation to prevent the spread of Covid-19. When COVID-19 struck, the whole world was shaken by this phenomenon, and one of the most significant issues was public transport. Transportation of the student and workers was affected because they needed to follow the protocols to decrease the virus's transmission. It was a big challenge and a significant barrier as patients underwent checkpoints before going to the hospital because of the strict restriction to different areas. People acquiring healthcare services are at greater risk of experiencing negative consequences during the COVID-19 pandemic, which has something to do with their health. According to Cochran (2020), these circumstances regarding transportation issue during the pandemic is associated with people who have a disability, the elderly, those who have underlying problems, and families with individuals who are experiencing poverty.

The following statement showed how the participants had experienced difficulty in their transportation:

Informant 1: *"When pandemic happened it's so hard to go outside." (nung nagka pandemic mahirap lumabas). "It's so hard to go outside when pandemic happened, but some usually dropped us off and pick us up at the hospital." (Kuwang, ano..nung nagka pandemic mahirap lumabas. Pero noong pandemic hinahatid sundo kami.) "My brother in-law, using his own car. (bayaw ko, ng sariling kotse.)*
 Informant 2: *"There are a lot of checkpoints when you go to the hospital" (mga pagpunta nga dito kasi daming checkpoint)*

4. Losing sources of income. Participants who had occupations before had lost their income during the pandemic. This has led to their loss of sources of income, which made acquiring health services more difficult. According to Bhalla, N. (2021), 50% of all individuals have lost their income due to the pandemic. Almost all businesses around the globe were forced to close to prevent the transmission of the virus from one person to another, but many people were affected and lost their jobs. Patients in the dialysis unit need to acquire hemodialysis every three or more times a week and pay for every session. According to the clients, their source of income was lost when the pandemic struck, and more difficult for them to pay their bills. Based on the Commonwealth Fund, more than 50% who lost their source of income or were infected by COVID-19 are struggling with their medical fees, leading to some debts. About a third of Americans continue to suffer with their medical fees and debts, even those who have healthcare insurance.

The following statement showed the participant's testimony of how they lost their income.

Informant 1: *"The pandemic had affected my source of income and expenses." (ang sobrang naapektuhan ay edi sa gastusin..dahil ako ay may sasakyan hindi nakakabhaye gawa nga ng pandemic.) "I have my jeep rental business and that is where I get my money for dialysis" (may jeep akong na-bhaye..: Oo, eh doon ko kinukuha ung aking pampada-dialysis.)*
 Informant 2: *"We lost our job" (Nawala yung mga trabaho ganon)*

5. Paying Caregiver's Personal Protective Equipment (PPE). Even before the pandemic, acquiring dialysis cost a tremendous amount of money for patients to have it three or more times per week, and they need to pay for each session. During their quarantine, the patient must pay for their caregiver's PPE, which increases their hospital bills. Patients are worried that some might lose their jobs during the pandemic. One of the challenges the informants faced while acquiring dialysis treatment was the requirement to pay for their caregiver's PPE. According to Neil Uffner (2020), paying for PPE is undoubtedly a significant expense, especially for families struggling financially during

this pandemic. As stated by the participants above, they expressed that it is more expensive than in pre-pandemic days.

The following statement showed how the informants consider it a challenge to pay for their caregiver's PPE:

Informant 3: "The expenses are bigger this pandemic, I was charged 10,000." (mas malaki ang gastos yung dialysis sa baba 10,000 mahigit talagang malaki ang nagastos ko nitong pandemic na to)

Informant 4: "Because every dialysis you get charge with Copay, without paying the Copay you will not get dialysis treatment." (Yun lang yun sa copay, kasi nga kailanga kada-dialysis kailangan mag bayad ng copay kasi pag di ka nagbayad walang dialysis)

Not Allowing Companion. Informants are having difficulty not allowing their companion to be with them while acquiring their dialysis treatment. There were many restrictions when a pandemic struck, and acquiring such healthcare services inside the hospital premises prohibits a large number in a room for less to no virus transmission. However, companions support the patient emotionally, especially in the dialysis unit. Patients might experience discomfort after acquiring hemodialysis and will experience some adverse reactions. A companion plays a significant role in helping and assisting loved ones. According to Philippine Heart Center (2020), the patient's relatives cannot go beyond the treatment area. Being with a companion while seeking healthcare services is essential, for it helps clients ease their loneliness, anxiety, fear, or depression. Companions also help break down information for the patient when she/he cannot understand it, but due to health protocols, it is impossible to accompany their relatives inside the treatment area.

The following are statements showing how the informants find it a challenge that their companions were not allowed to be with them:

Informant 4: *"Before it used to be easy because someone could accompany me inside the unit but now, they are not allowing it. If I feel sick I am just alone or with the nurse."* (dati maalwan ngayon hindi mahirap, sa loob ng dialysis di pwede bantay, pag masama ang pakiramdam sarili mo lang kasama yung nurse ganon lang.)

Wearing Personal Protective Equipment (PPE). Mandatory use of PPEs by the HCWs (Healthcare Workers) and the patient was the hospital protocol when COVID-19 struck. It says that wearing PPEs can help prevent getting infected by the virus of COVID-19. Few studies addressed that wearing PPEs significantly impacts HCWs, especially those doctors performing surgeries. Many aspects can be affected by wearing PPEs, such as tactile movements and instrument handling while performing surgery and other procedures. Participants have found it uncomfortable to wear PPE while acquiring their health service. If even the HCWs find it challenging to wear PPEs, patients with no prior medical experience may experience an even more significant burden. Wearing PPE is one main factor that can lead to psychological and physical burdens for those wearing it for a purpose. Some reported of these psychological discomfort includes difficulty breathing, headache, skin damage, and visual disturbances. Some reported their psychological concerns with wearing PPE, such as being scared that they cannot breathe properly or when they need to go to the washroom or eat or drink, which brings discomfort to everybody.

Herewith are the statements testifying how challenging it could be for the informants to wear a PPE every time they acquire their healthcare services.

Informant 3: *"It was hard because I have to wear scrub (PPE) since I was positive."* "Perohirap talaga kami kailangan naka scrub (PPE) ka dahil ako nag positive naman ako e")

Limitations and Implications

Conclusion

Based on the findings, the researchers conclude that:

Hemodialysis during Covid-19 Pandemic has to experience *constant hospital exposure* that results in them experiencing *haunting fear of acquiring Covid-19*, to the extent of being *scared of being positive*. Part of the hospital protocol they need to comply with before they can acquire healthcare services is swabbing (throat or nasal), and they have to do this every dialysis session. Their compliance made them *anxious about this constant swabbing*.

The prescribed regular hemodialysis sessions 2 – 3 times a week predispose the clients to the challenge of increased exposure to the Covid-19 virus and becoming positive. The regularity of their weekly sessions should be complied with despite the lockdowns and protocols. Thus, another challenge they encountered was difficult transportation. On top of their dialysis expenses, some of them lost their source of income and had to pay for the PPE of their healthcare provider and for theirs and what they were required to wear. They leave home for their session with a companion, but he/she cannot be with them during the dialysis sessions, which they found to be a real challenge.

References:

- [1] Bhalla, N. (06, May 2021). World Economic Forum. One in two people globally lost income due to the pandemic. <https://www.weforum.org/agenda/2021/05/how-many-people-experienced-a-lower-income-due-to-covid-19/>
- [2] CDC - Healthy People 2020 - Access to Health Services - Publications by Topic – Public Health Law. (2019, February 28). [Www.cdc.gov](https://www.cdc.gov/phlp/publications/topic/hp2020/access.html#:~:text=The%20Healthy%20People%202020%20(HP2020).
[https://www.cdc.gov/phlp/publications/topic/hp2020/access.html#:~:text=The%20Healthy%20People%202020%20\(HP2020](https://www.cdc.gov/phlp/publications/topic/hp2020/access.html#:~:text=The%20Healthy%20People%202020%20(HP2020)
- [3] CDC. (2021, August 6). Coping with Stress. [Www.cdc.gov](https://www.cdc.gov/mentalhealth/stress-coping/cope-with-stress/index.html).
<https://www.cdc.gov/mentalhealth/stress-coping/cope-with-stress/index.html>
- [4] Cochran, A. L. (2020). Impacts of COVID-19 on access to transportation for people with disabilities. *Transportation Research Interdisciplinary Perspectives*, 8, 100263.
doi:10.1016/j.trip.2020.100263
- [5] Department of Health (Philippines). Updates of Novel Coronavirus Disease (COVID-19)[Internet]. [cited 2020 March 19]. Available from:
<https://www.doh.gov.ph/2019-nCoV>
- [6] Dioscoridi, Lorenzo; Carrisi, Chiara (2020). *Covid-19 exposure risk for family members of healthcare workers: an observational study*. *International Journal of Infectious Diseases*, (), S1201971220305415–.doi:10.1016/j.ijid.2020.06.106
- [7] Fowler, D. (2020). *Unemployment during coronavirus: The psychology of job loss*. BBC Worklife. <https://www.bbc.com/worklife/article/20200327-unemployment-during-coronavirus-the-psychology-of-job-loss>
- [8] Goodman, K. "Flatten the Fear with Facts: What Is an Appropriate Level of COVID-19 Worry and the Steps You Can Take to Reduce Anxiety." [Adaa.org](https://adaa.org/learn-from-us/from-the-experts/blog-posts/consumer/flatten-fear-facts-what-appropriate-level-covid), November 23 2020, [adaa.org/learn-from-us/from-the-experts/blog-posts/consumer/flatten-fear-facts- what-appropriate-level-covid](https://adaa.org/learn-from-us/from-the-experts/blog-posts/consumer/flatten-fear-facts-what-appropriate-level-covid).
- [9] Hammarberg, K., Kirkman, M., & Lacey, D. S. (2016, January 11). *Qualitative research methods: when to use them and how to judge them*. OUP Academic.
<https://academic.oup.com/humrep/article/31/3/498/2384737>
- [10] Lan, F.-Y., Suharlim, C., Kales, S. N., and Yang, J. (2020). Association between SARS- CoV-2 infection, exposure risk and mental health among a cohort of essential retail workers in the USA. *Occupational and Environmental Medicine*, oemed- 2020-106774.
<https://doi.org/10.1136/oemed-2020-106774>
- [11] Mertens, G., Gerritsen, L., Duijndam, S., Salemink, E., and Engelhard, I. M. (2020). Fear of

- the coronavirus (COVID-19): Predictors in an online study conducted in March 2020. *Journal of Anxiety Disorders*, 74, 102258. <https://doi.org/10.1016/j.janxdis.2020.102258>
- [12] Nicomedes, C. J. C., and Avila, R. M. A. (2020). An analysis on the panic during COVID-19 pandemic through an online form. *Journal of Affective Disorders*, 276, 14–22. <https://doi.org/10.1016/j.jad.2020.06.046>
- [13] Nicomedes, C. and Avila, R. (2020) An analysis on the Panic of Filipinos During Covid-19 Pandemic in the Philippines. DOI:10.13140/RG.2.2.17355.54565
- [14] Philippine Heart Center (2020, May 18) Interim Guidelines On Admissions And Performance Of Procedures During The Covid-19 Pandemic <https://www.phc.gov.ph/covid/GL-ICP-018%20INTERIM%20GUIDELINES%20ON%20ADMISSIONS%20AND%20PERFORMANCE%20OF%20PROCEDURES%20DURING%20THE%20COVID-19%20PANDEMIC.pdf>
- [15] Seçer, İ., Ulaş, S., and Karaman-Özlü, Z. (2020). The Effect of the Fear of COVID-19 on Healthcare Professionals' Psychological Adjustment Skills: Mediating Role of Experiential Avoidance and Psychological Resilience. *Frontiers in Psychology*, 11. <https://doi.org/10.3389/fpsyg.2020.561536>
- [16] Taji, L., Thomas, D., Oliver, M. J., Ip, J., Tang, Y., Yeung, A., Cooper, R., House, A. A., McFarlane, P., & Blake, P. G. (2021). COVID-19 in patients undergoing long- term dialysis in Ontario. *CMAJ : Canadian Medical Association journal = journal de l'Association medicale canadienne*, 193(8), E278–E284. <https://doi.org/10.1503/cmaj.202601>
- [17] Tofighi M, Asgary A, Merchant AA, Shafiee MA, Najafabadi MM, Nadri N, Aarabi, M, Heffernan, J, and Wu, J. (2021) Modelling COVID-19 transmission in a hemodialysis centre using simulation generated contacts matrices. *PLoS ONE* 16(11): e0259970. <https://doi.org/10.1371/journal.pone.0259970>
- [18] Wirihana, Lisa; Welch, Anthony; Williamson, Moira; Christensen, Martin; Bakon, Shannon; Craft, Judy (2018). *Using Colaizzi's method of data analysis to explore the experiences of nurse academics teaching on satellite campuses*. *Nurse Researcher*, 25(4), 30–34. doi:10.7748/nr.2018.e1516

Level of Depression and Pessimism among College Students

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Abstract: Depression is common and is one of the significant mental health problems among students. As a result, it may negatively influence their mindset and interfere with their study journey, making it more complicated. This study aimed to investigate the relationship between depression and a pessimistic mindset in college students, especially those from divorced and intact families. Descriptive and correlational designs were employed, with 102 respondents recruited using a quota sampling technique. The questionnaire was Beck Depression Inventory (BDI) and Beck Hopelessness Scale (BHS). This study utilized descriptive and inferential statistics to describe and examine the relationship between variables. There was a significant relationship between depression and the pessimistic mindset of students from intact families ($p < 0.05$). On the contrary, there was no significant relationship between these variables among those from divorced families ($p > 0.05$). In addition, there was a significant difference in depression based on gender in intact families, where women had worse depression than men ($p < 0.05$). College students should be more aware of mental health issues and seek help immediately to prevent the development of worsening effects, especially during pandemics. In addition, nurses must be mindful of mental health and evaluate and promote mental health through social media.

Keywords: *college students, depression, family, pessimism*

Introduction & Literature Review

According to Kamus Besar Bahasa Indonesia (2021), pessimism is an individual who has an attitude or view without having good hopes, always feels worried about defeat, and quickly gives up hope. Another opinion from Gunawan (in Sari 2019) regarding pessimism is that individuals believe that they are cursed; no matter how much effort they put in, the results are not as expected. Therefore, never see things from the positive side and always choose to see things from the opposing side. Wahyuni (in sari 2019) thinks that pessimistic people tend to blame themselves, others, and the environment, which ultimately results in feelings of depression.

Depression is a state of emotional disturbance marked by persistent feelings of sadness, hopelessness, and guilt without meaning. It can affect mental processes, namely ways of thinking, feeling, and behaving both in daily activities and interpersonal relationships (Dirgayunita, 2016).). This condition can occur repeatedly and become chronic and can interfere with the individual's ability to carry out daily responsibilities. At the most severe level, the impact of depression is suicide (Dianovinina, 2018).

The latest data reported by the online news Cable News Network (CNN, 2020) that researchers from the University of Toronto, Canada, found depression rates rose three times compared to before the Covid-19 pandemic, and the results of WHO data in 2016 state that around 35 million people were affected by depression. Indonesia is the fourth country with the most depressive disorder (Tuasikal, 2018). The prevalence of depression in the population according to the age group of 15 years old by Riskesdas in the Indonesian Ministry of Health's Data and Information Center (2018) shows that the 15-24 years age group is in the fourth highest order at 6.2% and North Sulawesi is in 13th place of 34 provinces experiencing depression with a yield of 6.6%.

Depression often occurs, especially among early adults or adolescents, but not all are diagnosed because not all people express or complain about the feelings they experience (Kurnia, 2015). Depression, if not appropriately handled and sustainably, can lead to various negative thoughts, one of which is suicide. Therefore parents or families must pay extra attention to any changes that

occur in adolescents (Mandasari, 2020) because the family is the first environment for children's growth from birth to adulthood; thus, the role of the family is crucial (Danisati, 2018).

Mulina (in Danisati, 2018) says that having a complete family or parents, namely a father, and mother, makes it easier for children to meet their needs because complete parents work together to shape children's behavior. However, not all families can work well together, and some families will experience conflicts that ultimately affect all family members, including children (Yuhatriati, in Danisati 2018). One of the conflicts that exist in the family is divorce (Hasanah, 2019).

Divorce separates children from one parent, both father, and mother, so children's affection is not optimal (Danisati, 2018). In addition, divorce harms children's development, especially in the future. If children do not get good care in the family, their development can be hampered, and they tend to misbehave (Hasanah, 2019).

Research by Resty (2016) regarding the impact of divorce on the psychological condition of the family stated that divorce left an impact on all family members. The most significant impact was on children as they experienced the loss of their parents as role models which ultimately caused developmental disorders in children, especially in mental development.

The purpose of this study was to determine whether there is a relationship between the level of depression and a pessimistic mindset, especially in students from divorced families and intact families at the University of Klabat.

Methodology

The type of research used is quantitative research with a comparative descriptive design. In this study, the same variables were the level of depression and the pessimistic mindset, and the different samples were students from divorced families and intact families.

The instrument used on the level of depression is the Beck Depression Inventory (BDI), translated and modified by Iswari (2019). This instrument consists of four dimensions with 17 items. These four dimensions measure emotional, cognitive, motivational, and vegetative, where each item refers to behavioral manifestations caused by depression, and each item consists of 4-5 statements describing the absence of symptoms to the presence of the most severe symptoms. The original BDI questionnaire had 21 items, but the researcher only used 17 items in this study because the other four items did not match the respondents in this study. This instrument uses the Thurstone scale.

This scale assesses attitudes by representing statements about topics that are arranged with answer choices from those that do not approach the match or unfavorable, neutral, to the most suitable or favorable to the respondent (Sukardi, 2009), and each statement gives a different score (Morissan, 2012). Depression questionnaire scores: 1-10 = the ups and downs of this feeling are considered normal / still within normal range 11-16 = mood disturbance/mild moody feeling 17-20 = depression limit/start to show depression 21-30 = low depression 31-40 = moderate depression >40 = severe depression.

The instrument used in the pessimism mindset is the Beck Hopelessness Scale (BHS), which consists of 20 statements, and each statement includes 11 favorable items and nine unfavorable items and has three dimensions. These three dimensions discuss feelings about the future, loss of motivation, and expectations about the future. The scale used in this instrument is a Likert scale, with four answer choices, namely "Strongly Agree" (SS), "Agree" (S), "Disagree" (TS), and "Strongly Disagree" (STS). The use of four points on the Likert scale is done to avoid the number of neutral responses (Iswari, 2019). The pessimism mindset questionnaire scores 0-3 for the regular, vulnerable category, 4-8 for the mild pessimistic category, 9-14 for the moderately pessimistic category, and scores above 15 for the severe pessimism category.

In the process of collecting data, it is necessary to design a regulated as well as possible, where the design is carried out with the following steps: (1) Prepare research materials and materials; (2) Obtain approval from the supervisor regarding the research carried out; (3) Obtain a preliminary study permit from the Dean of the Faculty of Nursing; (4) Conduct a preliminary study to obtain initial data for research; (5) Submit a research permit to the University of Klabat, the Vice President for

Academic Affairs; (6) Obtain a permit/approval from the University of Klabat; (7) Explain the purpose of the study and ask for the respondent's consent by signing the Informed Consent with a choice of "yes" or "no." ; (8) Collect data online by distributing it through social media in the form of a Google Form link; (9) Collect data within 7x24 hours and process data and present research results.

Findings/Results

Table 1. *Depression level description*

Levels of Depression	Complete Family	Divorced Family	Total
Ups and down of Feelings (normal)	15 (14,7%)	15 (14,7%)	30 (29,4%)
Mood disturbance	13 (12,7%)	9 (8,8%)	22 (21,6%)
The start of Depression	8 (7,8%)	5 (4,9%)	13 (12,7%)
Low depression	5 (4,9%)	11 (10,8%)	16 (15,7%)
Moderate Depression	7 (6,9%)	4 (3,9%)	11 (10,8%)
Severe Depression	3 (2,9%)	7 (6,9%)	10 (9,8%)
Total	51 (50%)	51 (50%)	102 (100%)

From 102 respondents, there are 51 respondents from divorced families. Most were found in the category of depression with up and down feelings (normal) as much as 14.7% followed by depression in the low category of 10.8%. At the same time, the least amount of 3.9% is found in the moderate category of depression. The majority of respondents from intact families were also in the category of depression up and down feelings (normal), as much as 14.7%. Followed by depression in the category of mood disorders by 12.7%. While the least amount is 2.9% found in the severe category of depression.

Table 2. *The Pessimism Mindset description*

Pessimistic category	Complete Family	Divorced Family	Total
Normal Pessimistic	0 (0%)	0 (0%)	0 (0%)
Mild Pessimistic	0 (0%)	0 (0%)	0 (0%)
Moderate Pessimistic	0 (0%)	0 (0%)	0 (0%)
Severe Pessimistic	51 (50%)	51 (50%)	102 (100%)
Total	51 (50%)	51 (50%)	102 (100%)

Table 2 shows that of the 102 respondents who were divided into 51 students from divorced families and 51 from intact families, it was found that all respondents from intact families and divorced families had the same category of pessimistic mindset, namely severe pessimism.

Table 3. *The relationship between the level of depression and the pessimistic mindset of divorced family students.*

Variables	N	Pearson correlation (r)	p-value	Interpretation
Level of depression and pessimism mindset of divorced families	51	,132	,357	Not Signifikan

Table 3. shows that the $p\text{-value} = 0.357 > 0.05$, then H_{a1} is rejected, which means that there is no significant relationship between the level of depression and the pessimistic mindset of students from divorced families at the University of Klabat.

Table 4. *The relationship between the level of depression and the pessimistic mindset of whole family students.*

Variables	N	Pearson correlation (r)	p-value	Interpretation
Depression rate and whole family pessimism mindset	51	,293	,037	Significant

Table 4 shows that the $p\text{-value} = 0.037 < 0.05$, then H_{a2} is accepted, which means that there is a significant relationship between the level of depression and the pessimistic mindset of students from intact families at the University of Klabat. Moreover, the value of the correlation coefficient (r) is 0.293, indicating that the relationship between depression level and pessimistic mindset in students from intact families at Klabat University has a weak relationship strength and has a positive correlation direction, which means that the higher the depression, the higher the pessimistic mindset and vice versa.

Table 1. *Differences in the level of depression with the pessimistic mindset of intact family students by gender.*

Confounding variable (gender)	N	Depression Level of complete family (mean)	Pessimistic mindset of complete family (mean)
Male	24	14,04	41,46
Female	27	22,19	38,59

Table 5 shows that women's depression rates are much higher than men's. This is in line with research by Darmayanti (in Rahmayanti, 2018), which says that depression is more common in women because women are less assertive, focus more on symptoms of depression, and are less aggressive both physically and verbally in interacting with their group.

Table 2. *The relationship level of depression with the pessimistic mindset of intact family students by gender*

Variable (complete family)	p-value	Interpretation
Level's of Depression	,009	Significant
Pessimistic Mindset	,148	Not Significant

Table 6 shows that the value of $p = 0.009 < 0.05$, so H_{a3} is accepted, which means that there is a difference between the levels of depression in complete families when viewed from gender, while for the pessimistic mindset, the value of $p = 0.148 > 0.05$ means that there is no difference pessimistic mindset based on gender.

Table 3. *Differences in the level of depression with the pessimistic mindset of divorced family students based on gender*

Confounding variable (gender)	N	Depression Level of divorced family (mean)	Pessimistic mindset of divorced family (mean)
Male	24	17,17	41,13
Female	27	26,44	39,33

Table 7 shows the mean or average value of the two variables, namely the level of depression and the pessimistic mindset of divorced families when viewed from the gender factor.

Table 4. *Differences in the level of depression with the pessimistic mindset of divorced family students based on gender*

Variable (divorced family)	p-value	Interpretation
Levels of Depression	,066	Not Significant
Pessimistic Mindset	,348	Not Significant

Table 8 shows the $p\text{-value} = 0.066 > 0.05$, so H_{a4} is rejected, which means there is no difference between the levels of depression in intact families when viewed from the gender, and for the pessimistic mindset, the $p\text{-value} = 0.348 > 0.05$, which means that there is no difference. Pessimistic mindset based on gender.

Discussion

Level's of depression Description

In this case, everyone has the same risk of suffering from depression because depression can attack anyone regardless of age, gender, race, ethnicity, or socioeconomic status (David in Meivilia, 2015). Most of the respondents had depression in the normal, vulnerable category. This can be because the coping mechanisms used are still relatively adaptive so that students can overcome and forget by distracting themselves from pleasant things and assuming that everything that happens in life can change so that any small problem they face can be used as a lesson or life experience. Moreover, universities that often hold worship even online may be able to help in student self-development.

Level's of Pessimistic Mindset Description

As for the research conducted by Melinda (2017), there are also other causal factors; the first is the living environment. The environment has a big influence on behavior because the environment can make everyday life less enjoyable and tend to be boring, causing a sense of depression. Especially

in the current pandemic situation, everyone is required to stay at home and keep their distance, and there are no friends who usually meet at the lecture venue which affects stability in thinking and ultimately triggers a pessimistic mindset.

The relationship Levels of Depression with a Pessimistic mindset

In this study, the depression level of students from divorced families is not related to a pessimistic mindset because everyone has the same risk of suffering from depression. Moreover, students from divorced families received less support from their parents, so the level of depression was higher.

There is a relationship between the level of depression and the pessimistic mindset in students from intact families. During offline lectures, students are used to meeting friends to comfort and help each other so depression is less and the mindset of pessimism does not occur. Contrary to the time of the covid-19 pandemic, lecture activities are held online with more assignments so depression occurs and causes students to feel pessimistic.

Based on the results above, women are more dominant in depression than men because when women are faced with problems, they use logic and feelings simultaneously and mostly keep the existing problems to themselves, making them vulnerable to stress and depression. In contrast, men, who are mostly faced with problems, prefer to distract themselves by looking for entertainment or fun things.

In this study, there was no difference between the level of depression and the pessimistic mindset in students from divorced families. This is because students who come from divorced families are already depressed and pessimistic because of the circumstances and situations that occur at home. Lack of love and support causes students to be more prone to depression and pessimism.

What is formed in children cannot be separated from the role of the family. The results of research conducted by Sari (2016), children who live with divorced parents can affect psychological conditions because children experience many difficulties and are confused about the events they experience. However, children never complain about the feelings they face and tend to cover up their feelings.

Limitations and Implications

The first limitation of this study is that the distribution of questionnaires was online due to the covid-19 pandemic situation making the distribution process challenging. In addition, some respondents did not constantly check their cellphones or open chats which caused an extension in the timeline of the data collection. The next limitation of this study is that the number of samples did not reach the target due to the situation and limited time so the sampling technique was changed to quota sampling.

Conclusion

1. The description of the depression level of respondents from divorced families is mostly found in the category of depression up and down feelings (normal) as much as 14.7% followed by depression in the low category of 10.8%. At the same time, the least amount of 3.9% is found in the moderate category of depression.
2. The description of the depression level of respondents from intact families, mostly found in the category of depression up and down feelings (normal) as much as 14.7% followed by depression in the category of mood disorders by 12.7%. While the least amount is 2.9% found in severe category depression

3. The description of the pessimistic mindset in respondents from divorced families shows that all have a heavy pessimistic mindset.
4. The description of the pessimistic mindset in respondents from whole families displays a heavy pessimistic mindset.
5. There is no significant relationship between depression levels and a pessimistic mindset among students from divorced families at Klabat University.
6. There is a significant relationship between the level of depression with a pessimistic mindset in students from intact families at the University of Klabat.
7. There is a difference in the level of depression by gender in respondents from intact families. It was found that women had higher rates of depression than men.

References

- [1] Aditomo, A., & Retnowati, S. (2004). Perfeksionisme, harga diri, dan kecenderungan depresi pada remaja akhir. *Jurnal Psikologi*, 1, 1-14.
- [2] Aula, A. C. (2019). *Opini: paradigma kesehatan mental*. Retrieved Desember 2019, from UNAIR News: <http://news.unair.ac.id/2019/10/10/paradigma-kesehatan-mental/>
- [3] Ayu, Q. (2018). Depresi sebagai dampak kegagalan penyesuaian diri pada mahasiswa. *Seminar Nasional BK Perguruan Tinggi*. Bandung: Panitia SNBKPT.
- [4] Danisati, S., & Sari, E. P. (2018). Hubungan antara self-compassion dan depresi pada remaja dari keluarga bercerai. *Naskah Publikasi - Universitas Islam Indonesia*.
- [5] Dianovinina, K. (2018, Juni). Depresi pada remaja: gejala dan permasalahannya. *Jurnal Psikogenesis*, 6.
- [6] Dirgayunita, A. (2016, Juni). Depresi: ciri, penyebab dan penanganannya. *Journal An-nafs: Kajian dan Penelitian Psikologi*, 1.
- [7] Fitriah, A., & Hariyono, D. S. (2019, Mei). Hubungan self esteem terhadap kecenderungan depresi pada mahasiswa. *Psycho Holistic*, 1.
- [8] Hasanah, U. (2019). Pengaruh perceraian orang tua bagi psikologis anak. *Jurnal Analisis Gender dan Agama*, 2, 1.
- [9] Hulukati, W. (2018). Analisis tugas perkembangan mahasiswa fakultas ilmu pendidikan universitas gorontalo. *Jurnal Bikotetik*, 02, 73-114.
- [10] Humairah, R. (2016). Dampak perceraian terhadap kondisi psikologis keluarga.
- [11] Indrayani, Y. A., & Wahyudi, T. (2019). *Pusat data dan informasi kementerian kesehatan republik indonesia*.
- [12] Kalau terencana semua lebih indah. (2014). Retrieved Desember 2019, from BKKBN: <https://www.bkkbn.go.id/detailpost/kalau-terencana-semua-lebih-indah>
- [13] Krisdianto, M. A., & Mulyanti. (2015, Juni). Mekanisme koping berhubungan dengan tingkat depresi pada mahasiswa tingkat akhir. *Journal Ners and Midwifery Indonesia*, 3, 71-76.
- [14] Lubis, N. L. (2016). *Depresi: tinjauan psikologi*. Jakarta: Kencana.
- [15] Mandasari, L. (2020). Tingkat depresi dan ide bunuh diri pada remaja. *Indonesian Jurnal of Health Development*, 2, 1.
- [16] Melinda, R. (2017). Studi perilaku hopelessness pada siswa di smk daruttaqwa gresik. *Jurnal BK Unesa, Vol 07 Nomor 03*, 52-60.
- [17] *Pengertian kesehatan mental*. (2018). Retrieved Desember 2019, from Direktorat Promosi Kesehatan dan Pemberdayaan Masyarakat Kementerian Kesehatan RI: <http://promkes.kemkes.go.id/pengertian-kesehatan-mental>
- [18] *Peran keluarga dukung kesehatan jiwa masyarakat*. (2016). Retrieved Desember 2019, from Kementerian Kesehatan RI: <https://www.kemkes.go.id/article/print/16100700005/peran-keluarga-dukung-kesehatan->

jiwamasyarakat.html#:~:text=Menurut%20data%20WHO%20(2016)%2C,47%2C5%20juta%20terkena%20dimensia.

- [19]Ririn , R. (2013). Hubungan percaya diri (self confidence) dengan depresi pada mahasiswa angkatan 2010 fakultas kedokteran uns. *Perpustakaan UNS - Fakultas Kedokteran Universitas Sebelas Maret*.
- [20]Sari, D. L., Widiani, E., & Trishinta, S. M. (2019). Hubungan pola pikir pesimisme dengan resiko depresi pada remaja. *Nursing News*, 4, 1.
- [21]Tuasikal, A. N. (2018). Kematangan emosi, problem-focused coping, emotion-focused coping dan kecenderungan depresi pada mahasiswa tahun pertama. *Gadjah Mada Journal Of Psychology*, 4, 105-118. doi:10.22146/gamajop.46356
- [22]Wandono, W. A. (2017). Upaya peningkatan harga diri rendah pada pasien depresi. *Fakultas Ilmu Kesehatan - Universitas Muhammadiyah*.

Mental Health and Resilience of Selected University Students during the COVID-19 Pandemic

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Abstract: A recent pre-pandemic study shows that depression, anxiety, and stress (DAS) are prevalent among dental clinicians. This study aims to determine the mental health status and level of resiliency of selected students in the same sectarian institution in Silang, Cavite, during the COVID-19 pandemic. 94 out of 121 dental clinicians participated and answered the two instruments used in this study: the depression, anxiety, and stress scale (DASS-21) questionnaire and Resilience Scale (RS-14). The results show that the respondents' depression and anxiety were moderate, with a mean of 7 (SD=4.62) and 6 (SD=3.97), respectively, while stress was normal, with a mean of 7 and a standard deviation of 3.74. Results also show that the respondents' resilience was low, with a mean of 52 and a standard deviation of 8.84. Regarding the relationship between mental health and resilience, the results showed a significant relationship with p-values of 0.000, 0.001, and 0.000 for depression, anxiety, and stress, respectively. Depression (r-value= -0.520), anxiety (r-value= -0.334), and stress (r-value= -0.403) were negatively correlated with resilience. This means that as the clinicians' depression, anxiety, and stress increased, the level of resilience decreased, and vice versa. This study recommends that more resilience build-up programs can be introduced to dental clinicians.

Keywords: *mental health, resilience, covid-19 pandemic, depression, anxiety, stress, dental clinicians*

Introduction and Literature Review

The year 2020 marked the worldwide spread of the novel coronavirus disease – formally named COVID-19 because the initial cases started in late 2019 by the World Health Organization (2020). On March 11, 2020, WHO officially announced COVID-19 as a worldwide pandemic. As a result, countries began taking drastic measures, such as closing airports (Kiernan & DeVita, 2020). To ensure the safety of university students, many tertiary institutions have shut down and shifted to online learning, posing countless dilemmas among tertiary students. For instance, although lectures remain ongoing through the help of an online learning format, students have no access to laboratory equipment, thus preventing them from finishing the requirements to be able to graduate.

Many international students were not able to travel back to their homes. Furthermore, many students are experiencing economic stress related to COVID-19, like the global recession. These dilemmas caused by COVID-19 are expected to challenge students' mental health and resilience with heightened pre-existing stress levels. They do not only worry about their health, safety, and education but also the well-being of their families (Sahu, 2020).

Under normal circumstances, tertiary students already experience heightened levels of psychological distress. For instance, a study was conducted among 150 undergraduate clinical dental students in Iran. The focus of the study was students from third to sixth-year levels. The participants were surveyed using the Dental Environment Stress (DES) questionnaire and the validated Depression, Anxiety, and Stress Scale (DASS-21). The highest stress scores were observed among the fifth-year

students, followed by the third-year, fourth-year, and sixth-year students, of which females expressed higher stress levels than males. According to the results, the primary sources of stress were academic factors and clinical education (Jowkar et al., 2020). A study by Bagnes (2020) also used DASS-21 to measure the mental health of dental clinicians in a sectarian university in the Philippines prior to the COVID-19 pandemic. The result of the study shows that depression, anxiety, and stress (DAS) are prevalent among dental clinicians. Among those three variables, anxiety symptoms were the highest for dental clinicians. According to the study, the cause may differ from one person to another, but factors such as a build-up of stress, delay in finishing clinical requirements, and ability to graduate may be a huge contributor. It further showed that the respondents from this study with age 24 had the highest mean in depression and anxiety and the second highest in stress. Overall, this demonstrates that before the pandemic, dental clinicians already experience depression, anxiety, and stress at an extreme height.

Research shows that tertiary students suffer from COVID-19-related stressors, including financial constraints due to job loss, effects on daily routine, and academic delays (Cao et al., 2020). Due to physical distancing measures implemented to stop the spread of the virus, schools have shut down and shifted to online learning; thus, students have no access to laboratory equipment. According to a study, online-based learning presented limitations in the lab or clinical practical facets of education. This significantly impacts dentistry students since the prospect of graduating heavily relies on completing clinical and lab requirements. Furthermore, the study indicated that 77.4% of 382 students displayed negative opinions regarding online learning.

A published study showed that students who go into depression due to stress later suffer from decreased academic performance (Aafreen et al., 2018). Furthermore, out of those students, 86% of them felt that learning through online classes had little impact (Abbasi et al., 2020). As a result, it is safe to venture that stressors caused by this pandemic are expected to exacerbate further academic stressors for tertiary students who are under extreme stress prior this pandemic (Grubic et al., 2020) which will then affect their academic performance.

Although tertiary students are prone to experiencing stressors and mental health problems, they have low rates of seeking help. The result of a study shows that 37.5% of women reported seeking help. On the other hand, only 16% of men sought help; however, none were receiving counseling or therapy even though they scored, for overall psychological distress, at the at-risk range (Hubbard et al., 2018). Furthermore, based on research examining depression among tertiary students, 49% experienced, due to persistent stress, a state of physical, emotional, and mental exhaustion, while 17% had moderate to severe depression. 81% of depressed respondents were undiagnosed, and 23% stated that their stress was due to an inability to cope (Thompson et al., 2016).

In conclusion, the reviewed literature shows that tertiary students' mental health and resilience are affected by the COVID-19 pandemic. In addition to academic stressors, students face pandemic-related stressors that are expected further to intensify the heavy burden on their mental health (Conrad et al., 2020). This study aims to determine the mental health status and level of resiliency of selected students in a sectarian institution during this COVID-19 pandemic.

Methodology

The research used a quantitative analysis presentation while employing aspects of descriptive-comparative and descriptive-correlational research designs. A Descriptive Correlational research design can be analyzed quantitatively with no manipulation of variables. On the other hand, descriptive comparative analysis is a quantitative representation that attempts to compare similar specimens or cases in some aspects but differs in others. This involved giving participants questionnaires or surveys containing a set list of answers to collect statistical data. The gathered data were assessed to determine whether there is an interrelationship between mental health and resilience. The respondents of this study were students from a sectarian university in Silang, Cavite. They are students who enrolled in Term 1 of SY 2020-2021 specifically from the College of Dentistry.

The entire college of Dentistry has approximately 120 enrolled clinicians, and through this technique, we needed at least 92 students to participate in this study. Convenience sampling was the ideal form to select our participants. This aided our need to reach all sorts of diversity that made our data collection more heterogeneous regarding location, year level, sex, social, and economic status of students from the college of dentistry during the COVID-19 pandemic. The study had 94 dental clinicians from the Adventist University of the Philippines College, Silang Cavite. Among the respondents, 19 (20.2%) were between the age group 20-22 years, 59(62.8%) were from the age group 23-25 years, 12(12.8%) were between the age group 26-28 years, and 4(4.3%) were between the age group 29 and above years old.

The instrumentation used in this study was google questionnaire forms in which we evaluated the selected dentistry students to assess their capacity to bounce back or recuperate from stress. The research study instrument consisted of two measurements: the depression, anxiety, and stress scale (DASS-21) questionnaire and the Resilience Scale (RS-14) for measuring the extent of mental health and resilience of the respondents during the COVID-19 pandemic.

The DASS-21 is the shortened version of the DASS-42 developed by Lovibond and Lovibond (Lovibond & Lovibond, 1995 & Beaufort et al., 2017). It contains items and subjects that are asked to use 4-point severity/frequency scales to rate the degree to which they have experienced each state over the previous week. Sinclair et al. (2011) showed that the internal consistency reliability for DASS-21 was adequate with values of 0.91, 0.80, and 0.84 for depression, anxiety, and stress, respectively. According to another study by Coker et al. (2018), the reliability of DASS-21 showed that it has great Cronbach's alpha values of 0.81, 0.80. and 0.78 for depression, anxiety, and stress, respectively. The scores for depression, anxiety, and stress were determined by adding the scores for the relevant items.

Table 1. *Corresponding item number for each DAS Scale*

Scale	Item Numbers
Depression	3, 5, 10, 13, 16, 17, 21
Anxiety	2, 4, 7, 9, 15, 19, 20
Stress	1, 6, 8, 11, 12, 14, 18

Table 2. *Score Interpretation on DASS-21*

	Depression (D)	Anxiety (A)	Stress (S)
Normal	0-4	0-3	0-7
Mild	5-6	4-5	8-9
Moderate	7-10	6-7	10-12
Severe	11-13	8-9	13-16
Extremely Severe	14-21	10-21	17-21

Wagnild and Young's Resilience Scale (RS) estimates the ability to endure life stressors and flourish from challenges. The RS-14 is a shorter form of 25 items and measures similar psychological concepts. The RS and its short form have good reliability and validity from several studies. Mirošević et al. (2018) showed that Cronbach's α for RS-14 was 0.88; thus, RS-14 was found to perform well in clinical and non-clinical samples.

Table 3. *Score Interpretation on RS-14*

Resilience	
Low	(<64)
Moderately Low to Moderate	(65-81)
Moderately High	(82-90)
High	(>90)

Foremost, approval for the research study was obtained, after which the questionnaires were presented to the panel members for validation. An application for ethical protocols was presented to the Ethics Review Board (ERB) for approval to gather data. Furthermore, a letter requesting permission to conduct data-gathering procedures was given to the Dean of the College of Dentistry. The Dean provided an endorsement letter to the researchers. The participants were asked to sign the consent forms after informing them of the details of the research. Due to the present circumstances, the questionnaires were distributed via email and the clinician's messenger group chat, where we ensured that respondents were clinicians and that they were involved in the scope of our research by cross-checking it to the master list of clinicians enrolled during the 1st semester of SY 2020-2021. Once completed, the data from the questionnaires were collected and finalized. The final data collected was organized in Microsoft Excel and presented to the statistician. The information was encoded and explored with the assistance of the analyst.

Findings/Results

This section discusses the statistical analysis and interpretation of the information assembled to determine selected university students' mental health and resilience during the COVID-19 pandemic. A total of 94 participants answered the online questionnaire. Most of the respondents were Residents (48.9%), followed by Clinic 2 (21.3%), Clinic 4 (11.7%), Clinic 3 (9.6%), and Clinic 1 (8.5%).

The table below shows the mean total score of the respondents per variable. The mean for depression is 7 (SD=4.62), for anxiety is 6 (SD=3.97), and for stress is 7 (SD=3.74). Both depression and anxiety have moderate results, while stress is normal.

Table 4. *Comparison of the mental health of the respondents*

Variable	Mean	SD	Verbal Interpretation
Depression	7	4.62	Moderate
Anxiety	6	3.97	Moderate
Stress	7	3.74	Normal

Table 5 shows that the result for resilience is low, with a mean of 52 and a standard deviation of 8.84.

Table 5. *Resilience of the respondents*

Variable	Mean	SD	Verbal Interpretation
Resilience	52	8.84	Low

Table 6 shows a significant relationship between mental health and resilience at $p < 0.05$. The value of r is always between +1 and -1. The interpretation for r -values are as follows: -1 is a perfect downhill (negative) linear relationship, -0.70 is an intense downhill (negative) linear relationship, -0.50 is a moderate downhill (negative) relationship, -0.30 is weak downhill (negative) linear relationship and 0 is no linear relationship (Rumsey, 2016). The results show that depression (r -value= -0.520; p -value=0.000), anxiety (r -value= -0.334; p -value= 0.001), and stress (r -value = -0.403; p -value = 0.000)

have moderate to a weak downhill (negative) relationship with resilience. This means that as the clinicians' depression, anxiety, and stress increase, the level of resilience decreases, and vice versa.

Table 6. Relationship between mental health and resilience of respondents (N=94)

		Resiliency
Depression	r-value	-0.520**
	p-value	0.000
Anxiety	r-value	-0.334**
	p-value	0.001
Stress	r-value	-0.403**
	p-value	0.000

**Correlation is significant at $p < 0.05$

The present study is in accordance with a research in China that investigated the population's mental health and resilience in response to COVID-19. The result showed that resilience was inversely proportional to mental health (Ran et al., 2020).

Table 7 represents data showing the overall mean and standard deviation of the relationship between mental health and resilience of the 94 respondents considering sex.

Table 7. Significant relationship between mental health and resilience of respondents considering sex

Sex		Mean	SD	p-value	r-value	Verbal Interpretation
Male (N=33)	Depression	6.12	4.57	0.001	-0.530	Significant
	Anxiety	5.12	3.84	0.048	-0.346	Significant
	Stress	6.30	3.77	0.064	-0.327	Not significant
Female (N=61)	Depression	7.43	4.62	0.000	-0.519	Significant
	Anxiety	6.41	4.001	0.010	-0.328	Significant
	Stress	7.64	3.67	0.000	-0.458	Significant

Legend: $P < 0.05$ the null hypothesis is rejected; $p > 0.05$ the null hypothesis is accepted

The results from table 8 show that age does not have a significant relationship between the mental health and resilience of the respondents except for the younger groups of our respondents, which are 20-22 and 23-25.

Table 8. Significant relationship between mental health and resilience of respondents considering age.

Age		Mean	SD	p-value	r-value	Verbal interpretation
20-22 (N=19)	Depression	6.63	3.70	0.017	-0.539	Significant
	Anxiety	6.32	3.40	0.250	-0.277	Not significant
	Stress	6.74	2.77	0.134	-0.356	Not significant
23-25 (N=59)	Depression	7.53	4.99	0.000	-0.559	Significant
	Anxiety	6.34	4.36	0.008	-0.343	Significant
	Stress	7.71	4.22	0.001	-0.435	Significant
26-28 (N=12)	Depression	5.92	4.34	0.728	-0.113	Not significant
	Anxiety	4.50	2.35	0.486	-0.223	Not significant

29 + (N=4)	Stress	5.50	2.54	0.537	-0.198	Not significant
	Depression	3.50	1.29	0.464	-0.536	Not significant
	Anxiety	3.00	2.83	0.639	0.361	Not significant
	Stress	6.25	0.96	0.638	0.362	Not significant

Legend: $P < 0.05$ the null hypothesis is rejected; $p > 0.05$ the null hypothesis is accepted

Depression, anxiety, and stress have the highest mean in the 23 to 25 age group ($\bar{X}=7.53$, $SD=4.99$), ($\bar{X}=6.34$, $SD=4.36$), ($\bar{X}=7.71$, $SD=4.22$) respectively. Age group 29 and above has the lowest mean in depression and anxiety ($\bar{X}=3.50$, $SD=1.29$), ($\bar{X}=3.00$, $SD=2.83$), respectively, whereas age group 26 to 28 has the lowest mean in stress ($\bar{X}=5.50$, $SD=2.54$).

For the respondents with age between 20-22, depression (r -value= -0.539) has a moderate downhill (negative) relationship with resilience, while anxiety and stress (r -value= -0.277, r -value= -0.356) respectively; has a weak downhill (negative) linear relationship with resilience.

Respondents with age between 23-25, depression (r -value= -0.559) have a moderate downhill (negative) relationship with resilience, whereas anxiety and stress (r -value= -0.343, r -value= -0.435) respectively; has a weak downhill (negative) linear relationship with resilience.

The correlation coefficient of respondents with ages between 26-28. Their depression, anxiety, and stress (r -value= -0.113, r -value= -0.223, and r -value= -0.198) have a weak downhill (negative) linear relationship with resilience.

Respondents aged 29 and above have a moderate downhill (negative) relationship between depression (r -value= -0.536) and resilience, while both anxiety and stress (r -value= -0.361 and r -value= -0.362), respectively, have a weak downhill (negative) linear relationship with resilience.

Table 9 shows that among our respondents, lower clinic level and residents have a significant relationship between mental health and resilience. Other studies also support this.

Table 9. Significant relationship between mental health and resilience of respondents considering their year level

Year Level		Mean	SD	p-value	r-value	Verbal interpretation
Clinic 1 (N=8)	Depression	8.50	2.88	0.820	-0.096	Not significant
	Anxiety	8.38	2.56	0.683	0.172	Not significant
	Stress	8.00	2.67	0.928	-0.039	Not significant
Clinic 2 (N=20)	Depression	6.05	5.36	0.011	-0.553	Significant
	Anxiety	5.50	3.86	0.338	-0.226	Not significant
	Stress	6.55	3.73	0.144	-0.339	Not significant
Clinic 3 (N=9)	Depression	8.67	6.52	0.036	-0.700	Significant
	Anxiety	5.11	4.01	0.016	-0.769	Significant
	Stress	7.33	4.30	0.031	-0.714	Significant
Clinic 4 (N=11)	Depression	5.91	4.39	0.526	-0.215	Not significant
	Anxiety	4.45	4.06	0.448	-0.256	Not significant
	Stress	6.64	3.38	0.841	-0.069	Not significant
Residence (N=46)	Depression	7.02	4.16	0.000	-0.576	Significant
	Anxiety	6.26	4.11	0.011	-0.370	Significant
	Stress	7.39	3.96	0.001	-0.475	Significant

Legend: $P < 0.05$ the null hypothesis is rejected; $p > 0.05$ the null hypothesis is accepted

Clinic 3 has the highest mean in depression ($\bar{X}=8.67$, $SD=6.52$), whereas clinic 1 has the highest mean in both anxiety and stress ($\bar{X}=8.38$, $SD=2.56$), ($\bar{X}=8.00$, $SD=2.67$) respectively. Clinic 4 has the lowest mean in depression, anxiety, and stress ($\bar{X}=5.91$, $SD=4.39$), ($\bar{X}=4.45$, $SD=4.06$) and ($\bar{X}=6.64$, $SD=3.38$), respectively.

The correlation coefficient for Clinic 1 respondents has a weak downhill (negative) linear relationship between depression, anxiety, and stress (r -value= -0.096, r -value= -0.172, and r -value= -0.039), respectively, with resilience.

For clinic 2 respondents, the depression (r -value= -0.553) has a moderate downhill (negative) relationship with resilience. Both anxiety and stress (r -value= -0.226 and r -value= -0.339), respectively, have a weak downhill (negative) linear relationship with resilience.

Clinic 3 respondents have a strong downhill (negative) linear relationship between depression, anxiety, and stress (r -value= -0.700, r -value= -0.769, and r -value= -0.714), respectively, with resilience. Respondents from clinic 4 had a weak downhill (negative) linear relationship between depression, anxiety, and stress (r -value= -0.215, r -value= -0.256, and r -value= -0.069), respectively, with resilience. Residents' depression (r -value= -0.576) has a moderate downhill (negative) relationship with resilience, while anxiety and stress (r -value= -0.370 and r -value= -0.475), respectively, have a weak downhill (negative) linear relationship with resilience.

Results from table 10 show that as we moved to a group with 90,001 and above monthly family income, the connection between mental health and resilience of the respondents started becoming insignificant.

Table 10. *Significant relationship between mental health and resilience of the respondents considering their socio-economic status*

Monthly family income		Mean	SD	p-value	r-value	Verbal interpretation
10, 000 - 30, 000 (N=29)	Depression	6.93	4.43	0.099	-0.312	Not significant
	Anxiety	5.69	3.58	0.940	-0.015	Not significant
	Stress	7.03	4.16	0.332	-0.187	Not significant
30, 001 - 60, 000 (N=30)	Depression	6.23	4.18	0.001	-0.574	Significant
	Anxiety	6.07	4.11	0.021	-0.419	Significant
	Stress	6.67	3.06	0.007	-0.482	Significant
60, 001 - 90, 000 (N=20)	Depression	7.80	5.28	0.000	-0.707	Significant
	Anxiety	6.50	4.64	0.022	-0.510	Significant
	Stress	8.10	4.48	0.005	-0.598	significant
90,001 and above (N=15)	Depression	7.40	5.12	0.036	-0.545	Significant
	Anxiety	5.53	3.78	0.063	-0.490	Not significant
	Stress	7.20	3.17	0.072	-0.477	Not significant

Legend: $P < 0.05$ the null hypothesis is rejected; $p > 0.05$ the null hypothesis is accepted

The group with 60,001 to 90,000 family monthly income has the highest mean in depression, anxiety, and stress ($\bar{X}=7.80$, $SD=5.28$), ($\bar{X}=6.50$, $SD=4.64$), and ($\bar{X}=8.10$, $SD=4.48$) respectively. The group with 30,001 to 60, 000 family monthly income has the lowest mean in both depression and stress ($\bar{X}=6.23$, $SD=4.18$), ($\bar{X} = 6.67$, $SD=3.06$) respectively, whereas the group with 90,001 and above has the lowest mean in anxiety ($\bar{X}=7.20$, $SD=3.17$).

The group of respondents with a monthly income between 10,000 – 30,000 has a weak downhill (negative) linear relationship between depression, anxiety, and stress (r-value= -0.312, r-value= -0.015, and r-value= -0.187) with resilience.

Respondents with a family monthly income of 30,001-60,000 have a moderate downhill (negative) relationship with resilience, while anxiety and stress (r-value= -0.419 and r-value= -0.482), respectively, have a weak downhill (negative) linear relationship with resilience.

Depression, anxiety, and stress (r-value= -0.707, r-value= -0.510, and r-value= -0.598), respectively, have a moderate downhill (negative) relationship with resilience for the group of 60,001-90,000 family monthly income.

The group with 90,001 and above family monthly income has a moderate downhill (negative) relationship between depression (r-value= -0.545) with resilience, whereas anxiety and stress (r-value= -0.490 and r-value = -0.477), respectively, have a weak downhill (negative) linear relationship with resilience.

Table 11 shows that the respondents' residences had a significant relationship between their mental health and resilience. This can be interpreted as long respondents being provided with self-care practices to help cope with the stresses of their future profession, as stated in a study by Kim et al. (2015).

Table 11. *Significant relationship between mental health and resilience of the respondents considering their residences*

Residence		Mean	SD	p-value	r-value	Verbal interpretation
In-campus (N=80)	Depression	7.10	4.83	0.000	-0.496	Significant
	Anxiety	5.86	3.99	0.004	-0.317	Significant
	Stress	7.16	3.78	0.001	-0.376	Significant
Off-campus (N=14)	Depression	6.21	3.26	0.002	-0.756	Significant
	Anxiety	6.50	3.98	0.036	-0.562	Significant
	Stress	7.21	3.68	0.017	-0.626	Significant

Legend: $P < 0.05$ the null hypothesis is rejected; $p > 0.05$ the null hypothesis is accepted

In-campus residents have the highest mean in depression ($\bar{X}=7.10$, $SD=4.83$), whereas off-campus students have the highest mean in both anxiety and stress ($\bar{X}=6.50$, $SD=3.98$) ($\bar{X}=7.21$, $SD=3.68$) respectively.

The group of off-campus residents had the lowest mean in depression ($\bar{X}=6.21$, $SD=3.26$), while the group of on-campus students had the lowest mean in both anxiety and stress ($\bar{X}=5.86$, $SD=3.99$), ($\bar{X}=7.16$, $SD=3.78$) respectively.

In-campus respondents have a weak downhill (negative) relationship between depression, anxiety, and stress (r-value= -0.496, r-value= -0.317, and r-value= -0.376), respectively, with resilience. In comparison, off-campus has a moderate downhill (negative) relationship with depression, anxiety, and stress (r-value= -0.756, r-value= -0.562, and r-value= -0.626), respectively, with resilience.

Table 12 shows that although the respondents that had counseling or therapy do not have a significant relationship between mental health and resilience as far as anxiety is concerned, both groups have a significant relationship between mental health and resilience in depression and stress.

Table 12. *Significant relationship between mental health and resilience of the respondents considering whether they had counseling/therapy or not*

Had Counseling/ therapy		Mean	SD	p-value	r-value	Verbal Interpretation
Yes (N=12)	Depression	8.54	5.81	0.041	-0.595	Significant
	Anxiety	7.50	3.73	0.335	-0.305	Not significant
	Stress	8.17	4.20	0.047	-0.582	Significant
No (N=82)	Depression	6.73	4.42	0.000	-0.491	Significant
	Anxiety	5.73	3.98	0.004	-0.316	Significant
	Stress	7.02	3.68	0.001	-0.358	Significant

Legend: $P < 0.05$ the null hypothesis is rejected; $p > 0.05$ the null hypothesis is accepted

Among our respondents, the one that had counseling or therapy had the highest mean in depression, anxiety, and stress ($\bar{X}=8.54$, $SD=5.41$), ($\bar{X}=7.50$, $SD=3.73$), ($\bar{X}=8.17$, $SD=4.20$) respectively. A study by Pedrelli et al. (2014) supports these results where it was found that even when students receive counseling or therapy, it often appears inadequate.

Respondents who did not get counseling or therapy have the lowest mean in depression, anxiety, and stress ($\bar{X}=6.73$, $SD=4.42$), ($\bar{X}=5.73$, $SD=3.98$) and ($\bar{X}=7.02$, $SD=3.68$) respectively.

Respondents who had counseling/therapy had a moderate downhill (negative) relationship between depression and stress ($r\text{-value} = -0.595$ and $r\text{-value} = -0.582$), respectively, with resilience, while anxiety ($r\text{-value} = -0.305$) has a weak downhill (negative) linear relationship with resilience.

The respondents who did not have counseling/therapy had a weak downhill (negative) linear relationship between depression, anxiety, and stress ($r\text{-value} = -0.491$, $r\text{-value} = -0.316$, and $r\text{-value} = -0.358$), respectively, with resilience.

Discussion

Ninety-four dental clinicians from the Adventist University of the Philippines (AUP), specifically those enrolled during Term 1 of SY 2020-2021, participated in this study. The data was gathered using Convenience Sampling, and statistical tests used were standard deviation, mean, independent t-test, and Pearson's correlation. Among the respondents, there were thirty-three males (35%) and sixty-one females (65%) of which were mainly in the age bracket of 23-25 ($N=59$; 62.8%) followed by 20-22 ($N=19$; 20.2%), 26-28 ($N=12$; 13.3%), then 29 and above ($N=4$; 4.1%) years of age. The respondents were primarily Residents ($N=46$; 48.9%), followed by Clinic 2 ($N=20$; 21.3%), Clinic 4 ($N=11$; 11.7%), Clinic 3 ($N=9$; 9.6%), and Clinic 1 ($N=8$; 8.5%). Most of them lived in-campus ($N=80$; 85.1%), while the rest were off-campus ($N=14$; 14.9%). Lastly, a total of twelve respondents had counseling (12.8%), while eighty-two did not have counseling (87.2%).

For mental health status, the results show that the respondents' depression and anxiety were moderate, with a mean of 7 ($SD=4.62$) and 6 ($SD=3.97$), respectively, while stress was normal, with a mean and standard deviation of 7 and 3.74 respectively. Results also show that the respondents' resilience was low, with 52 for mean and 8.84 for standard deviation.

For the relationship between mental health and resilience, the results showed a significant relationship with p-values of 0.000, 0.001, and 0.000 for depression, anxiety, and stress, respectively. Furthermore, depression with an $r\text{-value}$ of -0.520, anxiety with an $r\text{-value}$ of -0.334, and stress with an $r\text{-value}$ of -0.403 were negatively correlated with resilience. This means that the resilience of clinicians increased as depression, anxiety, and stress decreased, and vice versa.

For the relationship between mental health and resilience considering sex, the mean score of depression ($\bar{X}=7.43$), anxiety ($\bar{X}=6.41$), and stress ($\bar{X}=7.64$) for females were the highest compared to

DAS of male clinicians with a mean score of 6.12, 5.12, and 6.30, respectively. As expected, Table 18 showed that the mean score for females' resilience (\bar{X} =51.44; SD=8.17) was lower than for the male clinicians (\bar{X} =52.06; SD=10.09).

Furthermore, depression with a p-value of 0.000, anxiety with a p-value of 0.010, and stress with a p-value of 0.000 in females all had significant relationships with resilience—no significant relationship for stress, alone, in males (p-value=0.064).

For the relationship between mental health and resilience considering age, 23-25 years of age had the highest mean score in depression (\bar{X} =7.53), anxiety (\bar{X} =6.34), and stress (\bar{X} =7.71). This would suggest that students between 23-25 years of age were affected the most during this pandemic. The age group 29 and above had the lowest mean in depression and anxiety, whereas the age group 26 to 28 had the lowest mean in stress. In the age group, 20-22, depression (p-value=0.017) alone had a significant relationship with resilience. Depression with a p-value of 0.000, anxiety with a p-value of 0.008, and stress with a p-value of 0.001 in the age group 23-25 had significant relationships with resilience. Meanwhile, DAS at age 26 and above had no significant relationship with resilience.

For the relationship between mental health and resilience considering year level, Clinic 3 had the highest mean of 8.67 for depression (SD=6.52), while Clinic 1 had the highest score for anxiety and stress with a mean of 8.38 (SD= 2.56) and 8.00 (SD=2.67), respectively. In Clinic 3 and Residents, depression, anxiety, and stress had a significant relationship at $p < 0.05$. In Clinic 2, depression (p-value=0.011) alone had a significant relationship with resilience. In Clinics 1 and 4, DAS had no significant relationship with resilience.

For the relationship between mental health and resilience considering socio-economic status, respondents with monthly family income between 60,001 to 90,000 have the highest mean in depression (\bar{X} =7.80), anxiety (\bar{X} =6.50), and stress (\bar{X} =8.10). Notably, respondents with monthly family income between 30,001 to 60,000 have the lowest score in depression, with a mean of 6.23, and stress, with a mean of 6.67. Family monthly income between 30, 001-60, 000 and 60, 001-90, 000 depression with a p-value of 0.001, anxiety with a p-value of 0.021, and stress with a p-value of 0.007 had a significant relationship with resilience. In contrast, depression with a p-value of 0.036 alone had a significant relationship for 90,001 and above. DAS had no significant relationship with resilience in family monthly income between 10,000-30,000.

For the relationship between mental health and resilience considering residence, in-campus students had the highest mean of 7.10 in depression (SD=4.83), compared to off-campus students with a mean of 6.21 (SD=3.26). Furthermore, depression with a p-value of 0.000, anxiety with a p-value of 0.004, and stress with a p-value of 0.001 for in-campus had significant relationships with resilience. Likewise, depression with a p-value of 0.002, anxiety with a p-value of 0.036, and stress with a p-value of 0.017) for off-campus had significant relationships with resilience.

For the relationship between mental health and resilience considering counseling/therapy, respondents that had counseling or therapy had the highest mean of 8.54 (SD=5.41) for depression, 7.50 (SD=3.73) for anxiety, and 8.17 (SD=4.20) for stress. In comparison, respondents who did not get counseling or therapy had the lowest mean of 6.73 (SD=4.42) for depression, 5.73 (SD=3.98) for anxiety, and 7.02 (SD=3.68) for stress. At $p < 0.05$, depression and stress had a significant relationship with resilience for those who had counseling/therapy. At $p < 0.05$, depression, anxiety, and stress had a significant relationship with resilience for those who did not have counseling/therapy. Only anxiety (p-value= 0.335) among students who had counseling/therapy had no significant relationship with resilience.

For the difference in resilience alone of the respondents, the results showed no significant difference when sex, age, year level, socio-economic status, residence, and counseling/therapy were considered.

Limitations and Implications

The possibility of collecting inaccurate and dishonest answers from the respondents, especially since they were asked to answer based on their situation during the 1st semester of SY 2020. Another limitation could be the slow internet in each respondent's respective dwellings or the lack of cellular

load. In addition, counseling/therapy was not specified in terms of timeline and duration, and lastly, there was an unequal distribution between the in-campus (N=80) and off-campus (N=14) respondents who participated in this study.

Conclusion

The study showed that there was a high prevalence of depression and anxiety among dental clinicians in AUP. After the relationship between mental health and resilience were determined, the results showed that there was a significant relationship which implied that mental health status influenced clinicians' level of resilience. The following conclusions were derived based on the results of the study. Regarding the relationship between mental health and resilience, considering the variables, depression, anxiety, and stress (DAS) in females all had significant relationships with resilience. For the age group 20-22, depression alone had a significant relationship, while for the age group 23-25, DAS had a significant relationship with resilience. For Clinic 3 and Residents, DAS had a significant relationship, while for Clinic 2, depression alone had a significant relationship with resilience. For a family monthly of 30,001-90,000, DAS had a significant relationship with resilience, while depression alone for 90,001 and above had a significant relationship. For both on-campus and off-campus, DAS had a significant relationship with resilience. For those who did not have counseling/therapy DAS had a significant relationship with resilience. For those who had counseling/therapy, only depression and stress had a significant relationship with resilience. It should be noted that counseling/therapy was not specified in terms of timeline and duration, which could have affected the participants' responses in this study.

As far as resilience is concerned, the difference in resilience of the respondents had no significant relationship when sex, age, year level, socio-economic status, residence, and counseling/therapy were considered

References

- [1] Aafreen, M. M., Priya, V. V., & Gayathri, R. (2018, January 1). *Effect of stress on academic performance of students in different streams*. ResearchGate. https://www.researchgate.net/publication/327202330_Effect_of_stress_on_academic_performance_of_students_in_different_streams
- [2] Abbasi, S., Ayoob, T., Malik, A., & Memon, S. I. (2020, May 1). *Perceptions of students regarding E-learning during Covid-19 at a private medical college*. PubMed Central (PMC). <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7306963/>
- [3] Bagnes, H. M. (2020). *Influence of Religious Practices and Social Support on the Mental Health of Dental Clinicians*. Adventist University of the Philippines.
- [4] Beaufort, I., De Weert-Van Oene, G., Buwalda, V., de Leeuw, J., & Goudriaan, A. (2017). The Depression, Anxiety and Stress Scale (DASS-21) as a Screener for Depression in Substance Use Disorder Inpatients: A Pilot Study. *European Addiction Research*, 23(5), 260–268. <https://doi.org/10.1159/000485182>
- [5] Cao, W., Fang, Z., Hou, G., Han, M., Xu, X., Dong, J., & Zheng, J. (2020, March 20). *The psychological impact of the COVID-19 epidemic on college students in China*. PubMed. <https://pubmed.ncbi.nlm.nih.gov/32229390/>
- [6] Coker, A., Coker, O., & Sanni, D. (2018). Psychometric properties of the 21-item Depression Anxiety Stress Scale (DASS-21). *African Research Review*, 12(2), 135. <https://doi.org/10.4314/afrrrev.v12i2.13>
- [7] Conrad, R., Rayala, H., Menon, M., & Vora, K. (2020, March 23). *Universities' Response to Supporting Mental Health of College Students During the COVID-19 Pandemic*. Psychiatric Times. <https://www.psychiatristtimes.com/view/universities-response-supporting-mental-health-college-students-during-covid-19-pandemic>

- [8] Grubic, N., Badovinac, S., & Johri, A. M. (2020, March). *Student mental health in the midst of the COVID-19 pandemic: A call for further research and immediate solutions*. ResearchGate. https://www.researchgate.net/publication/341105770_Student_mental_health_in_the_midst_of_the_COVID-19_pandemic_A_call_for_further_research_and_immediate_solutions
- [9] Hubbard, K., Reohr, P., Tolcher, L., & Downs, A. (2018). *Stress, Mental Health Symptoms, and Help-Seeking in College Students*. PSI CHI Journal of Psychological Research. https://cdn.ymaws.com/www.psichi.org/resource/resmgr/journal_2018/23-4_hubbard.pdf
- [10] Jowkar, Z., Masoumi, M., & Mahmoodian, H. (2020, February 12). *Psychological Stress and Stressors Among Clinical Dental Students at Shiraz School of Dentistry, Iran*. PubMed. <https://pubmed.ncbi.nlm.nih.gov/32104133/>
- [11] Kiernan, S., & DeVita, M. (2020, April 6). *Travel Restrictions on China due to COVID-19*. Think Global Health. <https://www.thinkglobalhealth.org/article/travel-restrictions-china-due-covid-19>
- [12] Lovibond, S.H. & Lovibond, P.F. (1995). *Manual for the Depression Anxiety Stress Scales*. (2nd. Ed.) Sydney: Psychology Foundation.
- [13] Mirošević, P., Klemenc-Ketiš, Z., & Selič, P. (2018). The 14-item Resilience scale as a potential screening tool for depression/anxiety and quality of life assessment: a systematic review of current research. *Family Practice*, 36(3), 262–268. <https://doi.org/10.1093/fampra/cmy081>
- [14] Ran, L., Wang, W., Ai, M., Kong, Y., Chen, J., & Kuang, L. (2020, July 29). *Psychological resilience, depression, anxiety, and somatization symptoms in response to COVID-19: A study of the general population in China at the peak of its epidemic*. PubMed Central (PMC). <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7388777/>
- [15] Sahu, P. (2020, April 4). *Closure of Universities Due to Coronavirus Disease 2019 (COVID-19): Impact on Education and Mental Health of Students and Academic Staff*. Cureus. <https://www.cureus.com/articles/30110-closure-of-universities-due-to-coronavirus-disease-2019-covid-19-impact-on-education-and-mental-health-of-students-and-academic-staff>
- [16] Sinclair, S. J., Siefert, C. J., Slavin-Mulford, J. M., Stein, M. B., Renna, M., & Blais, M. A. (2011). Psychometric Evaluation and Normative Data for the Depression, Anxiety, and Stress Scales-21 (DASS-21) in a Non-clinical Sample of U.S. Adults. *Evaluation & the Health Professions*, 35(3), 259–279. <https://doi.org/10.1177/0163278711424282>
- [17] Thompson, G., McBride, R. B., Hosford, C. C., & Halaas, G. (2016). *Resilience Among Medical Students: The Role of Coping Style and Social Support*. PubMed. <https://pubmed.ncbi.nlm.nih.gov/27064719/>
- [18] Wagnild, G., & Young, H. (1993). Development and psychometric evaluation of the Resilience Scale. *Journal of nursing measurement*, 1(2), 165-178
- [19] World Health Organization. (2020, March 12). *WHO announces COVID-19 outbreak a pandemic*. World Health Organization Regional Office for Europe. <https://www.euro.who.int/en/health-topics/health-emergencies/coronavirus-covid-19/news/news/2020/3/who-announces-covid-19-outbreak-a-pandemic>

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Correlation between Physical Activity in Natural Environment and Anxiety and Depressive Disorder Symptoms: A Cross-Sectional Study among University Students

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Abstract: Mental health is a raising concern, globally. Anxiety disorders and depression dominate among all mental health problems. Studies have shown the impact of physical activity and nature on improving mental health, including depression, and anxiety symptoms. This study was conducted at Asia-Pacific International University (AIU), Thailand to find out the correlation between physical activity in a natural environment with depressive and anxiety disorder symptoms. It is a cross-sectional study, a total of 62 students participated in a survey. This study indicates a high prevalence of depressive (67.2%) and anxiety (77%) symptoms regardless of the severity level at AIU campus. Thirty-five questionnaires were analyzed by using Pearson's correlation. Results show that there is a weak negative ($r=-0.157$) correlation between physical activity in a natural environment and anxiety symptoms, and a weak positive ($r=0.134$) correlation between physical activity in a natural environment and depressive symptoms.

Keywords: *natural environment, physical activity, anxiety, depression*

Introduction

Mental health problems are now a rising public health concern worldwide. Good mental health is defined as "a state of well-being in which an individual realizes his or her own abilities, can cope with the normal stresses of life, work productively and contribute to his or her community" (The World Health Organization, 2018). In 2017, there were estimates of 792 million people living with a mental health disorder, which is around one in ten globally (10.7%) (Dattani, Ritchie, & Roser, 2021). Mental health problems are the single largest cause of disabilities worldwide, and some of the major disabilities are depression, anxiety, dementia, and alcohol abuse (Pan American Health Organization, 2019). Among these, depression and anxiety disorders dominate (Dattani, Ritchie, & Roser, 2021). Moreover, depression and anxiety were among the top ten causes of disability-adjusted life-years in 10–24-year-old in 2019 (GBD 2019 Diseases and Injuries Collaborators, 2020).

As the most prevalent mental disorder, depression is defined as "a mood disorder that causes a persistent feeling of sadness and loss of interest" (Mayo Clinic, n.d., para. 1). Anxiety refers to an emotion identified by tense feelings, worried thoughts and physical changes like sweating, trembling, dizziness, etc. (American Psychological Association, n.d.). They often occur concurrently and sequentially in youth (Garber & Weersing, 2011).

The outbreak of the COVID-19 pandemic has put people under widespread emotional distress, significantly on those with anxiety and/or depressive disorders. A nationwide survey in China in 2021 found that the implementation of unprecedented strict quarantine measures has triggered a series of psychological disorders, such as panic disorder, anxiety, and depression (Qiu et al., 2020). Panchal et al. (2021) pointed out that the average share of adults in the U.S. reporting anxiety or depressive disorder symptom has increased from 11.0% in January to July 2019 to 41.1% in January 2021.

Literature Review

There is growing evidence of physical activity acts as a protective factor against mental health symptoms among children and adolescents. It protects against the emergence of depression regardless of age and geographical region and decreases anxiety symptoms in people with a current diagnosis of anxiety and /or stress-related disorders (Oliva et al., 2021; Schuch et al., 2018; Stubbs et

al., 2017). Chekroud et al. (2018) looked at the association between physical exercise and mental health in 1.2 million individuals in the USA. They found that all types of exercise were associated with a lower mental health burden than no exercise. The most significant associations with mental health were found in popular team sports, cycling, aerobics, and gym activities, with durations of 45 mins, and frequencies of three to five times per week. Another study by Grasdalsmoen et al. (2020) examined the association between frequency, intensity, and duration of physical exercise and mental health problems among university students. They found that psychological distress and depressive disorder were negatively associated with physical activity, the more frequent, intense, and longer the duration, the less psychological distress and depressive disorders were reported.

Besides exercise, nature has also shown its power in improving mental health problems. Nature affiliation impacts people's physical health and overall well-being positively (Howell & Passmore, 2013). According to Hossain et al. (2020), exposure to a natural environment improved depressive symptoms, anxiety, and mood disorders. In addition, exposure to nature increases positive emotions and the ability to reflect on a life problem (Mayer et al., 2009). A study by Beyer et al. (2014) showed that higher levels of neighborhood green space were significantly associated with lower levels of depression, anxiety, and stress symptoms. A recent study also showed that nature contact provides positive well-being effects, maintains mental health, and has the potential for boosting resilience to environmental stressors, including those associated with COVID-19 (Samuelsson et al., 2020).

Research Objective

Mitchell's study (2013) concluded that physical activity in natural environments was associated with reducing poor mental health more than physical activity in other environments. Lawton et al. (2017) found that people who engaged in outdoor physical activity reported higher nature-relatedness experiences and lower somatic anxiety levels. Asia-Pacific International University campus, located at Muak Lek, Thailand is surrounded by mountains, tree-lined pathways, and high green coverage. This study aims to find out if there is a correlation between physical activity in a natural environment and depressive and anxiety symptoms among the students at Asia-Pacific International University.

Research Questions and Hypothesis

Q: Is physical activity in a natural environment correlated with depressive symptoms?

H: Physical activity in a natural environment is correlated with depressive symptoms.

Q: Is physical activity in a natural environment correlated with anxiety symptoms?

H: Physical activity in a natural environment is correlated with anxiety symptoms.

Null Hypothesis:

Physical activity in a natural environment is not correlated with depressive symptoms.

Physical activity in a natural environment is not correlated with anxiety symptoms.

Methodology

Study Design and Setting

This study was a quantitative, cross-sectional study conducted at Asia-Pacific International University (AIU) Muak Lek campus in Saraburi, Thailand. The study population consisted of international students at Asia-Pacific International University that live on campus. Participants voluntarily filled in a questionnaire about their physical activity and depression and anxiety symptoms during the past seven days.

Instruments/Measures

The questionnaire used in this study was adapted from the Depression Anxiety Stress Scale-21 (DASS21) (University of Wisconsin-Madison, n.d.) and the International physical activity questionnaire (IPAQ) short version (IPAQ, n.d.). DASS21 is a short version of a self-report instrument designed to

measure depression, anxiety, and stress. Questions related to stress were removed since it was not the focus of this study. It does not require training to administer this questionnaire; it targets participants typically 17 and above and individuals in clinical settings or a research study. (NovoPsych, n.d.) IPAQ is a well-developed instrument that can be used internationally. It accesses respondents' vigorous, moderate physical activity and walking in the past week. In this study, these questions are divided into two sections that accessed participants' indoor and outdoor physical activity (IPAQ, n.d.). Both questionnaires are in the public domain and require no permission for use.

Data Collection

Before starting data collection, the proposal was sent to the research department at AIU for approval. After receiving the approval at the end of January, data collection started at the end of March and ended in the first week of April. This questionnaire was formed using google forms and was distributed to each dormitory messenger group to students at the library. Later, random sampling was used to send the questionnaire to students individually through messenger to get more students to participate.

Data Analysis

Data analysis was performed using the Statistical Package for the Social Sciences (SPSS). Descriptive statistics were used to examine the prevalence of depressive and anxiety symptoms, as well as physical activity levels. Pearson's correlation was used to analyze the linear relationship between indoor and outdoor physical activities and depressive and anxiety symptoms.

Ethical Considerations

An explanatory document about the survey and informed consent was provided to participants. Those who consented were asked to complete an anonymous, self-reported questionnaire.

Results

A total of 63 responses were received. One respondent filled in only demographic data; therefore, was removed. The remaining 62 responses were analyzed.

The youngest of the respondents was 19 years old, and the oldest was 32. Gender was almost evenly distributed at 46.8% and 53.2% male and female, respectively. Most of the respondents are Seventh-Day Adventist (SDA) Christians (83.6%), followed by Buddhists (8.2%), Baptists (6.6%), and others (1.6%). The distribution among the faculties from most to least were Arts & Humanities (22.6%), Education (22.6%), Religious studies (21.0%), Business Administration (8.1%), Information technology (8.1%), and Nursing (1.6%).

Prevalence of Physical Activity and Depressive Anxiety Symptoms

Responses were used to analyze the prevalence of physical activity and depressive anxiety symptoms and the correlation analysis. The prevalence of normal, moderate, and high physical activity levels at AIU were 37.1%, 42.9%, and 20.0%, respectively. The prevalence of reported normal, mild, moderate, severe, and extremely severe anxiety symptoms were 23.0%, 11.5%, 19.7%, 11.5%, and 34.4% respectively. The prevalence of reported normal, mild, moderate, severe, and extremely severe depressive symptoms were 32.8%, 13.1%, 19.7%, 18.0%, and 16.4% respectively.

The Correlation Between Physical Activity in A Natural Environment and Depressive Anxiety Symptoms

Pearson's correlation was used to analyze the correlation between physical activity in natural environments (referred to as "outdoor") and depressive and anxiety symptoms, indoor physical activity, and depressive and anxiety symptoms.

Table 1. *Correlation between Outdoor Physical Activity and Anxiety Symptoms*

	anxiety	MET_category_outdoor
MET_category_outdoor Pearson Correlation	-.157	1
Sig. (2-tailed)	.367	
N	35	35

Table 1 shows the weak negative correlation between outdoor physical activity and anxiety symptoms, the more outdoor physical activity, the fewer reported anxiety symptoms.

Table 2. *Correlation between Outdoor Physical Activity and Depressive Symptoms*

	MET_category_outdoor	depression
MET_category_outdoor Pearson Correlation	1	.134
Sig. (2-tailed)		.443
N	35	35

Table 2 shows the weak positive correlation between outdoor physical activity and depressive symptoms, the more outdoor physical activity, the more reported depressive symptoms.

Table 3. *Correlation between Indoor Physical Activity and Anxiety Symptoms*

	anxiety	MET_category_indoor
MET_category_indoor Pearson Correlation	.064	1
Sig. (2-tailed)	.715	
N	35	35

Table 3 shows there is no correlation between indoor physical activity and anxiety symptoms.

Table 4. *Correlation between Indoor Physical Activity and Depressive Symptoms*

	depression	MET_category_indoor
MET_category_indoor Pearson Correlation	.051	1
Sig. (2-tailed)	.773	
N	35	35

Table 4 shows there is no correlation between indoor physical activity and depressive symptoms.

Discussion

The results from this study indicated a high prevalence of depressive (67.2%) and anxiety (77%) symptoms regardless of the severe level. The majority of the respondents (62.9%) reported they had a moderate or high level of physical activity. The high prevalence of depressive anxiety symptoms, maybe because of the questionnaire. A study from Norton (2007) shows that Asian reported higher DASS-21 scores than other racial groups such as African, Caucasian, and Hispanic/Latin. Results also show no correlation between indoor physical activity and depressive anxiety symptoms. A weak negative correlation was found between outdoor physical activity and anxiety symptoms. A weak positive correlation was found between outdoor physical activity and depressive symptoms. The study by Taniguchi, et al. (2022) indicates exposure to sunlight is one important factor that has a positive impact on people's mental health, including depression.

Results on the correlation between outdoor physical activity and anxiety agree with Lawton et al.'s (2017) study. People who engaged in outdoor physical activity reported significantly lower somatic anxiety levels. Mitchell's study (2012) showed regular use of natural environments was associated

with a lower risk of poor mental health. However, no association solely between depression and the use of the natural environment was examined in Mitchell's study. Results from this study suggest the effect of physical exercise in the natural environment on solely depressive symptoms should be further examined.

Limitations

There were several limitations in this study, the biggest was the small sample size. The survey instruments were used directly without considering the primary language of the respondents. For example, how much time did the respondents spend on vigorous physical activity in the past week? Respondents were expected to answer how many minutes or hours. Instead, some respondents reported 1-2 times and were therefore removed from the data analysis. Besides, a mistake in question was found at the early stage of questionnaire distribution, and responses before fixing the error had to be removed. If a pilot study was carried out before actual research, it would have made a difference.

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References

- [1] American Psychological Association. (n.d.). Anxiety. <https://www.apa.org/topics/anxiety>
- [2] Beyer, K. M. M., Kaltenbach, A., Szabo, A., Bogar, S., Nieto, F. J., & Malecki. (2014). Exposure to neighborhood green space and mental health: Evidence from the survey of the health of Wisconsin. *Int J Environ Res Public Health*, 11(3), 3453–3472. <https://doi.org/10.3390/ijerph110303453>
- [3] Chekroud, S. R., Gueorguieva, R., Zheutlin, A. B., Paulus, M., Krumholz, H. M., Krystal, J. H., & Chekroud, A. M. (2018). Association between physical exercise and mental health in 1.2 million individuals in the USA between 2011 and 2015: a cross-sectional study [Abstract]. *The Lancet Psychiatry*, 5(9), 739–746. [https://doi.org/10.1016/S2215-0366\(18\)30227-X](https://doi.org/10.1016/S2215-0366(18)30227-X)
- [4] Dattani, S., Ritchie, H., & Roser, M. (2021). Mental health. *Our World in Data*. <https://ourworldindata.org/mental-health#citation>
- [5] GBD 2019 Diseases and Injuries Collaborators. (2020). Global burden of 369 diseases and injuries in 204 countries and territories, 1990–2019: a systematic analysis for the global burden of disease study 2019. *Lancet*, 396, 1204–22. <https://www.thelancet.com/action/showPdf?pii=S0140-6736%2820%2930925-9>
- [6] Garber, J., Weersing, V. R. (2011). Comorbidity of anxiety and depression in youth: Implications for treatment and prevention. *Clin Psychol (New York)*, 17(4), 293–306. <https://doi.org/10.1111/j.1468-2850.2010.01221.x>
- [7] Grasdalsmoen, M., Eriksen, H. R., Lønning, K. J., & Sivertsen, B. (2020). Physical exercise, mental health problems, and suicide attempts in university students. *BMV Psychiatry*, 20, 175. <https://doi.org/10.1186/s12888-020-02583-3>
- [8] Howell, A.J., & Passmore, H. (2013). The nature of happiness: Nature affiliation and mental well-being. In C. L. M. Keyes (Ed.), *Mental well-being: International contributions to the study of positive mental health* (pp. 231–257). https://doi.org/10.1007/978-94-007-5195-8_11
- [9] Hossain, M., Sultana, A., Ma, P., Fan, Q., Sharma, R., Neetut, & Sharmin, D. F. (2020). Effects of natural environment on mental health: an umbrella review of systematic reviews and meta-analyses. <https://doi.org/10.31234/osf.io/4r3mh>

- [10]Lawton, E., Brymer, E., Clough, P., & Denovan, A. (2017). The relationship between the physical activity environment, nature relatedness, anxiety, and the psychological well-being benefits of regular exercisers. *Front. Psychol.*, 26. <https://doi.org/10.3389/fpsyg.2017.01058>
- [11]Mayo Clinic. (n.d.). Depression (major depressive disorder). <https://www.mayoclinic.org/diseases-conditions/depression/symptoms-causes/syc-20356007>
- [12]Mayer, F. S., Frantz, C. M., Bruehlman-Senecal, E., & Dolliver, K. (2009). Why is nature beneficial? The role of connectedness to nature. *Environment and Behavior*, 41(5), 607-643. <https://doi.org/10.1177/0013916508319745>
- [13]Mitchell, R. (2013). Is physical activity in natural environments better for mental health than physical activity in other environments? [Abstract]. *Social Science & Medicine*, 91, 130-134. <https://doi.org/10.1016/j.socscimed.2012.04.012>
- [14]NovoPsych. (n.d.). *Depression anxiety stress scales - short form (DASS-21)*. <https://novopsych.com.au/assessments/depression/depression-anxiety-stress-scales-short-form-dass-21/>
- [15]Norton, P. J. (2007). Depression anxiety and stress scales (DASS-21): Psychometric analysis across four racial groups. *Anxiety Stress Coping*, 20(3), 253-65. <https://doi.org/10.1080/10615800701309279>
- [16]Oliva, S., Russo, G., Gili, R., Mauro, A. D., Spagnoli, A., Fegatelli, D. A., Romani, M., Costa, A., Veraldi, S., & Manti, F. (2021). Risks and protective factors associated with mental health symptoms during COVID-19 home confinement in Italian children and adolescents: The # Understandingkids study. *Front. Pediatr.* <https://doi.org/10.3389/fped.2021.664702>
- [17]Panchal, N., Kamal, R., Cox, C., & Garfield, R. (February 10, 2021). The implications of COVID-19 for mental health and substance use. Kaiser Family Foundation. <https://www.kff.org/coronavirus-covid-19/issue-brief/the-implications-of-covid-19-for-mental-health-and-substance-use/>
- [18]Pan American Health Organization. (2019.). Mental health problems are the leading cause of disability worldwide, say experts at PAHO Directing Council side event. https://www3.paho.org/hq/index.php?option=com_content&view=article&id=15481:mental-health-problems-are-the-leading-cause-of-disability-worldwide-say-experts-at-paho-directing-council-side-event&Itemid=72565&lang=en
- [19]Qiu, J., Shen, B., Zhao, M., Wang, Z., Xie, B., & Xu, Y. (2020). A nationwide survey of psychological distress among Chinese people in the COVID-19 epidemic: implications and policy recommendations. *Gen. Psychiatry*, 33, 1-3.
- [20]Schuch F. B., Vancampfort, D., Firth, J., Rosenbaum, S., Ward, P. B., Silva, E. S., Hallgren, M., Leon, A. P. D., Dunn, A. L., Deslandes, A. C., Fleck, M. P., Carvalho, A. F., & Stubbs, B. (2018). Physical activity and incident depression: A meta-analysis of prospective cohort studies. [Abstract]. *The American Journal of Psychiatry*. <https://doi.org/10.1176/appi.ajp.2018.17111194>
- [21]Stubbs, B., Vancampfort, D., Rosenbaum, S., Firth, J., Cosco, T., Veronese, N., Salum, G. A., & Schuch, F. B. (2017). An examination of the anxiolytic effects of exercise for people with anxiety and stress-related disorders: A meta-analysis. *Psychiatry Res*, 249, 102-108. <https://doi.org/10.1016/j.psychres.2016.12.020>
- [22]Samuelsson, K., Barthel, S., Colding, J., Macassa, G., & Giusti, M. (2020). Urban nature as a source of resilience during social distancing amidst the coronavirus pandemic. <https://doi.org/10.31219/osf.io/3wx5a>
- [23]Taniguchi, K., Takano, M., Tobari, Y., Hayano, M., Nakajima, S., Minura, M., Tsubota, & Noda, Y. (2022). Influence of external natural environment including sunshine exposure on public mental: A systematic review. *Psychiatry Int*, 3(1), 91-113. <https://doi.org/10.3390/psychiatryint3010008>

- [24]University of Wisconsin-Madison. (n.d.). *Depression anxiety stress scale-21(DASS21)*.
<https://arc.psych.wisc.edu/self-report/depression-anxiety-stress-scale-21-dass21/>
- [25]World Health Organization. (2018, March 30). Mental health: strengthening our response.
<https://www.who.int/news-room/fact-sheets/detail/mental-health-strengthening-our-response>

Effects of Social Support and Self-Esteem on Physical Health Mediated by Community Participation of Physically Challenged Individuals

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Abstract: This paper aims to design a structural equation model and evaluate confirmatory factor analysis using construct validity, convergent validity, and discriminant validity to explain better the effects of social support and self-esteem on physical health mediated by community participation of 360 individuals between the ages 18 to 60 who are physically disabled and wheelchair users living in the Philippines. The purposive sampling method was utilized in the collection of data. Average Variance Extracted (AVE) was used to satisfy the convergent validity. It was indicated that each latent construct had an AVE above the threshold level of 0.5. This implied that indicators are significantly correlated to each other within their latent construct. Similarly, discriminant validity was also established as indicated in the Fornell-Larcker Criterion results. This also suggested that latent constructs were distinct from one another. The structural Equation Model also showed that community participation fully mediated the effects of social support on physical health while it partially mediated the impacts of self-esteem on physical health. Social support and self-esteem both contributed 69.5% to the variance of community participation. In turn, community participation and self-esteem both contributed 82.4% to the variance in physical health.

Keywords *structural equation modeling, social support, self esteem, physical health, community participation*

1. Introduction

People with Disabilities (PWD) are one of the most marginalized groups in the world and are now considered to be a human rights issue. The world population is composed of 15% of people with disabilities (PWD) who are appraised to be more than one billion. This is a 5% increase from the previous report of the World Health Organization in 1970 (World Health Organization (WHO), 2017). In addition, around 200 million are suffering from physical disabilities and approximately 10% of those suffering from physical disabilities require to have a wheelchair (WHO, 2010).

Several studies (Canha et al., 2016; Dajpratham and Kongkasuwan, 2011; Kuvalekar et al., 2015) confirmed that the health-related quality of life of people with disability was poor than the population as a whole and physical health is the main concern of the disabled person. PWD always experience body pains, discomfort, decrease energy, and shortness of breath that disrupts their normal activities. Furthermore, dissatisfaction with their capacity and performance to perform daily activities, inaccessibility to health care, poor social inclusion, stigma, and injustices are reasons for having dissatisfaction with the physical health of people with disabilities (Copestake et al., 2014).

Participation has been defined operationally in terms of involvement in different roles in the community such as sports, livelihood, health service, and civic work. This involves decision-making, advocacy programs, and helping others with special needs in the community which are strong indicators of community participation entailing independence, social inclusion, and a high sense of involvement. However, being physically disabled caused low community participation due to various hindrances. Thus, it is challenging for leaders and disability sectors to create an effective program that will encourage people with disability to engage in the community (Ginis et al., 2017).

People with disability perceived social support as available human and material resources as needed. Hence, people with a disability experienced adequate concern, care, and love from their significant others. This social support must fit their needs to improve their social participation for their social growth. Some researchers described disability as a social concept than a medical issue. Thus, social support plays a significant role in enhancing the psychological health of disabled people (Christens and Lin, 2014; Forouzan et al., 2013).

Self-esteem is a personal judgment about worth and confidence in one's ability. It has a prominent role in the physical and psychological health of a person. Low self-esteem negatively influences the efficacy and creativity of physically- disabled individuals. They often doubt their abilities and blame their disability whenever negative situations arise. However, disabled people with high self-esteem have more respect for themselves, are confident to make their own decision, and often have the capacity to lead their peers. Furthermore, physically disabled people with high self-esteem feel their success in all responsibilities given to them (Bano, Anjum & Pasha, 2015; Houdek, MacCutcheon and Gilbertson, 2018)

Investigating factors such as social support and self-esteem are critical to the physical health of physically challenged individuals to maintain their comfort, quality of life and increase energy. Thus, this study is intended to determine to find out whether social support and self-esteem will influence the physical health of a person with a physical disability or not, and to what extent social support and self-esteem influence physical health as mediated by community participation.

2. Literature Review

2.1 Physical Health.

A study showed that the physical health score becomes poorer as age increases and the presence of a disability is associated with worsening physical health conditions compared to people without disabilities. Thus, the government needs to provide necessary health intervention and create policies that will focus on the health of people with disability (Pandit, 2016). Accordingly, poor physical health was found in individuals with a history of depression, low functional mobility, and low engagement in community programs. (White et al., 2016).

In addition, the study of Sahlin and Lexell (2015) found that people with disability who engaged in various community works and activities influence the physical and psychological domains of health-related quality of life. Furthermore, studies by the Center for Community Health and Evaluation and Human Impact partners (2015) and Patel, Kidd, and Frederick (2018) identified the connection between strong community engagement to better physical health conditions which leads to the development of psychological well-being.

In addition, the study of Pawlowska, Konarska and Zołnierczyk (2013) shows that people with physical disabilities reported having lower scores on perceived physical health-related quality of life which is associated with the low functional status of the respondents due to the physical signs such as body pains, weakness, easy fatigability that were regularly felt that disrupts their daily function. Another finding in this study showed that people with a physical disability who were unemployed have poor physical health due to inactivity.

Furthermore, the study found that people with disability were more likely to bear serious physical health conditions and high mortality rates than non-disabled people. However, involving them in community interventions will reduce health disparity (O' Mara-Eves, 2015).

In addition, a study conducted by Douglas, Georgiou, and Westbrook (2015) established that participation in the community such as volunteerism in a civic group improves social cohesion, and widens social networks will have a positive impact on the physical health of a person.

Moreover, several studies showed several variables were associated with physical health such as the study of Nishida, Ando and Sakakibara (2012) in which they showed that high self-care activities contributed to high social support that influenced better physical health. Also, high physical activity engagement had a better effect on physical health (Boullousa, Hautalla & Leicht, 2014; Colman & Dave, 2013; Mburu-Matiba, 2015; Rajati et al., 2018; Schmidt et al., 2017). Additionally, active household and leisure engagement has a positive effect on physical health (Dahan-Oliel, Majnemer and Shikako-Thomas, 2011).

The above literature review found that most PWPD suffer from poor physical health. Moreover, it also reveals that community participation and engagement in physical activity can influence the physical health of PWPD.

2.2 Community Participation

In the study of Akyurek and Bumin (2017), community participation is an important domain to be utilized in people with physical disabilities. The concept is based on the performance of people who are physically impaired on the level of participation in reference to the community setting and its facilitators and barriers to community participation. Community participation is a bridge to the gap between the person with a disability and the community.

The study by Tonak, Kitis, and Zencir, (2016) found that the physical and psychological domains of quality of life were affected by non-working status and no participation in community programs. The result implies the need to create programs that will encourage disabled people to actively engage in community programs to benefit from the training and other services offered in the community to enhance the physical and psychological Quality of Life of PWD. Furthermore, social support and community participation influence psychological enhancement (Christens and Lin, 2014).

The same findings go as well in the study of Salin and Lexell (2015) in which they found out that people with disability who engaged in various community works and activities influence physical and psychological domains of health-related quality of life. The study of Patel, Kidd and Frederick (2018) identified the connection between strong community engagement to better physical health conditions which leads to the development of psychological well-being. Likewise, the study of Mockevibieno and Savenkovieno (2012) showed that people with a physical disability who participated in different community activities such as sports and civic life have a better physical and psychological quality of life than those who did not participate. In addition, community integration decreases psychological health symptoms (Townley, 2015).

The National Disability Authority (NDA) (2014) reported that people with disability have the right to participate and lead in community groups and associations and decide and make the right choice based on their conscience and aspirations. Community participation is one of the most important goals identified by people with disability. Thus, agencies that provide for the health of people with disability need to create ways to develop the existing level of support for community participation among PWD.

The above review shows the importance of community participation among PWPD because it is central to their health-related quality of life. However, the literature reveals that a large number of people with physical disabilities had never or are rarely engaged in community activities. Thus, low participation of PWPD in community activities influences their quality of life.

2.3 Self-Esteem

Studies of Mustaq & Akhouri (2016) and Warimu (2015) discovered that there was a correlation between physical disability and the effect on self-esteem. Most people with disability have low self-esteem. The result of the correlation is associated with the diagnosis of a chronic disease that resulted in physical disability and is an initial driver of change in self-esteem.

Also, people with physical disabilities may be concerned about their functional disabilities, which do not necessarily conform to society or their perception of being different from others. Hence, they tend to feel either discriminated against or not belonging to a group. This low self-esteem reflects low self-respect and less efficiency (Lusli et al., 2015; Miyahara & Piek, 2014). This low self-esteem among people with disability is significantly associated between poor engagement in social activities and increased risk to their psychological health (Cantwell, Gallagher and Muldoon, 2015; Mikula et al., 2016) as well as physical health (Bagher-Nesami et al., 2016; Sani et al., 2016).

However, several studies showed that not all physically disabled people had low self-esteem, although, most of the studies were associated with other factors. These studies found that PWDs who have high knowledge, participate in social gatherings (Rice et al. 2015), are independent in wheelchair mobility (Pousada et al., 2014), and have higher self-esteem.

Also, disabled people who engaged in sports activities have high self-concept than those who did not engage in sports-related activities. People with physical disabilities participating in sports-related activities benefited from strengthening their motor functions and skills and made them discover their different identities and roles, giving them opportunities to change their perceptions and reduce their awareness of obstacles (Sahlin and Lexell, 2015). Further, the study showed an increase in self-esteem among people with physical disabilities who engaged in wheelchair dancing (De Villiers et al., 2013).

2.4 Social Support

According to the study of Devereux, Bullock, Gibb and Himler (2015), the severity of a disability, psychological symptoms, work independence, and social relationship are associated with perceived interpersonal support among people with a disability. Besides, people with disability perceived that family and friends' concern and care, transportation aid, and access to medical professionals and services were the promoters of social support (Davidsson & Sodergard, 2016; Vergunst et al., 2017).

However, several studies (Holanda et al., 2015; Human Right Watch, 2018; Sultan, Malik and Atta, 2016) found that PWDs had experienced poor support from friends for self-care and household activities and even disability-related services such as healthcare professional assistance and accessibility to various technology than people without disability. These resulted in reduced social inclusion which resulted in poor social interaction. Also, a study revealed that PWDs often encountered problems related to other people's attitudes toward their disability at home, community, and at work, leading to social inequality (Zheng et al., 2016). In addition, a lack of social support leads to extreme depression (Okhakhume, Aroniyiaso and Olagundoye, 2016).

Furthermore, the studies suggest that the presence of a severe physical disability can decrease social interactions and, if not properly addressed, eventually can cause social exclusion in society (Gooding, Anderson and McVilly, 2017). Thus, social support has a great influence on the psychological health of people with impairments. Thereby, adequate support that is readily available and the build-up of harmonious relationships and integration into social networks are important ingredients to promote independence and better psychological health (Tough et al., 2017). Also, high social support provides a better standard of living and active participation in different settings (Rock et al., 2016) as well as predicts better physical and psychological health (Anderson et al., 2017; Cantwell, Gallagher & Muldoon, 2015; Sazlina et al., 2012).

3. Methodology

The instrument was developed with a scale of 1-5 ranging from strongly disagree to strongly agree and pretested to 50 respondents who were members of the federation of persons with disability-Pasay Chapter and patients from one hospital in Pasay City. The Cronbach Alpha was computed and had the following alpha reliability coefficient: Self-Esteem, .954; Social Support, .941; Community Participation, .996; Physical Health, .972. Hence confirming the validity and reliability of the pre-tested instrument. The results assured that items within constructs are consistent with each other.

Thus, the final data gathering was conducted and collected 360 people with physical disability wheelchair users aged 18-60 years old who are living in the Philippines and purposive sampling methods were utilized. Of the 360 respondents, 160, 123 and 77 were from Luzon, Visayas and Mindanao respectively. The missing data was simply replaced by the median.

Data were analyzed using Partial least squares structural equation modeling (PLS-SEM). PLS-SEM is one of the most used techniques of multivariate data analysis. This type of multivariate technique is used to assess indicators/items. It can also further evaluate the causal relationships between latent constructs (Gudergan, Ringle, Wende, & Will, 2008). PLS-SEM maximizes the variance of the dependent latent construct. (Hair, Sarstedt, Ringle, & Mena, 2012). A variance-based SEM, PLS statistical approach, contrary to the covariance-based approach, is based on a component construct concept that is appropriate for explaining complex relationships brought about by many variables involved (Sarstedt, 2008; Valaei, Rezaei, & Ismail, 2017).

"The PLS algorithm allows each indicator to vary in how much it contributes to the composite score of the latent variable" (Chin, Marcolin, & Newsted, 2003, p. 25). Through new developments in PLS procedures, the method of SEM and PLS become a fully-fledged SEM approach (Henseler, Hubona, & Ray, 2016). PLS models may be assessed through tests of model fit, approximate measures of model fit based on bootstrapping (Dijkstra & Henseler, 2015), Average Variance Extracted, Correlation and Fornell-Larcher Criterion to account for Convergent and Discriminant validity.

4 Findings/Results

4.1. The goodness of model fit

The goodness of fit should be considered at the onset of model assessment prior to the examination of the measurement and structural model (Henseler et al., 2016). Thus, the need to report on the model fit by means of statistical inferences (tests of model fit) or use of the established fit indices (assessment of approximate model fit) (Dijkstra & Henseler, 2015; Henseler et al., 2016).

To evaluate the goodness of model fit, ADANCO statistical application is used to obtain the standardized root mean square residual (SRMR) as one of the suitable measures of model fit (L.-t. Hu & Bentler, 1998), as well as other criteria depending on the bootstrap to detect the likelihood of acquiring a discrepancy between the empirical and model-implied correlation matrix (Dijkstra & Henseler, 2015; Henseler et al., 2016) such as unweighted least squares discrepancy (dULS) (Dijkstra & Henseler, 2015) and geodesic discrepancy (dG).

According to Hair et al. (2014), a value of less than 0.1 (Hair et al., 2014) or 0.08, a more conservative view (L.-t. Hu & Bentler, 1998), is a good fit for SRMR. Table 1 revealed the tests of model fit as well as SRMR fit indicator. Agreeing with Henseler et al. (2016), the criteria of the complete model are SRMR < 95% of bootstrap quantile (HI95 and HI99 of SRMR), dULS < 95% of bootstrap quantile (HI95

and HI99 of dULS), and $dG < 95\%$ of bootstrap quantile (HI95 of dG). As shown in Table 1, these criteria are met; therefore, the model has a good fit.

Table 1. Goodness of fit as indicated by standardized root mean square residual (SRMR), unweighted least squares discrepancy (dULS) and geodesic discrepancy (dG).

Fit Criteria	Value	H195	H199
SRMR	0.0400	0.0228	0.0247
	1.3756	0.4481	0.5238
	3.5704	1.8263	2.1905

Construct validity and reliability are shown in Table 2 below consisting of constructs loadings, Average Variance Extracted (AVE), and Cronbach Alpha. Construct loadings are all above the minimum threshold value of 0.7 while the AVE of each construct is above the threshold level of .5 displaying convergent validity for all latent constructs. Likewise, Table 2 indicates that Cronbach's alpha values are between .964 and 0.994. The values are also acceptable (more than 0.7) (Henseler et al., 2016). Hence Table 2 indicates that all the latent constructs have a relatively higher level of internal consistency reliability (Hair, Ringle, & Sarstedt, 2011).

Table 2. Construct Validity

Construct	Item	Loadings	AVE			Cronbach Alpha
Self-Esteem	ps3	.819	.739	.969	.970	.969
	ps4	.883				
	ps5	.770				
	ps10	.912				
	ps11	.876				
	ps12	.880				
	ps14	.812				
	ps15	.852				
	ps16	.928				
	ps17	.898				
	ps19	.813				
Social Support	eso10	.917	.770	.964	.965	.964
	eso12	.917				

	eso13	.855				
	eso14	.914				
	eso15	.906				
	eso16	.871				
	eso17	.871				
	eso18	.758				
Community Participation	cp1	.973	0.9302	0.9938	0.9938	0.9938
	cp2	.973				
	cp3	.953				
	cp4	.956				
	cp5	.957				
	cp7	.977				
	cp8	.964				
	cp9	.949				
	cp10	.961				
	cp11	.966				
	cp12	.962				
	cp13	.981				
Physical Health	hp2	.785	.755	.969	.970	.968
	hp3	.883				
	hp4	.891				
	hp6	.852				
	hp8	.938				
	hp9	.902				
	hp10	.878				
	hp11	.894				
	hp13	.817				
	hp14	.848				

Table 3 shows Fornell and Larcker Criterion table (Fornell & Larcker, 1981). This is the correlation among the latent constructs which is shown in the off diagonal. The diagonal values shown are the depicted square root values of AVEs. Here the square root of AVE is being compared to the correlation among constructs. A comparison of the loadings should be that AVE is higher than correlations within the (Gold & Arvind Malhotra, 2001; Teo, Srivastava, & Jiang, 2008). The table below indicates that the discriminant validity is satisfied.

Table 3. *Discriminant validity- Fornell-Larcker criterion.*

Constructs	Self Esteem	Social Support	Community Participation	Physical Health
Self Esteem	.860			
Social Support	.424	.878		
Community Participation	.644	.481	.965	
Physical Health	.731	.420	.754	.869

The off-diagonal are the correlations amongst the latent constructs and diagonals are the square-root values of Average Variance Extracted (AVE).

4.2 Structural Model

The figure below is the resulting model of the effects of Social Support and Self-Esteem on Physical Health upon the mediation of Community Participation. Social Support and Self-Esteem contributed 67.6% of Community Participation while 79.1 % of Physical Health accounted for by Self-Esteem and Community participation. Effect sizes of Social Support and Self-Esteem on Community Participation are respectively .172 and .664 which is considered high. Effect sizes of Community participation and Self-Esteem on Physical Health are respectively .513 and .301 respectively which are again considered high.

Figure 1. *Emerging Structural Model of Social Support and Self-Esteem effects on Physical Health as mediated by Community Participation of Physically Challenged Individual*

5. Discussion

Mediation analysis was performed to assess the mediating effects of Community Participation on the influence of Social Support on Physical Health. The results (see table 4) revealed that the effect of Social Support on Physical Health was fully mediated by Community Participation ($H1: =.161, t=6.24, .000$).

Similarly, the direct effect of Self-Esteem on Physical Health is significant ($H1: =.407, t=8.74, .000$). The indirect effect of Self-Esteem on Physical Health through Community Participation was also found significant ($=.318, t=9.10, p=.000$). Hence with the inclusion of the mediating variable Community Participation, the impact of Self-Esteem on Physical Health (total effect) became significant ($=.725, t=25.19, p=.000$). This further shows that the relationship between Self-Esteem and Physical Health is partially mediated by Community participation.

Table 4. *Mediation effects of Community Participation in the influence of Self Esteem and Social Support on Physical Health*

Path Name	Total Effect			Direct Effect			Indirect Effect		
	Coefficient	t	p-value	Coefficient	t	p-value	Coefficient	t	p-value
SS->CP->PH	0.161	6.24	.000				0.161	6.24	.000
SE->CP->PH	0.725	25.19	.000	0.407	8.74	.000	0.318	9.10	.000

Legend: SS=Social Support, CP=Community Participation, PH=Physical Health, SE=Self Esteem

From the above result, it is recommended that the physically challenged individuals develop a community-based rehabilitation that will manage the strength and skills. In this way, they will be able to develop their physical health. Furthermore, there is a need to set up an organization for physically challenged individuals to develop their self-esteem and social support. Hence, when these are developed community participation will be enhanced, leading to the development of their physical health.

6. Limitations and Implication

This study considers self-esteem and social support as independent variables. These variables have a high standardized coefficient prediction on community participation among physically challenged individuals. In turn, community participation also has implications for physical health. However, self-esteem is also affected by other factors such as anxiety and depression, gender and the like. Likewise, social support can be predicted by other variables such as life stress (Won Hee Jun et al, 2018) and others.

Nevertheless, one should take note that social support does not have a direct effect on physical health. The effects of social support on physical health are via community participation. This means that community participation fully mediates the influence of social support on physical health. The more social support the better the physical condition. Similarly, community participation partially mediates the effects of self-esteem on physical health.

7. Conclusion

Among the physically challenged individuals, social support directly relates to their community participation. Akyurek and Bumin (2017) argued that people with physical disabilities utilize community participation as it bridges them and the people in the community. Interestingly, the above results showed that among the physically challenged individuals, the higher their self-esteem is, the more they participate in activities in the community and the more community involvement, their physical health improves. In effect, the more support they can get from their peer, parents, and friends the better their physical health. The study of Mustaq & Akhouri (2016) and Warimu (2015) concluded

that the low self-esteem of people with disabilities is associated with poor engagement in social activities; hence, increasing the risk to their psychological and physical health (Bagher-Nesami et al., 2016; Sani et al., 2016).

8. References

- [1] Akyurek, G. & Bumin, G. (2017). Community Participation in People with Disabilities. Department of Occupational Therapy, Faculty of Health Sciences, Hacettepe University, Ankara, Turkey. DOI: 10.5772
- [2] Bagher-Nesami, M., Goudarzian, A., Mirani, H., Jouybari, S. & Nasirii, D. (2016). Association Between Self-care Behaviors and Self-esteem of Rural Elderlies: Necessity of Health Promotion. *Mater Sociomed*. DOI: 10.5455/msm.2016.28.41-45
- [3] Bano, H., Anjum, N., & Pasha, S. (2015). Differences in Self-Esteem of University Students with and without Disability. *The Journal of Educational Research*. Vol 18. Issue 1
- [4] Canha, L., Simões, C., Matos, M., & Owens, L. (2016). Well-being and health in adolescents with disabilities. *Psicologia: Reflexão e Crítica*. DOI 10.1186/s41155-016-0041-9
- [5] Cantwell, J., Muldoon, M., & Gallagher, S. (2015). The influence of self-esteem and social support on the relationship between stigma and depressive symptomology in parents caring for children with intellectual disabilities: Stigma, self-esteem, and depressive symptomology. *Journal of Intellectual Disability Research*. DOI: 10.1111/jir.12205
- [6] Center for Community Health and Evaluation and Human Impact Partners (2015) Community Participation in Health Impact Assessments: A National Evaluation; Seattle, WA. Retrieved from http://www.humanimpact.org/wp-content/uploads/Full-report_Community-Participation-in-HIA-Evaluation.pdf
- [7] Christens, B. & Lin, C. (2014). Influences of Community and Organizational Participation, Social Support, and Sense of Community on Psychological Empowerment: Income as Moderator. *Family and Consumer Sciences Research Journal*. DOI: 10.1111/fcsr.12056
- [8] Colman, G., & Dave, D. (2013). Physical Activity and Health. National Bureau of Economic Research. <http://www.nber.org/papers/w18858>
- [9] Copestake, P., Sheikh, S., Johnston, J. & Bollen, A. (2014). Removing barriers, raising disabled people's living standards. Retrieved from <https://www.opm.co.uk/wp-content/uploads/2014/05/Removing-barriers-raising-living-standards.pdf>
- [10] Dahan-Oliel, N., Majnemer, A., & Shikako-Thomas, K. (2011). Quality of life and leisure participation in children with neurodevelopmental disabilities: A thematic analysis of the literature. *Quality of Life Research*. DOI: 10.1007/s11136-011-0063-9
- [11] Dajpratham, P., & Kongkasuwan, R., (2011). Quality of life Among the Traumatic Spinal Cord Injured Patients. *J Med Assoc*. 94: 1252-9
- [12] Davidsson, N., & Södergård, B. (2016). Access to Healthcare among People with Physical Disabilities in Rural Louisiana. *Social Work in Public Health*. <https://doi.org/10.1080/19371918.2015.1099496>
- [13] De Villiers D., Van Rooyen FC., Comm M., Beck V., Calitz Y., Erwee T., &Van Eeden L. (2013). Wheelchair dancing and self-esteem in adolescents with physical disabilities. *South African Journal of Occupational Therapy*. ISSN 2310-3833
- [14] Devereux, P., Bullock C., Gibb, Z., & Himler, H., (2015). Social-ecological influences on interpersonal support in people with physical disability. *Disabil Health J*. DOI:10.1016
- [15] Dijkstra, T. K., & Henseler, J. (2015). Consistent and asymptotically normal PLS estimators for linear structural equations. *Computational Statistics & Data Analysis*, 81, 10e23. Fornell, C., & Larck
- [16] Douglas, H., Georgiou, A., & Westbrook, J. (2015). Social participation as an indicator of successful aging: an overview of concepts and their associations with health. *Australian Health Review*. <http://dx.doi.org/10.1071/AH16038>

- [17]Elloker, T., Rhoda, A., Arowoia, A., & Lawall. (2018). Factors predicting community participation in patients living with stroke, in the Western Cape, South Africa. *Journal of Disability and Rehabilitation*. <https://doi.org/10.1080/09638288.2018.1473509>
- [18]Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research*, 18(1), 39e50.
- [19]Forouzan, A., Mahmoodi, A., Shushtari, Z., Salimi, Y., Sajjadi, H., & Mahmoodi, Z., (2013). Perceived Social Support Among People With Physical Disability. *Iran Red Crescent Med J*. DOI: 10.5812/ircmj.12500
- [20]Garcia, E. (2014). Persons with Disabilities: Status in the Philippines. 1 st International Conference of Public Librarians. Retrieved from <http://web.nlp.gov.ph/nlp/sites/default/files/20Mar2014/Persons%20with%20Disabilities%20by%20Edgardo%20garcia.pdf>
- [21]Ginis, M., Evans, M., Mortenson, W., & Noreau, L., (2017). Broadening the Conceptualization of Participation of Persons With Physical Disabilities: A Configurative Review and Recommendations. *Arch Phys Med Rehabil*. Vol 98 pp.395-402. IS: 00039993
- [22]Gooding, P., Anderson, J., & McVilly, K. (2017). Disability and social inclusion 'Down Under': A systematic literature review. *Journal of Social Inclusion*. Retrieved from <https://josi.journals.griffith.edu.au/index.php/inclusion/article/view/964/886>
- [23]Haegele, J., Aigner, C., & Healy, S. (2018). Physical activity, body mass index, and health status among youth with severe visual impairments aged 13–17 years in the United State. DOI: <https://doi.org/10.1016/j.dhjo.2018.07.001>
- [24]Hair, J. F., Sarstedt, M., Ringle, C. M., & Mena, J. A. (2012). An assessment of the use of partial least squares structural equation modeling in marketing research. *Journal of the Academy of Marketing Science*, 40(3), 414e443.
- [25]Hair, J. F., Henseler, J., Dijkstra, T., Sarstedt, M., Ringle, C., Diamantopoulos, A., et al. (2014). Common beliefs and reality about partial least Squares: Comments on ronkk € o and evermann. *€ Organizational Research Methods*, 17(2), 182e209.
- [26]Henseler, J., Hubona, G., & Ray, P. A. (2016). Using PLS path modeling in new technology research: Updated guidelines. *Industrial Management & Data Systems*, 116(1), 2e20.
- [27]Hu, L.-t., & Bentler, P. M. (1998). Fit indices in covariance structure modeling: Sensitivity to underparameterized model misspecification. *Psychological Methods*, 3(4), 424e453.
- [28]Holanda, C., Andrade, A., Bezerra, M., Nascimento, J., Neves, R., Alves, S., & Ribeiro, K. (2015). Support networks and people with physical disabilities: social inclusion and access to health services. DOI:10.1590/1413-81232014201.
- [29]Houdek, N., MacCutcheon, N., & Gilbertson, T. (2018). Self-Esteem. *Good Therapy*. Retrieved from <https://www.goodtherapy.org/learn-about-therapy/issues/self-esteem>
- [30]Jun, W., Yang, J., Lee, E., The Mediating Effects of Social Support and a Grateful Disposition on the Relationship between Life Stress and Anger in Korean Nursing Students; Elsevier Volume 12, issue 3, September 2018.
- [31]Kuvalekar, K., Kamath, R., Ashok, L., Shetty, B., Mayya, S., & Chandrasekaran, V. (2015). Quality of Life among Persons with Physical Disability in Udipi Taluk: A Cross Sectional Study. *J Family Med*. DOI: 10.4103/2249-4863.152258
- [32]Lusli, M., Zweekhorst, M., Miranda-Galarza, B., Peters, R. Cummings, S., Seda, F.,& Bunders, J. (2015). Dealing with Stigma: Experiences of Persons Affected by Disabilities and Leprosy. *BioMed Research International* <http://dx.doi.org/10.1155/2015/261329>
- [33]Mburu-Matiba, L. (2015). The Impact of Exercise (Physical Activity) and Healthy Lifestyle (Eating) Among the Youth. A Literature Review. *Health care and social service*. Thesis.
- [34]Mushtaq, S., & Akhour, D. (2016). Self Esteem, Anxiety, Depression and Stress among Physically Disabled People. *The International Journal of Indian Psychology*. Volume 3, Issue 4, No. 64 ISSN 2348-5396

- [35]National Disability Authority (2014). Promoting the Participation of People with Disabilities in Physical Activity and Sport in Ireland. Retrieved from <http://nda.ie/Publications/Health/Health-Publications/Promoting-the-Participation-of-People-with-Disabilities-in-Physical-Activity-and-Sport-in-Ireland1.html>
- [36]Okhakhume, A., Aroniyaso, O., Olagundoye, O., (2016). Influence of Social Support, Stress and Coping Strategies on Depression among Children with Physical Disability in Nigeria, *International Journal of Clinical Psychiatry*. doi: 10.5923/j.ijcp.20160402.01.
- [37]O'Mara-Eves, A., Brunton, G., Oliver, S., Kavanagh, J., Jamal, F., & Thomas, J. (2015). The effectiveness of community engagement in public health interventions for disadvantaged groups: a meta-analysis. *BMC Public Health*. <https://doi.org/10.1186/s12889-015-1352-y>
- [38]Patel, P, Kidd, S., & Frederick, T. (2018). Physical health, community participation and schizophrenia. *Journal of Health Psychology*. DOI: 10.1177/1359105316666654
- [39]Pousada, T., Pereira, J., Nieto, L., Groba, B., & Díez, E. (2014). Evaluating The Psychosocial Impact Of Wheelchair In People With Neuromuscular Disorders. Retrieved from <https://www.resna.org/sites/default/files/conference/2014/Outcomes/Pousada.html>
- [40]Rajati, F., Ashtarian, H., Salari, N., Ghanbari, M., Naghibifar, Z., & Hosseini, S. (2018). Quality of life predictors in physically disabled people. *Journal of Education and Health Promotion*. DOI: 10.4103/jehp.jehp_115_17
- [41]Sahlin, B., & Lexell, J. (2015). Impact of organized sports on activity, participation, and quality of life of people with neurologic disabilities PM R 1081-1088. DOI:10.1016
- [42]Sarstedt, M. (2008). A review of recent approaches for capturing heterogeneity in partial least squares path modelling. *Journal of Modelling in Management*, 3(2), 140e161
- [43]Schmidt, S., Tittlbach, S., Bös, K., & Woll, A. (2017). Different Types of Physical Activity and Fitness and Health in Adults: An 18-Year Longitudinal Study. *BioMed Research International*. <https://doi.org/10.1155/2017/1785217>
- [44]Tonak, HA., Kitis, A., & Zencir, M. (2016). Analysis of Community Participation Levels of Individuals Who Are Physically Disabled and Working in Industrial Environments. *Soc Work Public Health*. DOI:10.1080/19371918.2016.1160336
- [45]Townley, G. (2015). "It Helps You Not Feel So Bad—Feel Like You Again": The Importance of Community for Individuals with Psychiatric Disabilities. *Journal of Psychosocial Rehabilitation and Mental Health*. <https://doi.org/10.1007/s40737-015-0036-3>
- [46]Valaei, N., Rezaei, S., & Ismail, W. K. W. (2017). Examining learning strategies, creativity, and innovation at SMEs using fuzzy set Qualitative Comparative
- [47]Vergunst, R., Swartz, L., Hem, KG., Eide, AH, Mannan, H., MacLachlan, M., Mji, G.,.... Schneider, M. (2017). Access to health care for persons with disabilities in rural South Africa. *BMC Health Services Research* (2017) DOI 10.1186/s12913-017-2674-5
- [48]Warimu, H. (2015). Influence of Physical Disability on Self-Esteem among Adolescents in Kiambu County, Kenya. *International Journal of Innovative Research & Development Vol 4 Issue 11*. ISSN 2278 – 0211
- [49]White, J., Magin, P., Attia, J., Sturm, J, McElduff, P, & Carter, G. (2016). Predictors of health-related quality of life in community-dwelling stroke survivors: a cohort study. *Fam Pract*. doi: 10.1093/fampra/cmw011
- [50]World Health Organization (2017). WHOQOL: Measuring Quality of Life. Health statistics and information systems- World Health Survey. Retrieved from <http://www.who.int/healthinfo/survey/whoqol-qualityoflife/en/index4.html>
- [51]Zheng, Q., Tian, Q., Hao, C., Gu, J., Lucas, R., Tao, J., ...& Hao, Y. (2016). Comparison of attitudes toward disability and people with disability among caregivers, the public, and people with disability: findings from a cross-sectional survey. *BMC Public Health*. DOI 10.1186/s12889-016-3670-0

Galaw-Galaw at Pasasalamat: Effects of the Psycho-Physical Intervention Program on the Psychological Well-Being and Self-Esteem of Filipino Young Adults During the Covid-19 Pandemic

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Abstract: The effects of the COVID-19 pandemic have led to detriments for society resulting in mental disturbances and a sedentary lifestyle. However, there is a lack of information in current studies related to the effects of physical activity and gratitude on psychological well-being and self-esteem among Filipino young adults. Hence, this study aimed to determine the effects of the psycho-physical intervention program called High-Intensity Interval Training (HIIT) on the psychological well-being and self-esteem of Filipino young adults. This study utilized a quasi-experimental research design and voluntary sampling technique. The findings showed that the participants (n=31) had high levels of self-esteem and moderately high levels of psychological well-being before the intervention, there were no significant differences in the control group's self-esteem and psychological well-being whereas the experimental group had significant differences in self-esteem and psychological well-being with regards to purpose in life only. Therefore, this study discovered that individuals who regularly engaged in HIIT and express gratitude for 14 days could increase their self-esteem and psychological well-being concerning their purpose in life during this pandemic.

Keywords: *psychological well-being, self-esteem, gratitude, physical activity, COVID-19*

Introduction

The effect of the COVID-19 pandemic and the implementation of various restrictions have led to numerous unforeseen circumstances within society. The virus brought hindrances in the lives of many – be it with their work, financial stability, social life, and even with their plans. As highlighted in a May 2020 United Nations policy briefing, in an effort towards encouraging the international community to protect vulnerable populations stated that COVID-19 has had terrible consequences for mental health (United Nations, 2020). Adolescents and young adults were identified as an important target group, as they have had considerable disruptions in their education and housing situations and may face long-term financial consequences (Guintella et al., 2020; Villani et al., 2021; Li et al., 2021).

As of August 22, 2021, the World Health Organization (WHO) estimated the total number of cases documented worldwide to have surpassed 211 million, with over 4.4 million deaths. Consequently, the fundamental causes of low psychological well-being and mental health were the increase in infected cases, high fatality rate, and extensive isolation. With each passing second, it had a slight impact on their psychological and mental well-being, manifested in the form of increased tension, anxiety, depressive symptoms, and also occasional pain (Bao et al., 2020; Rubin & Wessely, 2020).

According to the results of a recent global study by YoungMind (2020), over 83 percent of respondents stated that being in quarantine had detrimental impacts on their mental health. Moreover, one in four university students suffered from mental and psychological problems (Odriozola-González et al., 2020). In addition, the mental health and psychological well-being of university students had been disrupted as a result of the pandemic (Wang et al., 2020). Based on the study of Sahu (2020), many students have indicated that pre-existing mental health concerns have worsened due to quarantine and self-isolation.

Furthermore, studies revealed that the incidence was twice as high for those who suffered from mental health disorders. Self-efficacy and self-esteem were revealed to be important predictors of psychological distress. Individuals in hospitals who were isolated for medical treatment were more

prone to experience depression, anxiety, wrath, and a loss of self-esteem. In contrast, those with high self-esteem experienced higher alterations in risk perception and fear arousal. Strong self-esteem was linked to good self-management (Villaroya et al., 2021; Lin & Chen, 2020; Chochinov, Bolton & Sareen, 2020; Arima et al., 2020).

Enforcing preventive strategies in addressing the contagion, such as the practice of social distancing, wearing masks, virtual meetings, and classes, were attempts made to reduce the risk of increased infection of the virus (Charney, Camarata, & Chern, 2020); these were known as nonpharmacological interventions. Despite the good intentions behind these prevention plans, they may have caused psychological detriments. According to Cheung et al. (2020), people who were in quarantine areas may experience boredom, anger, and loneliness; the symptoms of the coronavirus may contribute to the mentioned psychological distress due to fears of contracting the disease.

The restrictions brought by the pandemic have also reduced the physical activity level of people and have contributed to an increase in sedentary lifestyles, which compromised the mental health of individuals, particularly among young adults (Bird, et al., 2021). Across the globe, there were increased regulations in social distancing, daily activities were restricted, and resulted in global demands from governments to keep safe and stay at home. Consequently, the vast majority of people spent most of their time at home. As a result of these social distancing measures, people had fewer opportunities to be active and fit, particularly when activities, like walking or cycling for transportation or partaking as a leisurely pastime (e.g. running, walking the dog, going to the gym), were restricted. Data from a cross-sectional study also highlighted how other impediments, such as laziness and exhaustion, lack of time, lack of motivation, and lack of proper facilities owing to social isolation during the pandemic, contributed to the physical inactivity of their study participants in Brazil (Farah et al., 2021). Physical inactivity was projected to have ramifications in a range of sectors, including healthcare, as well as the mental health of individuals across the world (Physiopedia, 2021). The inability to train and workout may have repercussions, exacerbated stress or anxiety that many people experienced resulting from social isolation.

Gratitude was studied by Positive Psychology for researchers to evaluate its benefits. It is more than just the feeling of being grateful; it is a broader appreciation for anyone or anything, that poses a long-term positive influence. It was also linked to increased happiness (Ackerman, 2021). Conforming to the Journal of Radiology Nursing (2020), essentially, as observed before the COVID Pandemic, besides communicating verbally or in writing, people expressed gratitude through a handshake, a warm hug, or a pat on the back, but recently due to social restrictions, there were novel ways to show appreciation. The simple act of giving a thumbs-up or heart emoji, a shout-out at a Zoom meeting, or sending an email to a colleague or coworker to show appreciation for their achievements can play a great role in the aspect of gratefulness, especially during times of global crisis, it is crucial to support the positive outlook of life as it is symbiotic to health and wellness.

According to Harvard Health Publishing (2021), the process within the practice of gratitude can help people acknowledge the goodness in their lives, resulting in them connecting to something larger than themselves, such as with nature, other people, or even a higher power. Various studies have shown that expressing gratitude promoted optimism, increased life satisfaction, and improved the physical and psychological health of individuals; it enhanced empathy and reduced aggression, helped individuals to sleep better, drove them to be physically active, improved their self-esteem, and increased their mental strength. Moreover, individuals who expressed gratitude through writing letters showed significantly better mental health within weeks of practice. Gratitude helped people to unshackle toxic emotions, the practice provides long-lasting benefits to one's life and even had lasting effects on the brain (Emmons & McCullough, 2003; Brown et al., 2015; Brown & Wong, 2017; Morlin, 2015).

In response to the data presented by the studies mentioned, the researchers have cited various amounts of knowledge about the beneficial effects of physical activity and gratitude on the mental health of young adults. In addition, there are also studies related to COVID-19 and its negative impact on the mental health of Filipino young adults. However, the studies cited lack further information

related to the effects of physical activity and gratitude on psychological well-being and self-esteem. Thus, this investigated the psychological effects of physical activity and gratitude study among Filipino young adults.

Statement of the Problem

This study aimed to determine the effects of the psycho-physical intervention program on the psychological well-being and self-esteem of Filipino young adults. Specifically, this study aimed to answer the following research questions:

What is the level of psychological well-being and self-esteem of the participants before and after the intervention?

Are there significant differences in the psychological well-being and self-esteem of the participants before and after intervention?

Are there significant differences between the experimental and the control group?

Literature Review

This chapter presents a review of the literature, which included journal articles and books, both international and domestic, which were relevant to the topic. The population's mental health throughout the pandemic, the variables that contribute to poor mental health, and the effects of physical activity and gratitude on mental health were also discussed.

Mental Health During a Pandemic

The COVID-19 pandemic has posed significant mental health risks throughout the world. It had a detrimental impact on psychological well-being and in a broader sense, decreased self-esteem was a result of this major pandemic outbreak in the twenty-first century (Xiong et al., 2020; Alfawaz et al., 2021; Sikhangezile & Modise, 2020). This section examined the impact of the pandemic on psychological well-being and self-esteem, considering the severity of the pandemic, and the proportion of people quarantined.

Psychological Well-being

Psychological well-being concerns were observed all over the world during the worldwide humanitarian catastrophe of the COVID-19 pandemic (Roy et al., 2021). Many individuals were negatively affected by the COVID-19 pandemic, creating new hurdles for those who were mentally ill. A recent study by Jewell et al. (2020) evaluated the mental health conditions of 1,083 US individuals during the early periods of the pandemic, gathered from early April to early June 2020, and showed significantly higher rates of sadness, anxiety, and stress. The study revealed that many American citizens suffer from excessive stress, depressive symptoms, and anxiety. A similar study by Wang et al. (2020) analyzed the mental health condition and severity of depression and anxiety of university students, where it was revealed that the respondents were concerned with sadness, anxiety, or suicidal ideation. 48.14 percent of 2,031 people had moderate to severe depression, 38.48 percent had moderate to severe anxiety, and 18.04 percent had considered suicide. Throughout the pandemic, the majority showed signs of increased tension and worry. Only about half of the participants felt they could manage the stresses associated with the current situation effectively. A similar study conducted by Dai et al. (2021) on 2,200 people in China found that the COVID-19 pandemic restrictions have impacted the overall fitness, psychological health, and overall well-being of the Chinese people. It was proposed that emotional regulation intervention lowered the adverse psychological effects and improved the quality of life.

Furthermore, from December 2019 through October 2020, Li, Wang, Wu, Han & Huang (2021) conducted a meta-analysis and systematic review that was carried out in nine repositories. The study comprised 27 research with 706,415 respondents consolidated, and 14 mental health issues were collected. The meta-analyses found that the level of depression (39%) and anxiety (36%) among universities rose significantly during the pandemic COVID-19. A systematic comparative review by

Meherali et al. (2021) analyzed the 18 articles where the reviewed literature revealed high rates of depression, anxiety, disturbances in sleep, appetite, and impairment in social interactions were significant concerns to children and adolescents. There were reports of negative impacts on mental health and well-being as a result. The COVID-19 pandemic constraints resulted in significant emotional changes, including depression and anxiety (Sang et al., 2021).

Levels of Self-esteem

Self-esteem was defined as the optimistic or pessimistic attitude toward oneself. Throughout the COVID restriction, necessities such as food, fresh air, etc were compromised, and many individuals were concerned about their health, all of which impacted people's self-esteem (Sharma, 2020). Kupcewicz et al. (2020) identified the importance of self-esteem in college students' lives worldwide, self-esteem was understood to be founded on self-knowledge, which promoted happiness in life.

During the period of enforced home quarantine from March to May 2020, Arima et al. (2020) studied factors that were linked to psychological discomfort among 571 medical students. According to this research, self-efficacy, and self-esteem were both critical determinants in predicting emotional distress during the COVID-19 pandemic. An additional critical review by Gawai, et al. (2020) studied how the COVID-19 pandemic affected mental health around the world. Through considerations of the published papers on mental health and the COVID-19 pandemic over five months, from December 30, 2019, the researchers found that social isolation and self-quarantine measures developed from physical and social distancing, caused numerous individuals to develop psychological distress such as low self-esteem.

High self-esteem was shown to improve psychological well-being as revealed by Seok & Park (2021) who examined how perceptions of college students on body image impacted self-esteem, exercise flow, and psychological well-being when participating in sports activities, as well as the relationships between these variables. In an analysis of 256 respondents, besides the association of self-esteem with positive life satisfaction, the study suggested that understanding the relationship between self-esteem and exercise was able to cultivate increased life satisfaction (Szcześniak et al., 2020). In addition to this, a cross-sectional study by Roqué, Andrés & Saldaña (2020) sought to ascertain the effect of COVID-19 lockdown on frequent social media use, as well as investigate if social media use was related to body image problems and low self-esteem. A total of 2,601 respondents aged 14 to 35 years old from Spain were carried out. The results showed that there were strong correlations between social media use and body dissatisfaction, the desire to be slim, and low self-esteem among the younger group. These findings show that the lockdown affected social media usage, which is related to an increased demand for thinness and an increased risk of eating disorders which led to lower self-esteem among teenagers and young women.

Risk Factors of Mental Health

A variety of circumstances can put one's mental well-being at stake (About Mental Health, 2021). For young adults and the general population, social isolation, economic inequality, insecure work conditions, loneliness, and migration were the most common risk factors for mental health and well-being (Mental Wellbeing Risk & Protective Factors, 2018). Therefore, this section examined the factors that current research suggests have a role in the development of mental health issues.

Lack of Physical Activity

Although there were limited studies examining the link between mental health and physical activity, there was substantial evidence linking the association between physical inactivity and mental health. For instance, Suetani et al. (2019) discovered two studies that revealed a consistent association between reduced physical activity and a decreased risk of subsequent mental disorders; one of those studies discovered a bidirectional relationship between regular exercise and severe depression. In addition, an intervention study from the United Kingdom (Harris, 2018) discovered a significant effect of self-reported days of physical exercise on psychological health. The study revealed that participants

(n= 1,686) who reported no days of regular exercise had significantly lower psychological health than those who reported all other activity levels.

Furthermore, Stubbs et al. (2018) suggested that a decrease in physical activity was linked with an elevated risk of mental problems. This was supported by John Hopkins Medicine which stated that physical inactivity can exacerbate anxiety and distress, and may even raise the risk of certain malignancies and type 2 diabetes (Risks of Physical Inactivity, John Hopkins Medicine, n.d.). Most notably, Silva et al. (2020) reported that those who did not engage in physical activity during the COVID-19 health crisis had greater levels of anxiety, despair, and stress. Another study in Norway (Grasdalsmoen et al., 2020) employed data from the Norwegian National Health Survey (n= 50,054) which revealed that the level of psychological problems among respondents was adversely correlated with physical activity in a dose-response method. Respondents that have never exercised have greater psychological distress and depression scores compared to those respondents who exercise almost every day.

Lack of Gratitude

The lack or insufficiency in one or more of the elements within the gratefulness response when gratitude is called for in a particular circumstance was referred to as ingratitude. As a result, a person can be ungrateful in one or more ways, for example, forgetfulness, indifference, pride, and sloth were all considered vices or flaws in and of themselves (Manela, 2019). Considerably, the best evidence for an association between gratitude and mental health came from experimental investigations. Unanue et al. (2019) utilized three-wave cross-lagged panel designs with 30 days (n= 725) and 90 days (n= 1,841) between waves to examine two adult samples from Chile in a longitudinal research study. Both studies discovered that gratitude and satisfaction in life were positively predictive across time, with high gratitude levels leading to high levels of satisfaction in life and wellness. However, lower gratitude levels may lead to a downward spiral in overall wellness by fostering reduced satisfaction in life. Additionally, Czyżowska and Gurba (2022) explored the effects of a gratitude intervention on the sense of purpose in life, psychological well-being, overall health, and stress among young adults (n=80). The findings from the study revealed that the treatment group experienced significant increases in three dimensions of psychological well-being: positive relations with others, environmental mastery, and purpose in life. Significant reductions in anxiety/insomnia, depression symptoms, and perceived stress were also observed. There were no differences in life's level of purpose. There was a link between gratefulness and finding purpose in life and psychological well-being. Their study concluded that the gratitude intervention can improve the psychological well-being of young adults, but it may be ineffective in improving one's life purpose.

Another study from China (Zhang, Ye & Zhang, 2021) explored the impact of gratitude on life meaning among college students and the mediating effect of peer relations and family function (n=1049). The findings offered some suggestions and interventions for instilling meaning in the life of college students, as well as crucial conceptual frameworks and empirical recommendations for improving youth mental wellbeing. Young adults, for example, can increase their appreciative disposition by recording five grateful things each week, writing gratitude letters to others, and participating in gratitude groups. People who understand how to be thankful know how to appreciate everyone around them. As a result, people will obtain more affection and acceptance from others, as well as discover meaning and purpose in life.

Physical Activity on Mental Health

According to the WHO, regular exercise was proven to help prevent and manage non-communicable diseases, therefore serving as a cornerstone in the prevention and treatment of chronic diseases. It also helps one maintain body weight and overall physical fitness improving both physical and mental well-being, as well as the quality of life and well-being; making one's lifestyle more active. Exercise has been demonstrated to enhance mood and reduce negative emotions like stress, anxiety, and sadness (Semeco, 2021).

Moreover, the CDC's 2018 Physical Activity Guidelines for Americans reported that participation in regular workouts decreased the possibility of developing anxiety and depressive symptoms – both emotional disturbances that could affect the psychological well-being of a person (Lindsay, 2020). With this in mind, physical activities were proposed as a treatment for the mental and physical repercussions of this pandemic. It has been said before that it is an adequate strategy in helping people deal with emotional disturbances due to how its benefits have a long-term effect but also it gives immediate psychological benefits for mood and anxiety (Morgan, 2019).

Physical activity and Psychological Well-being

With isolation and preventive measures being imposed to keep the virus from spreading, another problem surfaced, particularly in the psychological well-being of people. It was stated that being isolated was to be confined by a worrisome contagion and overwhelmed by information that could potentially lead to chronic stress associated with more mental health concerns such as anxiety and even depression. It may also compromise how well people can cope during the pandemic (Burtscher et al., 2020, 1544-1545). One of the limitations that were presented was the factors that reduce the physical activity levels of people today. These limitations, or barriers, were identified in a cross-sectional study conducted in Brazil. In this study, the researchers found that there was a mix of intrapersonal and environmental factors that contributed to people being physically inactive during the pandemic and they are as follows: 1) "Weakness and lethargy", 2) "inadequate motivation", 3) "insufficient amenities", and 4) "scarcity of time". Inadequate motivation and insufficient amenities were most linked with affecting the levels of physical engagement during COVID-19. Note that this study was the first to examine the factors that prevent people from being physically active. The researchers (Botero et al., 2021) made great contributions by creating a foundation for future studies related to physical activity, especially during the pandemic.

Moreover, another cross-sectional study (Andrade et al., 2021) has also studied the relationship between levels of depression and anxiety and present exercise habits. The results revealed that those with decreased frequency of engaging in physical activity as a result of social isolation may not only have an increased risk of damaged physical health, but it may also bring compromise to their mental health. It was clear that with all the restrictions and barriers the pandemic has brought, people were becoming more vulnerable, both physically and mentally. Hence, López-Bueno et al., (2020) conducted an online survey of 2,250 participants about how adhering to the World Health Organization's physical activity guidelines by completing a physical activity that lasts for approximately 150 minutes per week during the pandemic may dramatically reduce the likelihood of having increased levels of anxiety and depression during the pandemic restrictions. The researchers also emphasized how healthy habits were beneficial by having a good physical activity level and emotional stability.

In addition, with a sample of older adults ranging from 60-92 years old in Spain, researchers Carriedo et al. (2020) found quantitative evidence suggesting a connection between exercise and having good resilience, positive affect, and lowered depressive symptoms during the COVID-19 restrictions. The psychological well-being of those who did engage in physical activities was somewhat better compared to those who did not. One study investigated how two classifications of physical exercise; outdoor and indoor, had different effects on the wellbeing of people. Outdoor activities were associated with decreased symptoms of anxiety, while indoor activities were associated with greater anxiety (Lawton et al., 2017). This supports the notion that being restricted from doing outdoor activities, especially during the pandemic can impact the stability and wellness of people, and that indoor activities may not be effective for some.

Physical Activity and Self-Esteem

Several authors studied the relationship between physical activity and its effects on self-esteem. According to a study on adolescents, physical activity can help create positive self-perception and promote healthy psychological well-being by improving physical evaluations and self-esteem. The

authors emphasized that body mass index, body dissatisfaction, and physical self-image were all important factors in developing a positive self-image (Fernández-Bustos et al., 2019). The same was for another study conducted by Kim & Ahn (2021) who investigated the effect of exercise engagement on changes in physical self-perception on changes in self-esteem worldwide. The study included (n = 189) university students from Seoul, Korea. Participants completed a survey that assessed physical self-perception, self-esteem, and psychological well-being before and after a six-week exercise intervention. The findings indicated that the amount of improvement in the variables was directly associated with one another. Thus, engagement in various physical activities can positively and directly enhance psychological well-being, also indirectly via self-esteem growth. In addition, Physical activity was found to significantly reduce or treat mental diseases such as depression and anxiety or stress-related ailments. It had the potential to increase education, social conditions, and biological and psychological growth (Malm, Jakobsson, & Isaksson, 2019). Under other conditions, researchers like Dąbrowska & Dąbrowska-Galas (2021) and Awick et al. (2021) examined the link between physical exercise and self-esteem among middle-aged women and breast cancer survivors. Both of these studies used different inventories and methods but came up with similar results. Physical activity had a good impact on mental health and enhanced self-esteem.

Overall, the studies mentioned above comprised different samples and different approaches to explore the effect of physical activity on the self-esteem of a population, yet they came up with similar conclusions that engaging and maintaining physical activity levels could lead to increased and enhanced self-esteem. However, researchers of these studies did not associate the mentioned variables with the COVID-19 pandemic.

Gratitude for Mental Health

A grateful attitude in times of adversity, such as the COVID-19 pandemic is critical to sustaining one's optimistic defiance – to heal, energize, and bring hope (Journal of Radiology Nursing, 2020). As explained by Tong and Oh (2021), Gratitude is a pleasant reaction to obtaining a desirable outcome from another person which then instigates positive consequences such as higher well-being as well as inspires the addressee to be prosocial. Nonetheless, still far less was discovered about the potential role of gratitude during the pandemic. Hence, considering the knowledge disparity of gratitude on mental health, this section will concentrate on how gratitude can impact psychological well-being and self-esteem.

Gratitude and Psychological well-being

The existential fear and distress caused by COVID-19 adversaries demanded the necessity for positive psychology on mental health. Amar & Manoj (2020) reported that positive mental health will play an important role in the pandemic crisis since it represents one's mental, emotional, and interpersonal well-being. The researchers' commentary on subjective well-being and stress reduction techniques demonstrated that retaining acts of kindness and being grateful that one is alive aids in surviving difficult experiences. In association, a narrative, nonsystematic review of studies related to matured gratitude revealed that refining this attitude through kindness, thankfulness to God for life, and appreciating small things in life principally supports stress management during the pandemic (Becken, 2021). In addition, an intervention called Three Good Things was associated with fewer psychopathological symptoms and more happiness. Withal, in a cross-sectional descriptive study by Biber et al. (2021) (n=1,640), participants completed an internet-based survey that comprised mental health indicators of optimism, gratitude, and anxiety. The evaluation of results reveals that being grateful and optimistic guarded individuals against anxiety, depression, and committing suicide. Furthermore, a cross-sectional study of the involvement of gratitude and COVID-19 in the link between self-compassion and psychological well-being among Vietnamese adults from 18 years to 60-year-old (n=509) showed that both self-compassion and gratitude were found to be significantly associated with psychological well-being by focusing on a constant appreciation of good things like broadening one's view by learning more about the "grim" and "bright" facets of life, thus fostering circumvent

negative biases, particularly during serious adversities (Nguyen et al., 2021). Moreover, since few studies examined whether age moderated, a cross-sectional study by Lopez et al. (2020) assessed the association of those aged 60–70 years old and 71–80 years old, with psychological well-being among the community-dwelling Spaniards (n= 878) during the COVID-19 periods. The findings implied that the pattern of the COVID-19 effect was irrelevant to the well-being of senior citizens, as were their assessments and personal resources for dealing with COVID-related challenges. Besides, these findings suggested that several socio-demographic and health-related factors influenced the well-being of aged groups. Hence, gratefulness, health-related behaviors, family dynamics, and resilience, all had significant associations with improved psychological well-being. Consistent with the previous findings cited, a 14-day daily diary study from mainland China of individuals aged 18–85 years (n=231) helped the participants with lowered levels of COVID-19-related stress and increased levels of subjective health on concurrent days (Jiang, 2020).

Gratitude and Self-esteem

Self-esteem was considered a self-assessment of the capability, consistency, flexibility, significance, and patience, in oneself when confronted with pressure. In addition, with a high degree of self-esteem, one can take both negatives and positives of life (Ab et al., 2020). A study by Szcześniak et al. (2022) of 254 participants revealed that gratitude mediated the relationship between religion and self-esteem. Related to the flexible definition of self-esteem, a study by Tong and Oh (2021) which examined if the feeling of gratitude among Chinese Singaporeans (n=441) was linked to coping strategies, revealed that gratitude could support the capability to adapt to crisis. Moreover, another study revealed that gratitude promoted the development of supportive environments which contributed to the sense of meaning and sense of purpose of front-line medical staff during the COVID-19 pandemic. (Feng & Yin, 2021). Furthermore, a study conducted in an Arabic environment (n=300), investigating the impact of self-esteem on the link between gratitude and subjective well-being, revealed that doing numerous gratitude practices improved one's subjective well-being (Yildirim, et al., 2019).

The previous studies mentioned above demonstrated that the pandemic had a considerable influence on the mental health of various populations. Studies have shown that this harmed an individual's psychological well-being and, in general, self-esteem declined (Alfawaz et al., 2021; Sikhangezile & Modise, 2020). Another study also indicated that there is a negative correlation between psychological distress and physical activity (Grasdalsmoen et al., 2020). In conjunction, another study found there was a positive correlation between gratitude and well-being (Unanue et al., 2019). Various studies also show physical activity and gratitude were two contributing factors to increased self-esteem and psychological well-being (Lindsay, 2020; Semeco, 2021;).

However, there were limited studies on the association between physical activity and gratitude on psychological well-being and self-esteem among young adults. Moreover, there were no recent studies on the effects of physical activity and gratitude on Filipino's psychological well-being and self-esteem, especially, young adults. Hence, this study conducted a pre-posttest on the treatment and control group to assess the effects of physical activity and gratitude on psychological well-being and self-esteem among Filipino young adults.

Methodology

This chapter presents the methods and procedures that were used in response to the problem of the study. This includes research design, population and sample methods, instrumentation, data collection method, statistical data treatment, and ethical consideration.

Research Design

A quasi-experimental research design was utilized in this study. This method aimed to determine whether the psycho-physical intervention program can have significant effects on the psychological well-being and self-esteem of the participants by manipulating their conditions. Participants in quasi-

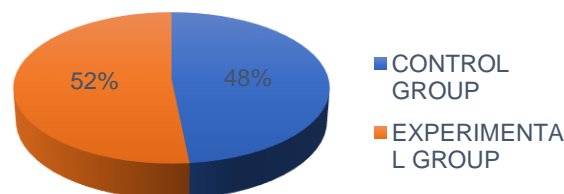
experiments were matched to different treatments in a nonrandom method; such as through administrative selection, self-selection, legal requirement, or some other nonrandom method. Moreover, this study also utilized pretest-posttest nonequivalent groups. Each of the two groups of participants was examined on pretest measures in this design. The treatment was subsequently administered to the treatment group, while the comparison group was given no treatment. The outcome measure—the posttest—was then administered to both groups (Reichardt, 2019). In this study, the participants were matched on the dependent variable and some extraneous variables before manipulating the independent variable by their physical activity status and gratitude levels. Moreover, the participants were assigned to treatment conditions based on self-selection and administrative selection. The experimental group engaged in physical activity and expressed gratitude while the control group did not receive any intervention. Lastly, quasi-experimental designs can be utilized to address implementation science objectives without requiring randomization (Miller, Smith, and Pugatch, 2020).

Population and Sampling Techniques

The target population of this study was young Filipino adults. The researchers specifically focused on recruiting participants of Filipino residency, ages ranging between 18-25, who were currently residing in the Philippines, with no heart diseases or any comorbidities, and who were not physically active. In selecting the participants, a voluntary sampling method was used. This method enhanced the accuracy and reliability of the data since participants were expected to be fully engaged in the study. The researchers utilized this sampling technique to acquire the appropriate sample and allow participants to volunteer themselves to be part of the study and gave ample time to decide whether or not to participate in the study (Murairwa, 2015).

Figure 2 presents the group distribution of the participants. 16 in the experimental group and 15 in the control group, with a total of 31 participants.

Figure 2. *Group Distribution of the Participants*



Demographic Profile

The demographic profile of the participants were gathered in this study with information including gender, age, nationality, medical condition, physical activity status, and gratitude levels. The figures below present the distribution.

Gender. Figure 3 described the gender distribution of the participants with 87% of the participants being females and 13% being males, for a total of 31 participants.

Figure 3. *Gender Distribution of the Participants*

Age. Figure 4 described the age distribution of the participants, with 32% of the participants aged 22 years old, 23% aged 19 years old, 19% aged 21 years old and 13% aged 20 years old, 7% aged 18 years old, and 6% aged 24 years old.

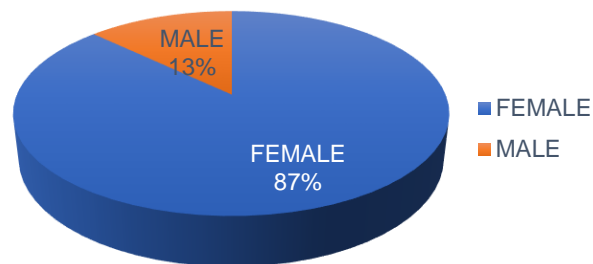
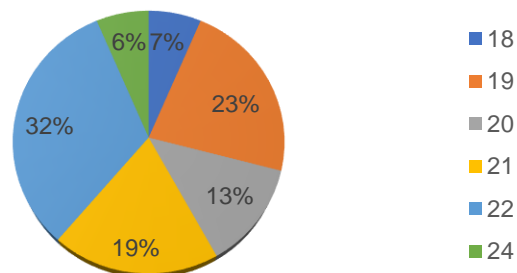
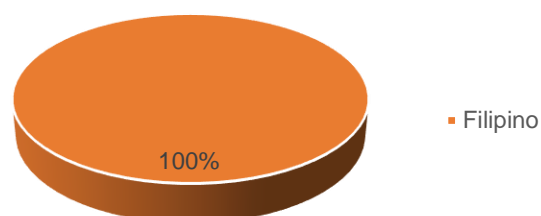


Figure 4. *Age Distribution of the Participants*

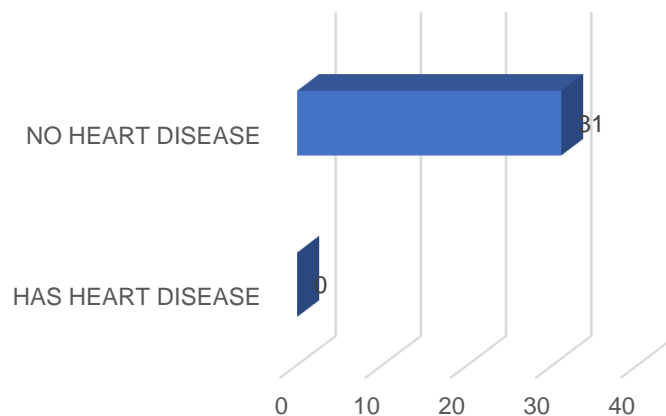


Nationality. Figure 5 described the nationality distribution of the participants, with 100% of the participants being Filipino.

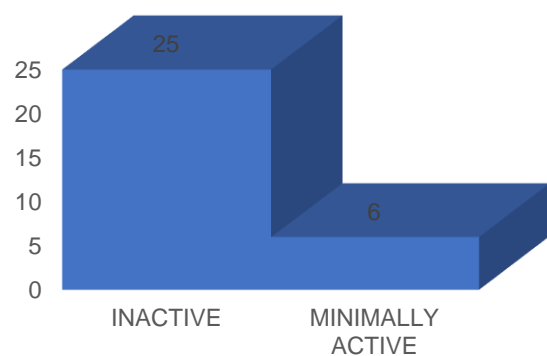
Figure 5. *Nationality Distribution of the Participants*



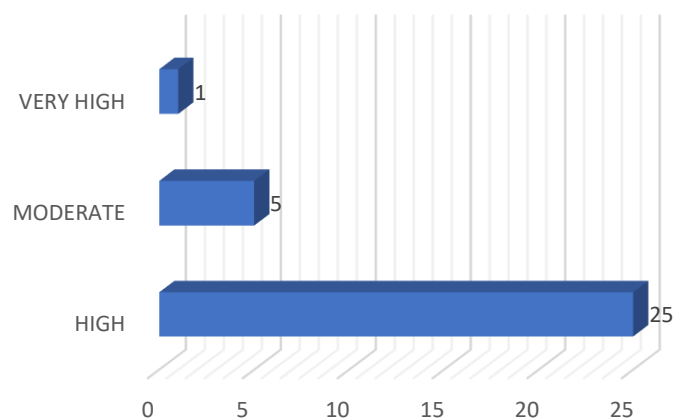
Medical Condition. Figure 6 described the medical condition distribution of the participants with 100% of the participants having no heart disease.

Figure 6. *Medical Condition Distribution of the Participants*

Physical Activity Status. Figure 7 described the physical activity status distribution of the participants. 80% were inactive and 20% were minimally active.

Figure 7. *Physical Activity Status Distribution of the Participants*

Gratitude Levels. Figure 8 described the gratitude level distribution of the participants, 25% of the participants had high gratitude levels, 16% had moderate gratitude levels, and 4% had very high gratitude levels.

Figure 8. *Gratitude Level Distribution of the Participants*

Instrumentation

To gather the appropriate data for the study, the researchers used structured questionnaires and/or inventories for the research instrumentation for data collection. Two questionnaires were chosen to measure the desired variables, namely: Rosenberg Self-Esteem Scale (RSES) and Ryff's Psychological Well-being Scale. Another two questionnaires were used only for determining the characteristics of the participants, namely the International Physical Activity Questionnaire – Short Form and Gratitude Resentment and Appreciation Test-Revised and Short-Form (GRAT).

Rosenberg Self-Esteem Scale (RSES), a Likert scale, self-report measure that consisted of 10 items stating the overall feelings of worth and/or acceptance of oneself has been chosen by the researchers to use as a measurement tool to assess the feelings of self-esteem and self-worth. It presents high reliability in the following areas: 0.77 in internal consistency, .90 in coefficient of reproducibility, and test-retest reliability with a 0.85 score.

Table 1 presents the scale and verbal interpretation of the RSES. It is rated on a 1-4 point Likert scale ranging from Strongly Disagree "1" to Strongly Agree "4" and verbal interpretations of the table range from Very Low to Very High.

Table 1. Verbal Interpretation for RSES

Rosenberg Self-Esteem Scale (RSES)			
Rating	Range	Scaled Response	Verbal Interpretation
1	1.00 – 1.49	Strongly Disagree	Very Low
2	1.50 – 2.49	Disagree	Low
3	2.50 – 3.49	Agree	High
4	3.50 – 4.00	Strongly Agree	Very High

Ryff's Psychological Well-being Scale (RPWBS) measures six dimensions of well-being and happiness, which were: Autonomy, Environmental Mastery, Personal Growth, Positive Relation with Others, Purpose in Life, and Self-Acceptance. The RPWBS uses the Likert scale to answer forty-two statements, where 1 represents strongly agree and 7 represents strongly disagree. This study decided to use the 18-item version of the scale for the participants. The scale has reliability for the following sub-scales: For internal consistency, Self-Acceptance has a score of .93, Positive Relation with Others has .91, Autonomy has .86, both Environmental Mastery and Purpose in Life have .90, whereas Personal Growth has .87 internal consistency reliability - all which pertains that the scale has a good reliability overall score, making it valid and reliable to use as a measurement for an individual's psychological well-being.

Table 2 presents the scale and verbal interpretation of the RPWBS. It is rated on a 1-6 point Likert scale ranging from Strongly Disagree "1" to Strongly Agree "6", and verbal interpretations of the table range from Very Low to Very High.

Table 2. Verbal Interpretation for RPWBS

Ryff's Psychological Well-Being Scale (RPWBS)			
Rating	Range	Scaled Response	Verbal Interpretation
1	1.00 – 1.49	Strongly Disagree	Very Low
2	1.50 – 2.49	Disagree	Low
3	2.50 – 3.49	Slightly Disagree	Moderately Low
4	3.50 – 4.49	Slightly Agree	Moderately High
5	4.50 – 5.49	Agree	High
6	5.50 – 6.00	Strongly Agree	Very High

Gratitude Resentment and Appreciation Test-Revised and Short-Form (GRAT) is a measurement instrument that consists of 16 items that assess the participants' dispositional needs. According to the author behind the test, there are several traits proposed that a grateful person demonstrates: 1) Would not feel deprived in life, 2) Have a sense of affluence, 3) Recognized others' contributions to their achievement and well-being, 4) Enjoys the modest pleasures of life, and 5) Recognizes the significance and demonstrates gratitude. The revised GRAT test has also been demonstrated to have high internal consistency, temporal stability, construct, and factorial validity (Watkins et al., 2003).

International Physical Activity Questionnaire - Short Form (IPAQ) is a self-reported kind of questionnaire with 7 items to be answered assessing the kinds of physical activity intensities and sitting periods that people do in their regular lifestyle, which were used to estimate overall physical activity in MET-min/week and sitting period. The questionnaire measures the duration and frequency of physical activity in the last 7 days in various domains including employment, transportation, household work, sport, recreation, and sitting period. It also measures the intensity of the physical activity in this category: Low/Inactive, Moderate, and High with criteria to meet. Furthermore, it has been known that the questionnaire has excellent test-retest reliability; for adults, it has a 0.81 overall score. The same goes for the mean age of 35.9 years old people, and a 0.97 reliability among college students. On the other hand, it has poor/adequate reliability with a score of 0.25 on average, computing all the scores in each of the targeted populations.

Pilot Study

The structured questionnaires were given to 39 Filipino young adults aged 18-25 when they agreed to participate and signed the informed consent. A time frame of 2 weeks was allotted for the pilot study for the participants to answer the questionnaires and to gather enough participants for reliability testing. After data collection, the data were handed over to the statisticians, and reliability testing of the questionnaires was conducted. Some items in the questionnaires were removed and the remaining items were used in this study.

Data Gathering Procedure

Figure 9. Flow of the Experimental Study

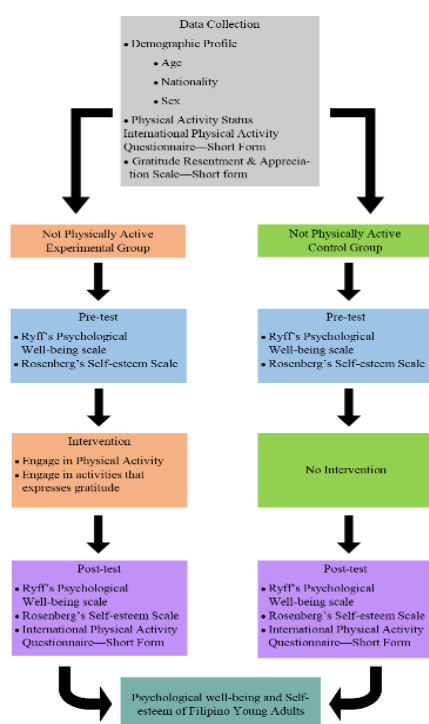


Figure 9 presents the flow of this study. Structured questionnaires through online administration were used to obtain data after the pilot study and all necessary advancements and revisions with the questionnaires and interventions were completed. Internet-based communication such as Facebook was utilized to gather potential participants. After willing participants were gathered, the link to the google forms was given via email and text message giving access to the structured questionnaires. Virtual meeting links via the ZOOM application were also given and used as a means for computer-mediated communication for the psycho-physical intervention program.

The experimental group had undergone a psycho-physical intervention program for 14 days. The intervention consists of two programs; expressing gratitude and HIIT cardio exercise. For expressing gratitude, the experimental group answered forms titled "Gratitude Forms" wherein they completed a sentence related to gratitude and appreciation. Then the experimental group read all the answers anonymously from the gratitude forms which were collectively called the "Gratitude Jar". After expressing gratitude, the HIIT cardio exercise began wherein the experimental group exercises for approximately 25 minutes which included a warm-up, HIIT, and a cool-down stretch. An exercise video was provided and the group participants were instructed to follow the exercises. The participants were encouraged to open their cameras during the ZOOM meeting sessions. After 14 days, both the experimental and control group were tested again with the questionnaires. After the data collection, the encoded data was handed over to the statisticians for statistical treatment and analysis.

Statistical Treatment of Data

The pre-test and post-test scores of the participants were described using mean and standard deviation. Descriptive analysis was used to examine the frequency distribution of the participants' demographic profiles such as age, gender, nationality, health condition, physical activity status, and gratitude levels. Moreover, paired sample t-test was used to measure whether the tests score of the two groups before and after the intervention had statistically significant differences. The standard error of the difference between means was used as a measure of error variability in the paired sample t-test. A direct computation to find the difference between the means of the two groups was done. In addition, an independent sample t-test was used to compare the scores of the control group and experimental group for statistically significant differences before and after the intervention. When two groups were compared, the independent sample t-test can be employed, however, the paired t-test was used when the two groups were dependent on one another (Kim, 2015). Jamovi and IBM SPSS Statistics software were utilized to manage and analyze the quantitative data of the study.

Ethical Considerations

Permission for this study was granted by the AUP Ethics Review Board (ERB). After the approval of ERB, the research instruments and intervention program were validated by six experts before the pilot study was conducted. Thereafter, participants were recruited and provided with informed consent to guarantee that the rights, dignity, and privacy of the participants were preserved. The informed consent was given and discussed before the administration of structured questionnaires, both via google forms. Since voluntary sampling was used, the participants were given adequate time to decide if they would agree to participate in the study. Moreover, the participants were informed that they had the right to withdraw from the study at any time. The researchers ensured anonymity and confidentiality by using codenames in place of the real names of the participants.

Results and Discussion

This chapter provides a full overview and discussion of the data analysis and the findings of this study. The findings were discussed in four major sections that aimed to answer the research questions of this study. The first and second sections contain the quantitative findings and the differentiation of the participants' levels of psychological well-being and self-esteem before and after the intervention. The third section presents the findings on the effects of the psycho-physical intervention program on the psychological well-being and self-esteem of both groups; the control group and the experimental

group. The last section presents the comparative data of the experimental and control group in mean scores, before and after the intervention program. Furthermore, the interpretations and discussions given in this chapter were well based on the empirical findings and associated literature.

Levels of Self-Esteem

This section consisted of questions that assessed the participants' level of self-esteem before and after the psycho-physical intervention program. Table 5 shows the RSES pre-test and post-test of the participants.

Table 3 revealed that the sample population exhibited high levels of self-esteem before and after the psycho-physical intervention program. On the pre-test and post-test, item number 7, "I feel that I am a person of worth", scored the highest mean ($\bar{x} = 3.06$ and $\bar{x} = 3.19$), implying that they had a favorable self-image. The overall self-esteem of the participants before the intervention garnered a mean of $\bar{x} = 2.65$. However, after the intervention, it garnered a mean of $\bar{x} = 2.86$ which were high, suggesting that the participants' self-esteem slightly increased after the intervention program. From these findings, we can conclude that the participants had high levels of self-esteem before participation in the psycho-physical intervention program, and their self-esteem did not change drastically after the intervention, as it remained high.

Table 3. *Participants' Level of Self-esteem*

RSES ITEMS	PRE-TEST		POST-TEST	
	ME AN	SD	ME AN	SD
SCALE			SCALE	
VERBAL INTERPRETATI ON			VERBAL INTERPRETATI ON	
1. I am satisfied with myself.	2.55	1.028	Agree	High
2. I think I am no good at all.	2.48	1.092	Disagree	Low
3. I feel that I have a number of good qualities.	2.87	0.957	Agree	High
4. I am able to do things as well as most other people.	2.68	0.909	Agree	High
7. I feel that I'm a person of worth.	3.06	0.964	Agree	High
8. I wish I could have more respect for myself.	2.03	1.016	Disagree	Low
10. I take a positive attitude toward myself	2.84	1.098	Agree	High
OVERALL SELF-ESTEEM	2.65	0.614		High
			2.86	0.781

According to the cross-sectional survey of Guddal et al. (2019), physically active youth were shown to have greater self-esteem and satisfaction in life. In addition, recent research by Iwon et al. (2021), found that after a physical intervention program, subjective well-being and physical exercise had significant relationships. Active participants showed greater levels of satisfaction and self-esteem than novices and sedentary participants.

Alternatively, the study of Yildirim, Alshehri, and Aziz (2019) revealed that there is a strong correlation between gratitude, self-esteem, and psychological well-being. It was discovered from 300 Arabic-speaking participants that gratitude and self-esteem were strong determinants of subjective happiness. Furthermore, it was discovered that self-esteem moderated the connection between gratefulness and subjective well-being. Their findings indicated that improving self-esteem may help grateful individuals feel better about their subjective well-being.

Levels of Psychological Well-being

This section included questions that assessed the participants' psychological well-being in terms of autonomy, environmental mastery, personal growth, positive relationships with others, life purpose, and self-acceptance before and after the psycho-physical intervention program. The tables below indicate the participants' pre and post-test scores according to subscales.

Table 4 presented the items and the average responses that were gathered that measured self-acceptance. The two highest responses that measured self-acceptance were item number 1, "I like most parts of my personality." with a mean of \bar{x} = 4.55 on the pre-test and \bar{x} = 4.77 on the post-test, along with item number 2 "When I look at the story of my life, I am pleased with how things have turned out so far" with a mean of \bar{x} = 4.58 in pre-test and \bar{x} = 4.65 on the post-test, both of which indicated a high level of self-acceptance.

Table 4. *Extent of Participants' Self-Acceptance*

ITEMS	PRE-TEST				POST-TEST			
	MEAN	SD	SCALE	VERBAL INTERPRETATION	MEAN	SD	SCALE	VERBAL INTERPRETATION
1. I like most parts of my personality.	4.55	1.21	Agree	High	4.77	1.15	Agree	High
2. When I look at the story of my life, I am pleased with how things have turned out so far.	4.58	1.41	Agree	High	4.65	1.25	Agree	High
5. In many ways I feel disappointed about my achievements in life.	3.58	1.46	Slightly - Agree	Moderately High	3.81	1.66	Slightly - Agree	Moderately High
OVERALL SELF-ACCEPTANCE	4.24	1.09		Moderately High	4.41	1.12		Moderately High

Moreover, the overall self-acceptance of the participants before the intervention garnered a mean of \bar{x} = 4.24. However, after the intervention, it garnered a mean of \bar{x} = 4.41 interpreted as moderately high, suggesting that the self-acceptance of the participants was generally stable before and after the intervention program. These results implied that the participants embraced every aspect of themselves; be they positive or negative attributes.

People with high scores on this dimension, according to Bingöl and Batic (2019), have a favorable attitude about themselves, encompassing both good and bad attributes, as well as positive views about the past. Furthermore, self-acceptance helps one to feel as if he or she has "special value."

Table 5 presents the items, and the average responses gathered that measured purpose in life. The highest response that measured purpose in the life subscale was item number 3, "People wander aimlessly through life, but I am not one of them." with a mean of \bar{x} = 3.90 on the pre-test and \bar{x} = 4.06 on the post-test, both of which was above average level of purpose in life.

Table 5. *Extent of Participants' Purpose in Life*

ITEMS	PRE-TEST				POST-TEST			
	ME AN	SD	SCALE	VERBAL INTERPRETATION	ME AN	SD	SCALE	VERBAL INTERPRETATION
3. People wander aimlessly through life, but I am not one of them.	3.90	1.22	Slightly Agree	Moderately High	4.06	1.263	Slightly Agree	Moderately High
7. I live my life in the present moment.	3.19	1.62	Slightly Disagree	Moderately Low	3.29	1.575	Slightly Disagree	Moderately Low
10. I feel as if I've done all there is to do in life.	2.90	1.66	Slightly Disagree	Moderately Low	3.10	1.491	Slightly Disagree	Moderately Low
OVERALL RPWBS PURPOSE	3.33	1.01		Moderately Low	3.48	0.864		Moderately Low

In addition, the overall purpose in life of the participants before the intervention garnered a mean of \bar{x} = 3.33, interpreted as moderately low. But after the intervention, it garnered a mean of \bar{x} = 3.48 which was moderately low, indicating that the purpose in life of the participants remained moderately low with slight improvements after the intervention program. These results also implied that the participants perceived themselves as having a direction in life, and they felt that life was meaningful. Participants who scored high in this dimension indicated that the purpose of their life is to have goals and a view on life that gives it significance (Bingöl & Batic, 2019). In addition, a person can create long-term goals and devise strategies for achieving them (Gallego, et al., 2020). Table 6 presented the items, and the average responses gathered that measured environmental mastery. The highest mean score was item number 9, "I am good at managing the responsibilities of daily life." with a mean of \bar{x} = 4.06 on the pre-test and \bar{x} = 4.29 on the post-test, which were both moderately low.

Table 6. *Extent of Participants' Environmental Mastery*

ITEMS	PRE-TEST				POST-TEST			
	ME AN	SD	SCALE	VERBAL INTERPRETATION	ME AN	SD	SCALE	VERBAL INTERPRETATION
4. The demands of everyday life get me down.	3.00	1.51	Slightly Disagree	Moderately Low	3.42	1.54	Slightly Disagree	Moderately Low
8. I feel I am in charge of the situation in which I live	4.03	1.38	Slightly Agree	Moderately High	4.19	1.47	Slightly Agree	Moderately High
9. I am good at managing the responsibilities of daily life.	4.06	1.24	Agree	Moderately High	4.29	1.13	Slightly Agree	Moderately High
OVERALL RPWBS- Environment Mastery	3.70	1.01		Moderately High	3.97	1.05		Moderately High

Moreover, the overall environmental mastery of the participants before the intervention obtained a mean of $\bar{x}=3.70$, and increased to $\bar{x}=3.97$ after the intervention program, which indicated a moderately high level of environmental mastery. The results implied that the participants have the competency to manage their own lives and acted responsibly on the demands of their environment.

Bingöl & Batic (2019) stated that individuals who scored high in environmental mastery can control the environment while maintaining a sense of competency and mastery. Furthermore, this dimension of psychological well-being indicates the ability to create pleasant situations that reflect one's interests and preferences (Gallego et al., 2020).

Table 7. *Extent of Participants' Positive Relations with Others*

ITEMS	PRE-TEST				POST-TEST			
	ME AN	SD	SCALE	VERBAL INTERPRETA TION	ME AN	SD	SCALE	VERBAL INTERPRETA TION
6. Maintaining close relationships is difficult.	3.42	1.54	Slightl y Disagr ee	Moderately Low	3.58	1.59	Slightl y Agree	Moderately High
13. People would describe me as a thoughtful person.	4.55	1.23	Agree	High	4.71	1.07	Agree	Moderately High
16. I have not experienced trusting relationships with others.	4.13	1.61	Slightl y Agree	Moderately High	4.16	1.57	Slightl y Agree	Moderately High
OVERALL RPWBS- Relations with Others	4.03	1.11		Moderately High	4.15	1.05		Moderately High

Table 7 presented the items and the average responses in measuring positive relations with others. The response that scored the highest mean was item number 13, "People would describe me as a thoughtful person." with a mean of $\bar{x} = 4.55$ on the pre-test and $\bar{x} = 4.71$ on the post-test, which was interpreted as high and moderately high respectively. Overall, the positive relations with others garnered a mean of $\bar{x} = 4.03$ on the pre-test and $\bar{x} = 4.15$ on the post-test, indicating a moderately high level of positive relations with others. After the intervention program, there was only a minor difference in the mean of the participants' pre-test and post-test scores. Nonetheless, the results indicate that the individuals exhibit significant sentiments of empathy and care for those around them. These also indicated that the participants were capable of more profound love, friendship, and high-quality interpersonal interactions.

Having good and trusting relationships with people, as well as experiencing empathy, love, and trust, are all examples of positive interpersonal interactions (Bingöl & Batic, 2019). Furthermore, this also allows them to create secure social relationships (Gallego et al., 2020).

Table 8. *Extent of Participants' Personal Growth*

ITEMS	PRE-TEST				POST-TEST			
	ME AN	SD	SCALE	VERBAL INTERPRETAT ION	ME AN	SD	SCALE	VERBAL INTERPRETAT ION
11. Life has been a continuous process of personal development.	5.29	5.29	Agree	High	5.48	0.962	Agree	High
14. I gave up trying to make big changes in my life in the past 2 years.	4.52	4.52	Agree	High	4.58	1.747	Agree	High
OVERALL RPWBS-Personal Growth	4.90	4.90		High	5.03	1.110		High

Table 8 presented the items and the average responses collected to measure the spiritual growth subscale. The highest mean score was item 11, "Life has been a continuous process of personal development." which garnered a mean score of \bar{x} = 5.29 on the pre-test, and \bar{x} = 5.48 on the post-test, which were both interpreted as high. Moreover, the overall spiritual growth garnered \bar{x} = 4.90 on the pre-test, and \bar{x} = 5.03 on the post-test, which was interpreted as both high levels of spiritual growth, which implied that the participants had high levels of personal growth before the intervention program, and was slightly increased after the intervention program. These findings also suggested that participants have the drive to improve themselves continuously and that they were open to new experiences to better their lives.

Gallego et al. (2020) stated that individuals with high levels of personal growth can put measures in place that help them reach their full potential. In addition, this dimension is related to self-actualization, which implies having a sense of realizing potential (Bingöl & Batic, 2019).

Table 9. *Extent of Participants' Autonomy*

ITEMS	PRE-TEST				POST-TEST			
	ME AN	SD	SCALE	VERBAL INTERPRETAT ION	ME AN	SD	SCALE	VERBAL INTERPRETAT ION
15. I tend to be influenced by people with strong opinions.	3.97	1.426	Slightly Agree	Moderately High	4.03	1.329	Slightly Agree	Moderately High
17. I have confidence in my own opinions, even if they are different from	4.23	1.175	Slightly Agree	Moderately High	4.45	1.060	Slightly Agree	Moderately High

the way most other people think.								
18. I judge myself based on the values that I deemed important.	4.32	1.013	Slightly Agree	Moderately High	4.84	1.068	Agree	High
OVERALL RPWBS Autonomy	4.17	0.779		Moderately High	4.44	0.722		Moderately High

Table 9 presented the items and the gathered average responses that measured autonomy. The response that obtained the highest mean was item number 18, "I judge myself based on the values that I deemed important." with a mean of $\bar{x} = 4.32$ on the pre-test, and $\bar{x} = 4.84$ on the post-test, which was interpreted as moderately high. Furthermore, the overall autonomy of the participants obtained a mean of $\bar{x} = 4.17$ before the intervention program, and a mean of $\bar{x} = 4.44$ after the intervention program, which both indicated moderately high levels of autonomy. There was an insignificant difference between the mean of the pre-test and post-test of the participants since they already had moderately high levels of autonomy even before the intervention program. Nevertheless, these findings indicated that the participants had a sense of independence and evaluated themselves according to their standards. In other words, the participants do not need the approval of others to feel validated.

As explained by Bingöl & Batic (2019), the concept of autonomy pertains to the ability to govern one's conduct by resisting social pressure. A high score indicates resistance to societal pressure. This denotes the individual's capacity to keep their individuality amid others (Gallego et al., 2020).

Table 10. *Participants' Level of Psychological Well-being*

Overall	MEAN	SD	VERBAL INTERPRETATION	MEAN	SD	VERBAL INTERPRETATION
SELF- ACCEPTANCE	4.24	1.09	High	4.41	1.12	Moderately High
PURPOSE	3.33	1.01	Low	3.38	0.864	Moderately Low
ENVIRONMENTAL MASTERY	3.70	1.01	High	3.97	1.05	Moderately High
RELATIONS WITH OTHERS	4.03	1.11	High	4.15	1.05	Moderately High
PERSONAL GROWTH	4.90	4.90	Moderately High	5.03	1.110	High
AUTONOMY	4.17	0.779	High	4.44	0.722	Moderately High
OVERALL PSYCHOLOGICAL WELL-BEING	4.06	0.650	Moderately High	4.25	0.664	Moderately High

Table 10 presented the items and the average responses collected to assess the participants' overall psychological well-being before and after the psycho-physical intervention program. In the pre-test, item number 11, "Life has been a continuous process of personal development." and item number 2, "When I look at the story of my life, I am pleased with how things have" garnered the highest mean responses of $\bar{x} = 5.29$ and $\bar{x} = 4.58$ respectively. While on the post-test, item number 11, "Life has been a continuous process of personal development." and item number 18, "I judge myself based on the values that I deemed important." obtained the highest response, with a mean of $\bar{x} = 5.48$ and $\bar{x} = 4.84$ respectively. All the responses that obtained the highest mean were interpreted as high. On the other hand, the overall mean of the psychological well-being of the participants was $\bar{x} = 4.06$ before the intervention program, and it shifted to $\bar{x} = 4.25$ after the intervention program, which indicated that the participants have moderately high levels of psychological well-being before and after the intervention program. These findings also implied that the participants' levels of personal growth, self-acceptance, and autonomy were moderately high throughout the study. Hence, the participants were more likely to be satisfied with their lives. They may probably feel that their lives have meaning, purpose, and direction. They also perceived themselves to be living by their standards. They were also capable of utilizing their talents and potential. The participants were more likely to have unconditional acceptance of themselves, and they were aware of their limitations.

Hence, those who have a high dimension of well-being tend to acknowledge and embrace different aspects of themselves. They form relationships with others or even care for the welfare of others. Also, they had a higher tendency to reject society's standards that influenced them to think and behave in a certain manner; govern behavior from the inside, have a sense of mastery and competence in their surroundings, feelings of continuous improvement, the idea that one is growing and evolving, openness to new experiences, and the realization of one's potential and perceived improvement in self and conduct through time (Celestine, 2022).

Granero-Jiménez et al. (2022) found that a higher degree of physical activity indicated a connection to higher psychological well-being in participants aged 18 to 35 years ($n=489$). Their study emphasized the effect of physical activity on the psychological well-being of young people and the need to work on intrinsic motivation to raise levels of physical activity.

Furthermore, it was stated that gratitude had an impact on psychological well-being. Măirean et al. (2019) discovered through a study conducted among university students regarding the relationship between the trait gratitude and psychological well-being, that all dimensions of the trait gratitude were positive towards psychological traits that were significantly related to psychological well-being.

Differences between Self-esteem and Psychological well-being

This section compared the mean scores of both groups' pre-test and post-test scores. A paired sample t-test was utilized to determine the mean differences of each group in terms of their pre-test and post-test scores in RSES and RPWBS.

Table 11. *Mean Differences of the Control Group in RSES*

RSES	M	SD	SE	Control Group Paired Sample t-test			
				t	df	p	Effect size
Pretest	2.69	0.592	0.153	1.80	14	0.093	0.465
Post test	2.46	0.709	0.183				

Reject H_0 if $p \leq .05$

Table 13 presented no significant difference in the control group before and after the 14-day interval where $t=1.80$ and $p=0.093$. Thus, it denoted that the self-competence and self-acceptance of overall self-esteem results were not statistically significant. The result implied that individuals who do not practice or undergo the psycho-physical intervention program through regular physical activity and expression of gratitude could not expect significant changes or differences in their self-esteem levels.

In like manner, Table 11 showed the control group pretest and the post-test scores in RPWBS. It showed the psychological well-being levels of the control group before and after the 14-day interval period.

Table 12. Mean Differences of the Control Group in RPWBSRPWBS

	M		SD		SE		Control Group Paired Sample T-test			
	PRE	POST	PRE	POST	PRE	POST	t	df	p	Effect size
Acceptance	4.11	4.02	1.159	0.831	0.299	0.214	0.405	14	0.691	0.1046
Purpose	3.78	3.56	1.089	0.932	0.281	0.241	0.824	14	0.424	0.2129
Mastery	3.64	3.73	1.050	1.093	0.271	0.282	-0.564	14	0.582	-0.146
Relations	3.98	3.80	1.080	0.924	0.279	0.239	0.798	14	0.438	0.2061
Personal	4.73	4.70	1.033	1.115	0.267	0.288	0.135	14	0.894	0.0350
Autonomy	4.13	4.40	0.853	0.747	0.220	0.193	-1.402	14	0.183	-0.362
OVERALL PWB	4.06	4.04	0.660	0.554	0.170	0.143	0.278	14	0.785	0.0717

Reject H_0 if $p \leq .05$

Table 12 explicated the mean differences in the RPWBS scores of the control group before and after the 14-day interval. The table elucidated the p-value (sig. 2-tailed) to be $<.05$. All the variables measured for the control group resulted in a p-value of greater than 0.05 (acceptance $p=0.69$, purpose $p=0.424$, mastery $p=0.582$, relations $p=0.438$, personal $p=0.894$, autonomy $p=0.183$; overall well-being $p=0.785$) denoting no statistically significant difference. This result implied that the psychological well-being of the control group was consistent even after the 14 days interval, emphasizing that their psychological well-being neither improved nor declined.

Table 13. Mean Differences of the Experimental Group in RSES

RSES	M	SD	SE	Experimental Group Paired Sample t-test			
				Statistic	df	p	Effect size
Pretest	2.61	0.650	0.163	-3.53	15	0.003	-0.884
Post test	3.23	0.664	0.166				

Reject H_0 if $p \leq .05$

Table 13 illustrated the significant difference in the self-esteem of other participants. The table presented that both pretest and post-test self-esteem resulted in $p\text{-value}=0.003$, which was less than 0.05, and conveyed a significant difference in self-esteem, before and after the intervention. The result also indicated a large effect size (Cohen's $d= -0.884$). The result implied that engaging in physical activity and expressing gratitude helped the participants to be more confident and capable of loving themselves. It was also related to self-management and knowing one's worth. Many favorable effects were linked to gratitude; including increased happiness, positive affect, optimism, and self-esteem. In a study by Robustelli and Whisman (2018), there were substantial positive bivariate relationships between gratitude and all four measures of life satisfaction. Furthermore, gratitude was shown to be specifically and positively connected with happiness in relationships, and life in general, but not with happiness in job or health.

Using various surveys that assessed psychological well-being, a study looked into the influence of psychological health and well-being on the physical activity environment among 262 participants who were getting the necessary weekly engagements of physical exercises. Their results indicated that those who did regular exercises had similar psychological well-being across exercise environments,

which indicated having good levels of autonomy. Additionally, the link between natural relatedness, anxiety, and psychological well-being suggested that devising interventions to promote nature-relatedness could help people feel better and decrease anxiety (Lawton et al., 2017). Another interesting study confirmed that gratefulness and self-esteem, in the paradox of power that was established with the acknowledgment that others value themselves, conveyed that power magnifies, rather than weakens the feelings of gratitude (Barlett, Valdesolo, & Arpin, 2020).

Findings in the study of Lee (2017) revealed that the participants (n=76) improved in self-esteem, happiness, and gratitude disposition while in the program. Thus, it was assumed for these participants, that if their optimistic emotions were persistent, they would procure a higher sense of duty and secure the primary requirements of being dental hygienists.

Gratitude interventions have been shown to improve personal and societal well-being. Gabana et al. (2022) discovered that high school soccer teams that participated in "The Athlete Gratitude Group"; a multi-session gratitude intervention showed increased psychological well-being, resilience, and team cohesiveness, showing considerably greater mental health improvements.

Moreover, Table 16 below illustrated the pre-test and post-test of the experimental group and how they improved the psychological well-being of each participant involved in the 14-day psycho-physical intervention program.

Table 14. Mean Differences of the Experimental Group in RPWBS

RPWBS										
	M		SD		SE		Experimental Group Paired Sample T-test			
	PRE	POST	PRE	POST	PRE	POST	t	df	p	Effect size
Acceptance	4.35	4.77	1.036	1.257	0.259	0.314	-1.93	15	0.073	-0.482
Purpose	2.92	3.42	0.735	0.821	0.184	0.205	-2.57	15	0.021	-0.642
Mastery	3.75	4.19	1.007	0.996	0.252	0.249	-2.08	15	0.055	-0.520
Relations	4.08	4.48	1.171	1.075	0.293	0.269	-1.87	15	0.081	-0.468
Personal	5.06	5.34	0.981	1.044	0.245	0.261	-1.71	15	0.108	-0.428
Autonomy	4.21	4.48	0.729	0.720	0.182	0.180	-1.65	15	0.120	-0.412
OVERALL PWB	4.06	4.45	0.663	0.713	0.165	0.178	-3.42	15	0.004	-0.856

Reject H_0 if $p \leq .05$

As shown in Table 14, most variables measured for the control group resulted in a p-value of greater than 0.05 (acceptance $p = 0.073$, mastery $p = 0.055$, relations $p = 0.081$, spiritual $p = 0.108$, autonomy $p = 0.120$) therefore denoting no statistically significant difference, except for purpose ($p = 0.021$) with moderate effective size (Cohen's $d = -0.642$) and overall well-being ($p = 0.004$) with a large effect size (Cohen's $d = -0.856$), where both of these variables indicated a statistically significant difference. These results indicated that the participants' sense of purpose improved and significantly changed after the psycho-physical intervention program. However, the well-being sub-variables; self-acceptance, environmental mastery, positive relations with others, spirituality, autonomy, or the sense of personal growth, did not show any significant difference based on the alpha level ($p < .05$). Nevertheless, it can still be observed that there were slight changes that occurred in comparing the pretest and post-test results of the sub-variables. In addition to the significant difference in purpose, it is remarkable to highlight that the overall well-being significantly increased after participants' involvement in the 14-day intervention of expressing gratitude and HIIT cardio exercise.

Thus, RPWBS scores of the experimental group implied that participants' multifaceted overall well-being improved after the intervention. Self-acceptance; the creation of strong bonds with people, the ability to govern complicated settings to meet personal needs and ideals, a sense of autonomy in thinking and action, and continuing personal growth and self-development characterized them. Exceptionally, the sense of purpose improved among the other six variables, which enforced the idea

that the purpose of a person can be found in goals and a view on life which gives it significance (Gallego et al., 2020; Bingöl & Batic 2019). Moreover, it demonstrated that during the pandemic, the participants recognize the essence of finding the meaning of the present, and the past, and, most importantly seeking life's purpose.

According to a study by Deichert, Fekete & Craven (2021), gratitude increased the favorable effects of assistance on psychological well-being. Moreover, sufficient evidence suggested how efficacious exercise was in treating clinical depression. Interestingly, Borrega-Mouquinho et al. (2021) discovered that High-Intensity Interval Training (HIIT) and Moderate-Intensity Training (MIT) could considerably reduce stress, anxiety, and depression while also increasing resilience. Similarly, Okuyama et al. (2021) discovered that physical activity enhances psychological wellness. They propose that adolescents who were suffering from the effects of COVID-19 should engage in physical activity.

In a study review done by Belcher et al. (2021), through cognitive neuroscience and neuroimaging literature, they revealed that the top-down control brain networks continue to develop throughout adolescence. They proposed that cardiovascular exercises boost adaptability and mental well-being by boosting both specific areas of the brain and significant neuronal pathways, to promote behavioral and emotional regulation. Therefore, these findings corroborated that there was an indubitable significant difference before and after the psycho-physical intervention in the experimental group.

Differences Between Experimental and Control group

This section compared the mean scores of the experimental and control group in the RSES and RPWBS, before and after the psycho-physical intervention program. An independent t-test was utilized to determine the mean differences between the score of the two groups in RSES and RPWBS.

Table 15. Mean Differences of the Two Groups in RSES

RSES							
PRE-TEST				POST-TEST			
STATISTICS	DF	P	EFFECT SIZE	STATISTICS	DF	P	EFFECT SIZE
0.351	29	0.728	0.126	-3.145	29	0.004	-1.13

Reject H_0 if $p \leq .05$

Table 15 presents the differences between the mean scores of the two groups in RSES before and after the psycho-physical intervention program. The results revealed that there were no significant differences ($t=0.351$, $p=0.728$) before the intervention with an effect size of cohen's $d=0.126$, implying that the sample of both groups was homogenous, and their level of self-esteem was the same. However, there were significant differences ($t=-3.145$, $p=0.004$) after the intervention with a large effect size (cohen's $d=-1.13$), which indicated positive effects of the psycho-physical intervention program on the self-esteem levels of the experimental group.

The findings of the present study regarding the self-esteem of the participants were supported by several related literatures. A study by Ahmed et al. (2017) showed that physically active individuals had higher self-esteem and work concentration compared to inactive individuals who had shown lower levels of self-esteem but higher levels of ego orientation ($n=200$). It was also shown that individuals with higher self-esteem and health-related physical fitness were positively related to self-esteem, goal orientation, and physical self-efficacy which demonstrates that regular exercise and sports activities had a beneficial impact on both physiological and psychological elements (Ahmed et al., 2017). This was also the case for a study that found that a regular promotion of physical activity was a good factor for the participants to continuously engage in exercising. Additionally, a cross-sectional study discovered that exercise had a positive and implicit impact on self and a direct impact on negative body image, and they concluded that exercise could help individuals achieve a positive self-concept and promote positive psychological well-being by enhancing their physical perception and body satisfaction through exercising (Kostorz & Sas, 2019).

Table 16. Mean Differences of the Two Groups in RPWBS

RPWBS	PRETEST				POST-TEST			
	Statistics	df	p	Effect Size	Statistics	df	p	Effect Size
Acceptance Subscale	-0.6163	29	0.542	-0.2215	-1.94166	29	0.062	-0.6978
Purpose Subscale	2.59598	29	0.015	0.933	0.4411	29	0.662	0.1585
Mastery Subscale	-0.28564	29	0.777	-0.1027	-1.21072	29	0.236	-0.4351
Relations Subscale	-0.26044	29	0.796	-0.0936	-1.88062	29	0.07	-0.6759
Spiritual Subscale	-0.91008	29	0.37	-0.3271	1.66014	29	0.108	-0.5966
Autonomy Subscale	-0.26378	29	0.794	-0.0948	-0.3004	29	0.766	-0.108
Overall Well-being	0.00195	29	0.998	7.01E-04	-1.78396	29	0.085	-0.6412

Reject H_0 if $p \leq .05$

Table 16 presents the differences between the mean scores of the two groups in RPWBS, before and after the psycho-physical intervention program. The results revealed that there were no significant differences in their overall well-being before the intervention ($t=0.00195$, $p=0.998$) with an effect size of cohen's $d=7.01e-4$. But interestingly, psychological well-being for purpose in life showed significant differences before the intervention ($t=2.595$, $p=0.015$) with an effect size of cohen's $d=0.933$, indicating that the control group had a better sense of direction in life compared to the experimental group before the intervention although they concluded at the same level after the intervention. Moreover, there were still no significant differences in their overall well-being after the intervention ($t=-1.783$, $p=0.085$) with an effect size of cohen's $d=-0.6412$, suggesting that the intervention had less noticeable effects on the psychological well-being levels of the experimental group. Additionally, the results indicated that the intervention program for the experimental group does not significantly provide a difference from the control group's psychological well-being levels due to its minimal effect. Additionally, the well-being of the experimental group was sustained after the intervention, which implied that the intervention still had gradual effects.

Related studies involving the investigation of the effects and relationships between physical activity and overall well-being had been observed. Another study looked at the effect of changes in physical self-concept on developments in global self-esteem and psychological well-being in exercise participants ($n=189$). It revealed that the physical self-concept transformed by exercise involvement may directly and favorably impact psychological well-being, and it may indirectly influence psychological well-being changes through enhancements in self-esteem (Kim & Ahn, 2021). In addition, psychologically researched evidence shown in the book of Weinberg & Gould titled the Foundations of Sport and Exercise Psychology (6th Edition), stated that physical exercise can modulate personality and self-development. It was also correlated with hardiness, a personality style that enables a person to withstand or cope with stressful situations. Moreover, physical exercise has beneficial physiological and behavioral impacts on the brain and its cognitive performance and also promotes a state of well-being (Mandolesi et al., 2018). A 2019 literature measured the effect of physical activity on the well-being of 928 participants by using well-being scales and participating in an intervention, as a result, there was no significant evidence that physical activity was connected with improved mental health, but rather there was a protective relationship discovered among physical activity and emotional difficulties. This further suggests that physical activity can potentially reduce symptoms of depression and anxiety in adolescents (Bell et al., 2019). However, as mentioned in this study, the treatment only gave a minimal increase in the well-being of the experimental group

after engaging in the intervention program. Nevertheless, several studies have indicated an effective link between physical activity and gratitude in improving well-being.

Limitations and Implications

This study determined the effects of the psycho-physical intervention program on the psychological well-being and self-esteem of Filipino young adults during a pandemic. As the study proceeded, a few areas emerged as potential future areas of research. The following are the recommendations:

Filipino young adults are recommended to engage in physical activity such as HIIT since it can be completed in less than 30 minutes which is suitable for busy individuals, and also express gratitude through writing a journal to boost their levels of self-esteem and improve their psychological well-being.

A greater sample size should be obtained to provide a more viable representation of the population and measure significant intervention effects.

Other types of sampling techniques, such as snowball and/or convenient sampling can be used for better retention of participants and broad availability in recruitment for the study.

Various theories should be considered in assessing the variables to further explain the underlying results of the study.

Compare different types of physical activity (e.g., weight training, functional movements, yoga) to investigate if these interventions may provide the same or better treatment effects.

Participants of this study were advised to continue exercising regularly and express gratitude through journal writing, to sustain their levels of self-esteem and psychological well-being.

Conclusion

The series of lockdowns and restrictions caused by the COVID-19 pandemic undeniably disordered the quality of life of every young Filipino adult, affecting not only their physical wellness but, most critically, their mental health, causing a sedentary lifestyle and psychological distress. Hence, the study investigated the effects of the psycho-physical intervention program on psychological well-being and self-esteem during the pandemic. Consideration of the findings concluded that although the participants already had a positive view of themselves and were satisfied with their lives, engaging in cardio exercises like High-Intensity Interval Training (HIIT), and expressing gratitude, elevated and improved their psychological well-being and self-esteem. Furthermore, the study also demonstrated that Filipino young adults who did not undergo the intervention only showed sustained self-esteem and psychological well-being levels after the 14-day interval. It seems that individuals whose levels of self-esteem and psychological well-being ranged from moderately high to high tend to engage in activities that will be beneficial to them similar to the participants in this study who committed themselves to finishing the 14-day intervention program. This is in line with the Self Determination Theory, which holds that people are naturally motivated to develop and grow when their requirements for competence, autonomy, and relatedness were met, as evidenced by the levels of self-esteem and psychological well-being of the participants.

Additionally, the psychological well-being, particularly the sense of purpose of the Filipino young adults, exceptionally showed a significant difference among the other variables. It is concluded that after the psycho-physical intervention, despite the pandemic's distressing situation, they continued to look for their purpose in life which helped them see the meaning of the past and present, and enabled them to pursue their goals instead of having no sense of direction. Perhaps the intervention program boosted the psychological well-being of the Filipino young adults in terms of purpose in life wherein they have expressed gratitude for 14 days. Indeed, it is indisputable to conclude that there was a significant difference before and after the intervention in the experimental group and an insignificant difference in the control group that participated in this study. Given these points, individuals who regularly engaged in HIIT and expressed gratitude for 14 days can potentially increase their self-esteem and psychological well-being during a pandemic.

References

- [1] Ab Rahman, Z., Mohd Noor, A. Y., Kashim, M. I. A. M., Saari, C. Z., Hasan, A. Z., Pa'ad, N. S., ... & Mohammed, A. F. (2020). Critical review of the relationship between resilience, self-esteem and religiosity among the tabligh during the fight of COVID-19. *Journal of Critical Review*, 7(5), 1136-1144. *About Mental Health*. (2021, June 28). CDC. <https://www.cdc.gov/mentalhealth/learn/index.htm>
- [2] Ahmed, M. D., Yan Ho, W. K., Leon Van Niekerk, R., Morris, T., Elayajara, M., Ki-Cheon, L., & Randles, E. (2017, January 26). The self-esteem, goal orientation, and health-related physical fitness of active and inactive adolescent students. *Cogent Psychology*, 4(1). <https://doi.org/10.1080/23311908.2017.1331602>
- [3] Allen, S. (2018, May). The Science of Gratitude. *Greater Good Science Center*.
- [4] Alfawaz, H. A., Wani, K., Aljumah, A. A., Aldisi, D., Ansari, M., Yakout, S. M., Sabico, S., & Al-Daghri, N. M. (2021). Psychological well-being during COVID-19 lockdown: Insights from a Saudi State University's Academic Community. *Journal of King Saud University. Science*, 33(1), 101262. <https://doi.org/10.1016/j.jksus.2020.101262>
- [5] Andrade, M. S., da Costa, T. S., de Lira, C., Hill, L., Knechtel, B., Nikolaidis, P., Puccinelli, P., Rosemann, T., & Seffrin, A. (2021, March 01). Reduced level of physical activity during COVID-19 pandemic is associated with depression and anxiety levels: an internet-based survey. *BMC Public Health*, 21(425), 11. <https://doi.org/10.1186/s12889-021-10470-z>
- [6] Arima, M., Takamiya, Y., Furuta, A., Siriratsivawong, K., Tsuchiya, S., & Izumi, M. (2020). Factors associated with the mental health status of medical students during the COVID-19 pandemic: a cross-sectional study in Japan. *BMJ open*, 10(12), e043728.
- [7] Awick, E. A., Lloyd, G. R., McAuley, E., & Phillips, S. M. (2021, June 14). Physical activity, self-efficacy and self-esteem in breast cancer survivors: a panel model. *HHS Public Access*. 10.1002/pon.4180
- [8] Beken, L. (2021). A Perspective on Mature Gratitude as a Way of Coping With COVID-19. *Frontiers in Psychology*. <https://doi.org/10.3389/fpsyg.2021.632911>
- [9] Belcher, B. R., Zink, J., Azad, A., Campbell, C. E., Chakravarti, S. P., & Herting, M. M. (2021). The roles of physical activity, exercise, and fitness in promoting resilience during adolescence: effects on mental well-being and brain development. *Biological Psychiatry: Cognitive Neuroscience and Neuroimaging*, 6(2), 225-237.
- [10] Bell, S. L., Audrey, S., Gunnell, D., Cooper, A., & Campbell, R. (2019, December 26). *The relationship between physical activity, mental wellbeing and symptoms of mental health disorder in adolescents: a cohort study - International Journal of Behavioral Nutrition and Physical Activity*. *International Journal of Behavioral Nutrition and Physical Activity*. Biomed Central. <https://ijbnpa.biomedcentral.com/articles/10.1186/s12966-019-0901-7>
- [11] Biber, D., Melton, B., & Czech, D. (2020). The impact of COVID-19 on college anxiety, optimism, gratitude, and course satisfaction. *Journal of American College Health*. <https://doi.org/10.1080/07448481.2020.1842424>
- [12] Bingol, T., Batik, M. (2019). Unconditional Self-Acceptance and Perfectionistic Cognitions as Predictors of Psychological Well-Being. *Journal of Education and Training Studies* Vol. 7, No. 1; January 2019 <http://jets.redfame.com>
- [13] Bird, J. M., Delevoy-Turrell, Y. N., Guerin, S. M., Hamer, M., Hutchinson, J. C., Karageorghis, C. I., . . . Terry, V. R. (2021). Physical activity and mental well-being under COVID-19 lockdown: a cross-sectional multinational study. *BMC Public Health*, 13.
- [14] Borrega-Mouquinho, Y., Sánchez-Gómez, J., Fuentes-García, J. P., Collado-Mateo, D., & Villafaina, S. (2021). Effects of high-intensity interval training and moderate-intensity training on stress, depression, anxiety, and resilience in healthy adults during coronavirus disease 2019 confinement: a randomized controlled trial. *Frontiers in Psychology*, 12, 270.

- [15]Botero, J. P., Correia, M. d. A., Cucato, G. G., Farah, B. Q., Lofrano-Prado, M. C., do Prado, W. L., Malk, N., de Melo, P. H., & Ritti-Dias, R. M. (2021, March 27). Barriers to physical activity during the COVID-19 pandemic in adults: a cross-sectional study. *Sports Science for Health*, 17(441-447), 7. <https://doi.org/10.1007/s11332-020-00724-5>
- [16]Britannica, The Editors of Encyclopaedia. "Regression". *Encyclopedia Britannica*, 13 Apr. 2021, <https://www.britannica.com/science/regression-mathematics>. Accessed 3 November 2021.
- [17]Burtcher, J., Burtcher, M., & Millet, G. P. (2020, May 06). (Indoor) isolation, stress, and physical inactivity: Vicious circles accelerated by COVID-19? *Scandinavian Journal of Medicine & Science in Sports*, 30(8), 2. Wiley Online Library. 10.1111/sms.13706
- [18]Carriedo, A., Cecchini, J. A., Fernandez-Rio, J., & Mendez-Gimenez, A. (2020, November 28). COVID-19, Psychological Well-being and Physical Activity Levels in Older Adults During the Nationwide Lockdown in Spain. *AM J Geriatric Psychiatry*. 10.1016/j.jagp.2020.08.007
- [19]Celestine, N. (2022). The Ryff Scales of Psychological Well Being: Your How-To Guide. *Positive Psychology.com*. <https://positivepsychology.com/ryff-scale-psychological-wellbeing/>
- [20]Charney, S. A., Camarata, S. M., & Chern, A. M. (2020). Potential Impact of the COVID-19 Pandemic on Communication and Language Skills in Children. *SAGE journals*, 2.
- [21]Cherry, K. (2021, March 15). Self-Determination Theory and Motivation. *verywellmind*. <https://www.verywellmind.com/what-is-self-determination-theory-2795387>
- [22]Cheung, T., Li, W., Ng, C. H., Yang, Y., Yu-Tao, Z., Zhang, Q., & Zang, L. (2020). Timely mental health care for the 2019 novel coronavirus outbreak is urgently needed. *Europe PMC*, 3.
- [23]Chochinov, H. M., Bolton, J., & Sareen, J. (2020). Death, Dying, and Dignity in the Time of the COVID-19 Pandemic. *Journal of Palliative Medicine*, 23(10), 1294–1295. <https://doi.org/10.1089/jpm.2020.0406>
- [24]COVID-19 in the Philippines (2021, February 21). World Health Organization. <https://www.who.int/philippines/emergencies/covid-19-response-in-the-philippines#>
- [25]Czyżowska, N., & Gurba, E. (2021). Enhancing Meaning in Life and Psychological Well-Being Among a European Cohort of Young Adults via a Gratitude Intervention. *Frontiers in Psychology*, 12.
- [26]Dąbrowska, J., & Dąbrowska-Galas, M. (2021, July 8). Physical Activity Level and Self-Esteem in Middle-Aged Women. *International Journal of Environmental Research and Public Health*. 10.3390/ijerph18147293
- [27]Dai J, Sang X, Menhas R, Xu X, Khurshid S, Mahmood S, Weng Y, Huang J, Cai Y, Shahzad B, Iqbal W, Gul M, Saqib ZA and Alam MN (2021) The Influence of COVID-19 Pandemic on Physical Health–Psychological Health, Physical Activity, and Overall Well-Being: The Mediating Role of Emotional Regulation. *front Psychology*. 12:667461. doi: 10.3389/fpsyg.2021.667461
- [28]Declaring a State of Public health Emergency Proclamation No. 922, (n.d.). Official Gazette. <https://www.officialgazette.gov.ph/downloads/2020/02feb/20200308-PROC-922-RRD-1.pdf>
- [29]Deichert, N. T., Fekete, E. M., & Craven, M. (2021). Gratitude enhances the beneficial effects of social support on psychological well-being. *The Journal of Positive Psychology*, 16(2), 168-177.
- [30]Gabana, N. T., Wong, Y. J., D'Addario, A., & Chow, G. M. (2022). The Athlete Gratitude Group (TAGG): Effects of coach participation in a positive psychology intervention with youth athletes. *Journal of Applied Sport Psychology*, 34(2), 229-250.
- [31]Páez Gallego, J., De-Juanas Oliva, Á., García Castilla, F. J., & Díaz Santiago, M. J. (2020). A study about social values and psychological well-being in young people: Implications for educational social work. *Social Work Education*, 39(6), 721-736. Guddal, M. H., Stensland, S. Ø., Småstuen, M. C., Johnsen, M. B., Zwart, J. A., & Storheim, K. (2019). Physical activity and sport participation among adolescents: associations with mental health in different age

- groups. Results from the Young-HUNT study: a cross-sectional survey. *BMJ open*, 9(9), e028555.
- [32]Feng, L. & Yin, R. (2021). Social Support and Hope Mediate the Relationship Between Gratitude and Depression Among Front-Line Medical Staff During the Pandemic of COVID-19. *Frontiers in Psychiatry*. <https://doi.org/10.3389/fpsyg.2021.623873>
- [33]Fernández-Bustos, J. G., Infantes-Paniagua, Á., Cuevas, R., & Contreras, O. (2019, July 10). Effect of Physical Activity on Self-Concept: Theoretical Model on the Mediation of Body Image and Physical Self-Concept in Adolescents. *frontiers in Psychology*, 11. <https://doi.org/10.3389/fpsyg.2019.01537>
- [34]Gao, J., & McLellan, R. (2018). Using Ryff's scales of psychological well-being in adolescents in mainland China. *BMC psychology*, 6(1), 17. <https://doi.org/10.1186/s40359-018-0231-6>
- [35]Gawai, J. P., Singh, S., Taksande, V. D., Sebastian, T., Kasturkar, P., & Ankar, R. S. (2020). Critical Review on Impact of COVID 19 and Mental Health.
- [36]Granero-Jiménez, J., López-Rodríguez, M. M., Dobarrío-Sanz, I., & Cortés-Rodríguez, A. E. (2022). Influence of physical exercise on psychological well-being of young adults: a quantitative study. *International journal of environmental research and public health*, 19(7), 4282.
- [37]Hammer, J., & Brenner, R. (2017, July 14). Disentangling Gratitude: A Theoretical and Psychometric Examination of the Gratitude Resentment and Appreciation Test–Revised Short (GRAT–RS). *Journal of Personality Assessment*. <https://doi.org/10.1080/00223891.2017.1344986>
- [38]Harris, M. A. (2018). The relationship between physical inactivity and mental wellbeing: Findings from a gamification-based community-wide physical activity
- [39]Ho, C. S., Ho, R. C., Pan, R., Tan, Y., Wan, X., Wang, C., & Xu, L. (2020). Immediate Psychological Responses and Associated Factors during the Initial Stage of the 2019 Coronavirus Disease (COVID-19) Epidemic among the General Population in China. *International Journal of Environmental Research and Public Health*.
- [40]Hosseini, F. B., Charbagh, Z., Poshtiban, K., Gholidahaneh, M., & Ghorbani, S. (2021, September 2). Self-Esteem, Goal Orientation, Physical Self-Efficacy, and HealthRelated Physical Fitness among Athletic and Non-Athletic Middle-School Students: a Comparative Study. *Int. J. School of Health*, 8(4), 7. doi: 10.30476/INTJSH.2021.92872.1179
- [41]Iwon, K., Skibinska, J., Jasielska, D., & Kalwarczyk, S. (2021). Elevating Subjective Well-Being Through Physical Exercises: An Intervention Study. *Frontiers in psychology*, 12, 702678. <https://doi.org/10.3389/fpsyg.2021.702678>
- [42]Jewell, J. S., Farewell, C. V., Welton-Mitchell, C., Lee-Winn, A., Walls, J., & Leiferman, J. A. (2020). Mental Health During the COVID-19 Pandemic in the United States: Online Survey. *JMIR formative research*, 4(10), e22043. <https://doi.org/10.2196/22043>
- [43]Jiang, D. (2020). Feeling Gratitude Is Associated With Better Well-being Across the Life <https://academic.oup.com/psychsocgerontology/advancearticle/doi/10.1093/geronb/gbaa220/6025410> Kanekar, A. & Sharma, M. (2020). COVID-19 and Mental Well-Being: Guidance on the Application of Behavioral and Positive Well-Being Strategies. *Healthcare*. <https://www.mdpi.com/2227-9032/8/3/336>
- [44]Kim, T. K. (2015). T test as a parametric statistic. *Korean journal of anesthesiology*, 68(6), 540.
- [45]Kostorz, K., & Sas, K. (2019, July 10). *Effect of Physical Activity on Self-Concept: Theoretical Model on the Mediation of Body Image and Physical Self-Concept in Adolescents*. *Frontiers*. <https://www.frontiersin.org/articles/10.3389/fpsyg.2019.01537/full>
- [46]Kourakou, A., Tigani, X., Bacopoulou, F., Vlachakis, D., Papakonstantinou, E., Simidala, S., Ktena, E., Katsaouni, S., Chrousos, G., & Darviri, C. (2021). The Rosenberg Self-Esteem Scale: Translation and Validation in the Greek Language in Adolescents. *Advances in experimental medicine and biology*, 1339, 97–103. https://doi.org/10.1007/978-3-030-78787-5_13

- [47]Kupcewicz, E., Grochans, E., Mikla, M., Kadučáková, H., & Jóźwik, M. (2020). Role of Global Self-Esteem in Predicting Life Satisfaction of Nursing Students in Poland, Spain and Slovakia. *International Journal of Environmental Research and Public Health*, 17(15), 5392. <https://doi.org/10.3390/ijerph17155392>
- [48]Lawton, E., Bymer, E., Clough, P., & Denovan, A. (2017, June 26). The Relationship between the Physical Activity Environment, Nature Relatedness, Anxiety, and the Psychological Well-being Benefits of Regular Exercisers. *frontiers in Psychology*. <https://doi.org/10.3389/fpsyg.2017.01058>
- [49]Lee, S.-Y. (2017, October 31). Effect of Gratitude Training Program on Dental Hygiene Students' Gratitude Disposition, Self-Esteem, and Happiness. *Journal of Dental Hygiene Science*. The Korean Society of Dental Hygiene Science. <https://doi.org/10.17135/jdhs.2017.17.5.405>
- [50]Li Y, Wang A, Wu Y, Han N and Huang H (2021) Impact of the COVID-19 Pandemic on the Mental Health of College Students: A Systematic Review and Meta-Analysis. *front Psychology*. 12:669119. doi: 10.3389/fpsyg.2021.669119
- [51]Lin, H. C., & Chen, C. C. (2021). Disease Prevention Behavior During the COVID-19 Pandemic and the Role of Self-Esteem: An Extended Parallel Process Model. *Psychology Research and Behavior Management*, 14, 123–135. <https://doi.org/10.2147/PRBM.S291300>
- [52]Lindsay, A. R. (2020, May 05). Physical activity is a strong benefit during COVID-19. *NEVADAToday*. <https://www.unr.edu/nevada-today/news/2020/physical-activity-during-covid>
- [53]Lopez, J. et al. (2020). Psychological well-being among older adults during the COVID-19 outbreak: a comparative study of the young–old and the old–old adults. *International Psychogeriatric*.<https://www.cambridge.org/core/terms><https://doi.org/10.1017/S1041610220000964>
- [54]Lopez-Bueno, R., Calatayud, J., Ezzatvar, Y., Casajús, J. A., Smith, L., Andersen, L. L., & López-Sánchez, G. F. (2020, July 23). Association Between Current Physical Activity and Current Perceived Anxiety and Mood in the Initial Phase of COVID-19 Confinement. *frontiers in Psychiatry*. 10.3389/fpsyt.2020.00729
- [55]Malm, C., Jakobsson, J., & Isaksson, A. (2019). Physical activity and sports—real health benefits: a review with insight into the public health of Sweden. *Sports*, 7(5), 127.
- [56]Măirean, C., Turliuc, M., Arghire, D. (2019). The Relationship Between Trait Gratitude and Psychological Wellbeing in University Students: The Mediating Role of Affective State and the Moderating Role of State Gratitude. *Journal of Happiness Studies* (2019) 20:1359–1377 <https://doi.org/10.1007/s10902-018-9998-7>
- [57]Meherali, S., Punjani, N., Louie-Poon, S., Abdul Rahim, K., Das, J. K., Salam, R. A., & Lassi, Z. S. (2021). Mental Health of Children and Adolescents Amidst COVID-19 and Past Pandemics: A Rapid Systematic Review. *International Journal of Environmental Research and Public Health*, 18(7), 3432. <https://doi.org/10.3390/ijerph18073432>
- [58]Meherali, S., Punjani, N., Louie-Poon, S., Abdul Rahim, K., Das, J. K., Salam, R. A., & Lassi, Z. S. (2021). Mental Health of Children and Adolescents Amidst COVID-19 and Past Pandemics: A Rapid Systematic Review. *International Journal of Environmental Research and Public Health*, 18(7), 3432. <https://doi.org/10.3390/ijerph18073432>
- [59]Mental illness - Symptoms and causes. (2019, June 8). Mayo Clinic. Retrieved May 16, 2022, from <https://www.mayoclinic.org/diseases-conditions/mental-illness/symptoms-causes/syc-20374968>
- [60]Mental wellbeing risk & protective factors. (2018, July). VicHealth. <https://www.vichealth.vic.gov.au//media/ResourceCentre/PublicationsandResources/General/VicHealth-Attachment-1---Evidence-review-of-risk--protective-factors.pdf?la=en&hash=4CFF1B8DDED1E3CE257289448655A136AB5B4C16>

- [61]Miller, C. J., Smith, S. N., & Pugatch, M. (2020). Experimental and quasi-experimental designs in implementation research. *Psychiatry research*, 283, 112452. Monica Y. Bartlett, Piercarlo Valdesolo & Sarah N. Arpin (2020) The paradox of power: The relationship between self-esteem and gratitude, *The Journal of Social Psychology*, 160:1, 27-38, DOI: 10.1080/00224545.2019.1601609
- [62]Murairwa, S. (2015). Voluntary sampling design. *International Journal of Advanced Research in Management and Social Sciences*, 4(2), 185-200.
- [63]N, G., & Mehak, M. (2021, November 28). Gratitude resentment and appreciation scale (GRAT-16): analyzing psychometrics properties in the Indian context. *IISc Research Publications*. <https://doi.org/10.1007/s12144-021-02169-6>
- [64]Nguyen, T., Nguyen, G., & Le, H. (2021). The Influence of COVID-19 Stress on Psychological Well-Being Among Vietnamese Adults: The Role of Self-Compassion and Gratitude. *American Psychological Association*. <https://doi.org/10.1037/trm0000295>
- [65]Oguz-Duran, N. (2017, January). The Revised Short Gratitude, Resentment, and Appreciation Test (S-GRAT): Adaptation for Turkish college students. *ResearchGate*. https://www.researchgate.net/publication/315832710_The_Revised_Short_Gratitude_Resentment_and_Appreciation_Test_S-GRAT_Adaptation_for_Turkish_college_students
- [66]Okuyama, J., Seto, S., Fukuda, Y., Funakoshi, S., Amae, S., Onobe, J., ... & Imamura, F. (2021). Mental health and physical activity among children and adolescents during the COVID-19 pandemic. *The Tohoku journal of experimental medicine*, 253(3), 203-215.
- [67]Parrocha, A. (2020). State of public health emergency declared in PH. *Philippine News Agency*.<https://www.pna.gov.ph/articles/1095955>
- [68]Reichardt, C. S. (2019). *Quasi-experimentation: A guide to design and analysis*. Guilford Publications.
- [69]Reverté-Villarroya, S., Ortega, L., Lavedán, A., Masot, O., Burjalés-Martí, M. D., Ballester-Ferrando, D., Fuentes-Pumarola, C., & Botigué, T. (2021). The influence of COVID-19 on the mental health of final-year nursing students: comparing the situation before and during the pandemic. *International journal of mental health nursing*, 30(3), 694–702. <https://doi.org/10.1111/inm.12827>
- [70]*Risks of Physical Inactivity*. (n.d.). Johns Hopkins Medicine. <https://www.hopkinsmedicine.org/health/conditions-and-diseases/risks-of-physical-inactivity>
- [71]Robustelli, B. L., & Whisman, M. A. (2018). Gratitude and life satisfaction in the United States and Japan. *Journal of happiness studies*, 19(1), 41-55.
- [72]Roy, A., Singh, A. K., Mishra, S., Chinnadurai, A., Mitra, A., & Bakshi, O. (2021). Mental health implications of COVID-19 pandemic and its response in India. *The International Journal of Social Psychiatry*, 67(5), 587–600. <https://doi.org/10.1177/0020764020950769>
- [73]Sahu, P. (2020). Closure of universities due to coronavirus disease 2019 (COVID-19): impact on education and mental health of students and academic staff. *Cureus*, 12(4).
- [74]Sang X., Menhas R, Saqib ZA, Mahmood S, Weng Y, Khurshid S, Iqbal W and Shahzad B (2021) The Psychological Impacts of COVID-19 Home Confinement and Physical Activity: A Structural Equation Model Analysis. *front Psychology* 11:614770. doi: 10.3389/fpsyg.2020.614770
- [75]Semeco, A. (2021, June 21). The Top 10 Benefits of Regular Exercise. *healthline*. <https://www.healthline.com/nutrition/10-benefits-of-exercise>
- [76]Seok, B. G., & Park, H. S. (2021). Analyzing the effects of body image on college students' self-esteem, exercise flow, and psychological well-being. *Ilkogretim Online*, 20(3).
- [77]Sharma, P. (2020). A study to assess self-esteem of people during COVID-19 pandemic in Nepal. *Indian Journal of Health and Wellbeing*, 11(10-12), 493-498.

- [78]Sikhangezile, N., & Modise, M. A. (2020). Social distancing, cultural and psychological effects on learners in a rural setting in Zimbabwe. *Journal of Ethnic and Cultural Studies*, 7(3), 200-209.
- [79]Silva, L. R. B., Seguro, C. S., De Oliveira, C. G. A., Santos, P. O. S., de Oliveira, J. C. M., de Souza Filho, L. F. M., ... & Rebelo, A. C. S. (2020). Physical inactivity is associated with increased levels of anxiety, depression, and stress in brazilians during the COVID-19 pandemic: a cross-sectional study. *Frontiers in Psychiatry*, 11, 1257.
- [80]Stubbs, B., Vancampfort, D., Hallgren, M., Firth, J., Veronese, N., Solmi, M., Brand, S., Cordes, J., Malchow, B., Gerber, M., Schmitt, A., Correll, C., De Hert, M., Gaughran, F., Schneider, F., Kinnafick, F., Falkai, P., Mölle, H., & Kahl, K. (2018, October). EPA guidance on physical activity as a treatment for severe mental illness: a meta-review of the evidence and Position Statement from the European Psychiatric Association (EPA), supported by the International Organization of Physical Therapists in Mental H. *National Library of Medicine*. 10.1016/j.eurpsy.2018.07.004. 1257.
- [81]Suetani, S., Stubbs, B., McGrath, J. J., & Scott, J. G. (2019). Physical activity of people with mental disorders compared to the general population: A systematic review of longitudinal cohort studies. *Social psychiatry and psychiatric epidemiology*, 1-15.
- [82]Supporting young people's mental health through the COVID-19 crisis . (2021, May 12). OECD. https://read.oecd-ilibrary.org/view/?ref=1094_1094452-vvnq8dqm9u&title=Supporting-young-people-s-mental-health-through-the-COVID-19-crisis&_ga=2.68375249.155988789.1630393419-1272635258.1630393418
- [83]Szcześniak, M., Bielecka, G., Madej, D., Pieńkowska, E., & Rodzeń, W. (2020). The Role of Self-Esteem in the Relationship Between Loneliness and Life Satisfaction in Late Adulthood: Evidence from Poland. *Psychology research and behavior management*, 13, 1201–1212. <https://doi.org/10.2147/PRBM.S275902>
- [84]Szcześniak, M., et al. (2022). The Mediating Effect of Dispositional Gratitude on the Relationship between Religious Struggles and Self-Esteem: Preliminary Results. *Religions*. 2022; 13(1):70. <https://doi.org/10.3390/rel13010070>.
- [85]Tong, E. & Oh, V. (2021). Gratitude and Adaptive Coping Among Chinese Singaporeans During the Beginning of the COVID-19 Pandemic. *Frontiers in Psychiatry*. <https://doi.org/10.3389/fpsy.2020.628937>
- [86]Unanue, W., Gomez Mella, M. E., Cortez, D. A., Bravo, D., Araya-Véliz, C., Unanue, J., & Van Den Broeck, A. (2019). The reciprocal relationship between gratitude and life satisfaction: evidence from two longitudinal field studies. *Frontiers in psychology*, 10, 2480.
- [87]Unanue, W., Gomez Mella, M. E., Cortez, D. A., Bravo, D., Araya-Véliz, C., Unanue, J., & Van Den Broeck, A. (2019). The reciprocal relationship between gratitude and life satisfaction: evidence from two longitudinal field studies. *Frontiers in psychology*, 10, 2480.
- [88]Vall-Roqué, H., Andrés, A., & Saldaña, C. (2021). The impact of COVID-19 lockdown on social network sites use, body image disturbances and self-esteem among adolescent and young women. *Progress in Neuro-psychopharmacology & Biological Psychiatry*, 110, 110293. <https://doi.org/10.1016/j.pnpbp.2021.110293>
- [89]Wang, X., Hegde, S., Son, C., Keller, B., Smith, A., & Sasangohar, F. (2020). Investigating Mental Health of US College Students During the COVID-19 Pandemic: Cross-Sectional Survey Study. *Journal of medical Internet research*, 22(9), e22817. <https://doi.org/10.2196/22817>
- [90]Wright, L. J., Williams, S. E., & Veldhuijzen van Zanten, J. J. (2021). Physical activity protects against the negative impact of coronavirus fear on adolescent mental health and well-being during the COVID-19 pandemic. *Frontiers in Psychology*, 12, 737.
- [91]Xiong, J., Lipsitz, O., Nasri, F., Lui, L., Gill, H., Phan, L., Chen-Li, D., Iacobucci, M., Ho, R., Majeed, A., & McIntyre, R. S. (2020). Impact of COVID-19 pandemic on mental health in the

general population: A systematic review. *Journal of affective disorders*, 277, 55–64.

<https://doi.org/10.1016/j.jad.2020.08.0>

- [92] Yildirim, M., Alshehri, N., & Aziz, I. (2019). Does Self-esteem Mediate the Relationship between Gratitude and Subjective Well-being? *Polish Psychological Bulletin* 2019, vol. 50(2) 149–156 DOI - 10.24425/ppb.2019.126030
- [93] Zhang, P., Ye, L., Fu, F., & Zhang, L. G. (2021). The Influence of Gratitude on the Meaning of Life: The Mediating Effect of Family Function and Peer Relationship. *Frontiers in Psychology*, 12.

Academic Procrastination, Self Esteem and Resiliency of Selected Dentistry Students: A Basis for An Intervention Program

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Abstract: The difficulty of the dental program can have an impact on a student's academic procrastination, self-esteem, and resiliency. This study aimed to determine the levels of academic procrastination, self-esteem, and resiliency of dentistry students enrolled in the Doctor of Dental Medicine program at a private university in Silang, Cavite. There were 183 student respondents, ages 18-28 years old, and currently enrolled in the program. A simple random sampling technique was used, and the study adapted three survey questionnaires: (1) Academic Procrastination Scale – A Short Form, (2) The School Short Form Coopersmith Self-Esteem Inventory, and (3) Connor-Davidson Resilience Scale 10-Item. Google Forms was used for the survey questionnaires and data collection of the respondents. The findings indicated that the respondents had an average level of academic procrastination, low levels of self-esteem, and high levels of resiliency. The study also found that there was a negative correlation between self-esteem and academic procrastination. Moreover, male students were more likely to procrastinate than female students. The results of this study can be used as a baseline for an intervention program to decrease the level of procrastination and improve self-esteem.

Keywords: *procrastination, self-esteem, and resiliency*

Introduction

Procrastination is a common phenomenon. This behavior was recognized by a philosopher William James 120 years ago who said, "Nothing is so fatiguing as the eternal hanging on of an uncompleted task". William James coined the term self-esteem in 1890 while the concept of self-esteem was first articulated in the writings by an enlightenment theorist of the 18th century David Hume, who shared that it was necessary to value and think well of one's self because it served as an encouragement to help people explore their full potential (Stanford Encyclopedia of Philosophy Archive, 2019). Furthermore, research about resiliency can be traced back to the 20th century. Pioneers in resilience research such as Norman Garmezy, Lois Murphy, Michael Rutter, and Emmy Werner, sought to understand how certain people did well when faced with hardships while others faltered (Masten, 2015).

Self-esteem and resiliency are necessary characteristics for students to thrive and recover after failure or adversity. These qualities can influence a student's academic success and in also any endeavors an individual undertakes. Ackerman (2020) referred to self-esteem as a "person's overall sense of his or her value or worth" (para. 6). Academic self-esteem was operationally described as the evaluative assessment of the ability to meet academic obstacles (D'Mello Monteiro, & Pinto, 2018) and resiliency as a psychological construct seen in certain people that, amid hardship, accounts for accomplishment (Cassidy, 2016). Academic resilience is the student's ability to excel academically despite adversity (Ye et al., 2021).

High self-esteem and resiliency were protective factors against mental illnesses and influenced academic success (Abiola & Udofia, 2011; Alipio, 2020) but poor self-esteem and low resiliency were found to be associated with mental illnesses such as stress, anxiety, and depression and resulted in academic failure of students (Beiter et al., 2015; Cassidy, 2015; Nguyen et al., 2019; Ratanasiripong, China, & Toyama, 2018). Prior studies indicated that vulnerability, self-adjustment to schoolwork, financial worries, a history of mental illness, and relationships with friends and family were all factors influencing mental health among university students (Ratanasiripong & Rodriguez, 2011; Field et al., 2012).

A healthy level of self-esteem is important for the holistic development of university students. Students regarded their academic performance as an ultimate determinant of their self-worth. Ackerman (2020) referred to *self-esteem* as a "person's overall sense of his or her value or worth" (para. 6). Kharsa and Latada (2016) explained that self-esteem is an attitude towards oneself and is connected to personal values about abilities, talents, social relationships, and potential performance. Rogerson and Scott (2010) found in their study that when students stressed and worried about failing their tests, they developed low self-esteem and uncertainty which could contribute to typical symptoms of procrastination and avoidance and can contribute to disengagement.

Students also showed resiliency which is the "capacity to overcome acute or chronic adversity that is seen as a major threat to a student's educational development" (Martin, 2013, p. 488). Resilience is a psychological construct seen in certain people that, amid hardship, accounts for accomplishment (Cassidy, 2016). Cheng and Catling (2015) found that there was an increased susceptibility of university students to mental illness, which may be attributable to poor handling of academic stress. Resilience was correlated with positive social and personal well-being, better mental health, and student transition to university life (McGillivray & Pidgeon, 2015).

Dentistry is a difficult and stressful program of study. It is common to find dental students struggling with procrastination, self-esteem, and resiliency. Few studies focus on the procrastination, self-esteem, and resiliency of dentistry students. This study is important because it will shed light on students' condition concerning these issues. It can help raise awareness through assessing the students' level of self-esteem and resiliency and its correlation with the academic procrastination by the students. This research can further form the basis for an intervention program.

Statement of the Problem

The researchers could find no research on academic procrastination, self-esteem, and resiliency of dental students been published to date. This study aimed to determine the degree of self-esteem and resiliency and its relation to procrastination by dental students studying at a private university in Silang, Cavite. This study addressed the following questions:

What is the level of self-esteem of dentistry students?

What is the level of resiliency of dentistry students?

What is the level of academic procrastination of dentistry students?

Is there a significant relationship between self-esteem and academic procrastination?

Is there a significant relationship between resiliency and academic procrastination?

Is there a significant difference in the level of academic procrastination when the following are considered?

Age

October 25-26, 2022

Gender

Year of study

What intervention program should be developed?

Hypothesis

The main purpose of this study was to determine the self-esteem level, resiliency level, and the correlation of these two independent variables, to academic procrastination. The results of this study may be used as a basis for an intervention program for dentistry students.

The following hypotheses were formulated to answer the research questions:

There is no significant relationship between self-esteem and academic procrastination.

There is no significant relationship between resiliency and academic procrastination.

There is no significant difference in the level of academic procrastination when age, gender, and year of study are considered.

Review of Literature

Self-Esteem

Factors that shape and influence self-esteem include regard for oneself, relationships, and experiences at home and school (Mayo Clinic, 2020). Students who considered themselves extremely worthy and valuable feel competent in any work were motivated to strive hard with complete commitment and dedication to enhance their overall performance (Bhatt & Bahadur, 2018). Shore (n.d.) explained that low self-esteem may reduce the motivation to learn, the ability to concentrate, and the willingness of a student to take risks.

For certain individuals, competence was a major source of self-esteem. Furthermore, students associated their self-esteem with academic competency. Compared to adolescents with lower academic-dependent self-esteem (i.e., those with high academic contingent self-esteem), adolescents whose self-esteem derived from their academic ability and achievements were at greater risk of developing depression (Schöne, Tandler, & Steinsmeier-Pelster, 2015). Moreover, Aryana (2010) claimed that those with greater academic success appeared to feel more positive, while students who do poorly academically showed lower self-esteem (Crocker et al., 2003). Di Giunta et al. (2013) also reported that high self-esteem was positively correlated with higher grades. Low self-esteem will further impair a student's academic performance. Some effects of low self-esteem include anxiety, tension, isolation, and an increased risk of depression (The University of Texas at Austin Counseling and Mental Health Center, n.d.).

The Mayo Clinic (2020) argued that having healthy self-esteem can make a person trust their abilities and will help them learn and develop new skills. Aryana (2010) and Yazon (2016) considered self-esteem to be a big determinant of academic achievement and that if students had higher levels of self-esteem they would achieve greater academic performance. Shore (n.d.) pointed out that one of the building blocks of school success was positive self-esteem since it offers a firm basis for learning. High self-esteem helped students to work with full dedication and determination, improving their overall performance (Bhatt & Bahadur, 2018). Self-esteem and academic success were important for students to grow holistically and students with high self-esteem were very good at performing and engaging in different school events, such as tournaments, athletics, and extracurricular activities. Such students also get along with their peers and are comfortable reaching out to their teachers (D'Mello, Monteiro, & Pinto, 2018).

Several studies reported that males tend to have higher self-esteem than females worldwide (Arshad, Zaidi, & Mahmood, 2015; Bleidorn et al., 2016; Kong, Ding, & Zhao, 2014; Malik & Saida; 2013; Mosknes et al. 2010). The reason for this was that men tend to overestimate their ability and performance, whereas women tend to be the opposite though the performances of both genders were identical (Kay & Shipman, 2015). Kay and Shipman (2015) further explained that women are perfectionists, which was a source of low confidence that affects women throughout their lives. Women were more cautious and biologically wired with tendencies to take chances only when they were certain that they were fully prepared and competent, unlike men, who were more likely to take risks thus having more confidence and believe in themselves.

Several studies reported that self-esteem increases with age, from adolescence through adulthood (Bleidorn et al., 2016; Orth & Robins, 2014). Similar findings were observed by Ogihara and Kusumi (2020), who explained that the average level of self-esteem was low in youth but increased through to old age. According to Orth, Trzesniewski, and Robins (2010), as people age, they became more stable in their jobs, families, and/or personal relationships.

Resiliency

Resiliency is the ability to thrive in any situation despite adversities. According to Buslig (2019), students' enthusiasm to reach out and mingle positively with their peers, teachers, schoolmates, dorm mates, and other individuals they meet makes them resilient. Sima and Singh (2017) explained that individuals with decent social support networks appeared to have stronger mental health, deeper life insights, and even changed perspectives in job and life experiences. Students who experienced a large network of social support tend to perform better academically and grew socially.

Some students were often driven by self-motivation and high expectations to excel in all their aspirations (Buslig, 2019). Motivation was a main factor in the improvement of a student's success levels (Ullah et al., 2013). Motivation may come from the teaching performance and disposition of instructors, the role of parents, and engagement in learning (Alija & Deari, 2016). Students craved approval and positive feedback from teachers and were more likely to be excited about studying if they knew their role was acknowledged and appreciated ("Motivating Students", n.d.). In addition, Buslig (2019) suggested that students may establish high resilience in a school where resilience building was promoted in teaching techniques and which helped foster student academic success.

A student's achievement goal orientation has a direct impact on academic resilience. *Achievement goal orientations* refer to the general tendencies of students to approach, participate in and assess their academic success and results based on their academic achievements (Tian, Yu, & Huebner, 2017). Splan et al. (2011) found that resiliency and achievement goal orientation were positively and moderately correlated. Indeed, Buslig (2019) showed in a later study that despite difficulties, academically resilient students were able to adapt and cope effectively with difficult situations in their lives; thus, resiliency helped students excel in their studies.

Academic Procrastination

Procrastination is common in academic contexts, especially in environments where students must meet deadlines for completing assignments that require students' time and concentration (Gafni & Geri, 2010). Almunandar, Tewu, and Al-Ghaniyy (2017) explained that poor time management is the primary reason for procrastination; lacking proper time-sharing and time management to complete academic tasks results in procrastination attitudes such as diversion and laziness. Ojo (2019) suggests that instead of reading their books to gain knowledge, students spend a lot of time doing frivolous things, focusing on meaningless things which leads to poor academic success. Hussain and Sultan (2010) found that family issues, lack of motivation, and too much work at the same time led students to procrastinate and fail to complete their assignments, resulting in academic stress and dependence

behaviors. Price (2020) argued that fear of failing or confusion regarding the first steps of an assignment are the two most common causes of procrastination. Procrastinators might be gripped by fear and may stare at a screen or book for hours. Therefore, procrastination is related to not just negative repercussions for the postponed task, but also diminished psychological well-being and performance, as well as increased distress (Rozenal & Carlbring, 2014).

Additionally, several studies reported that boys have a higher tendency to procrastinate than girls (Batoool, Khursheed, & Jahangir, 2017; Babu et al., 2019; Khalid et al., 2019; Khan, et al. 2014; Olea & Olea, 2015). This is most likely explained by the fact that females tend to be more responsible and organized than males. However, a study conducted by He (2017) reported that there are no significant differences between male and female students regarding procrastination.

There are considerable disparities between age groups. Younger people tend to postpone more than older people. The decrease in procrastinating behavior with aging can be explained by the gain in experience and maturing (Jiao et al. 2011). Babu et al. (2019) also found that as age increases, academic procrastination decreases (academic procrastination score increases), and self-esteem increases, or alternatively stated, academic procrastination declines with age (He, 2017). The study also discovered a statistically significant negative relationship between education and academic procrastination. As a student proceeds from undergraduate to Ph.D., he or she procrastinates less for schoolwork.

Olea & Olea (2015) found there is no significant difference in academic procrastination when students are grouped according to age and year of study as did AlQudah, Alsubhien, and Heilat (2014). This is because the year of study does not dictate or impact the student's ability to complete his duties on time; rather, it is determined by the student's self-efficacy.

Interestingly, Estrito and Victor (2019) found that although students procrastinate, they are aware of how to resolve their procrastination and know how to change their behavior. Some researchers have suggested ways to prevent academic procrastination. For example, Rekha Gohain, Gogoi, and Moni Saikia (2021) suggest students can set simple and achievable goals, break large tasks into smaller ones, get rid of distractions, and avoid using social networking sites that kill more time than individual want to spend.

Self-Esteem and Academic Procrastination. According to Rebetz, Rochat, and van der Linden (2015), low self-esteem can cause academic procrastination. Hajloo (2014) also found that procrastinators have low self-esteem, which leads to a general inclination to engage in activities like task delay and avoidance and defend self-presentation by explaining their poor performance and undesirable results. Shore (n.d.) suggests that a student's drive to study, capacity to focus, and willingness to take chances can all be hampered by poor self-esteem. Positive self-esteem, on the other hand, is one of the pillars of academic achievement; it serves as a solid foundation for learning. Additionally, Duru and Balkis (2014) found that academic procrastination has a significant mediation effect on self-esteem and academic accomplishment; students with higher self-esteem will likely accomplish their tasks without delay. According to Batoool, Khursheed, and Jahangir (2017), self-esteem appears to serve as an academic self-regulation mechanism that aids in the reduction of academic procrastination. While self-esteem does not directly influence academic procrastination, it does influence students' academic self-efficacy which influences the extent of academic procrastination.

Resiliency and Academic Procrastination. Kotze and Lamb (2012) reported that resiliency is a strong predictor of positive mental health and work performance. According to Ko and Chang (2018), students with higher levels of resilience reported less procrastination behavior and resilience had an indirect influence on procrastination; furthermore, resilient individuals tend to evaluate themselves positively, believe in their decisions, are confident in their performance, express opinions often, and have a low expectation of failure, thus it is reasonable to assume that resilient individuals can solve challenges and problems which makes them less likely to delay their tasks. Indeed, individuals with

greater resilience exhibit fewer procrastinating tendencies when handling the challenges of the professional decision-making process (Shin and Kelly, 2015).

Theoretical Framework

The theories used in this research are William James's and Resilience theory.

William James Theory

William James used a simple formula to define self-esteem. He suggested that self-esteem is equal to one's successes divided by one's expectations of success (called pretensions). He further explained that the idea of self-esteem is defined by one's concepts and how well he likes himself, and is also linked to the inner value of one's ego.

In the current study, participants who are confident in their abilities may do well in school because believing in themselves might help them better deal with academic challenges. Being confident about oneself may prevent voluntary delay in work because the student believes in his capability to overcome the academic tasks.

Resilience Theory

Renowned clinical psychologist Norman Garmezy, an important researcher in the area of schizophrenia, studied how adversity in life affects mental illness, concentrating on cognitive skills, motivation, and other protective factors that might help prevent mental illness (Harlow, 2009). He has been called the "grandfather of resilience theory" due to his pioneering work in the field.

Resilience Theory argues that it is not the nature of adversity that is most important, but how it is dealt with. When we face adversity, misfortune, or frustration, resilience helps us to bounce back; it helps us survive, recover, and even thrive in the face and wake of misfortune (Moore, 2020). The resilience theory is a framework for understanding how some individuals can bounce back in life after experiencing an adverse situation in a strength-focused approach.

Adversity may be defined as unfortunate, difficult, or challenging events that occur in our lives; adversity can be a great learning opportunity (Raab, 2019). Mediating processes are "the potential or manifested capacity of a dynamic system to adapt successfully to disturbances that threaten the function, survival, or development of the system" (Masten, 2015) and "the process of adjusting well to significant adversity" (Theron, 2016). The mediating process that can help build resilience stems from networks of social relationships with family, friends, school, colleagues, and neighborhoods (Hartling, 2008). Resiliency acts as a process and at the same time becomes an outcome (van Breda, 2018).

Participants in this study may be able to overcome the academic challenges they are facing if they have the strength to do so. They are considered resilient if they continue to deal with their academic obstacles. As a result, a resilient student will not put off academic duties that can be completed promptly.

Conceptual Framework

The student's self-esteem and resiliency have an impact on his or her academic procrastination. A person's perception of his or her ability to finish the activities at hand and overcome the academic hurdles that he or she is experiencing may delay their academic work. Furthermore, variables such as age, gender, and year of study may influence the relationship between self-esteem and resiliency to academic procrastination.

Research Paradigm

This research determined whether self-esteem and resiliency have a relationship with academic procrastination and whether age, gender, and year of study (moderating variables) influence the academic procrastination (dependent variable). The independent variables are self-esteem and resiliency.

Definition of Terms

This section presents the operational definition of the terms used in this study.

Academic Procrastination. A habit in which the students unnecessarily delay the completion of their schoolwork, and instead do it when the due date is near.

Dentistry students. The students currently enrolled in Doctor of Dental Medicine from 1st-year to 6th-year students.

Intervention program. A program that aims to help and prevent academic procrastination and improves self-esteem and resiliency.

Resiliency. The ability of the student to succeed academically despite external adversity and academic difficulties.

Self-Esteem. This refers to how a student sees their value regarding their academic performance.

Simple Random Sampling. A subset of a population is chosen at random.

Methodology

Research Design

The study employs a descriptive research design and quantitative method to collect data. Data collected included student's level of academic procrastination, self-esteem, and resiliency. This study also used a correlational design to determine if there is a relationship between (1) self-esteem and academic procrastination, and (2) resiliency and academic procrastination.

"Descriptive research design aims to accurately and systematically describe the current status of a population, situation or phenomenon" (McCombes, 2019, para. 1). This research design is applicable because the researchers want to discover the characteristics of the sample population of dental students aged 18 – 28 years old. In addition, the research uses a set of survey questionnaires to obtain information (McCombes, 2019) which, in this case include information on level of academic procrastination, self-esteem, and resiliency of dental students.

This study additionally used a correlational design. *"Correlational research design* measures a relationship between two variables without the researcher controlling either of them" (McCombes, 2019, para. 1). Once the researchers obtained the data needed, this data was used in a series of statistical tests to confirm whether there are significant relationships between (1) self-esteem and academic procrastination, and (2) resiliency and academic procrastination. The correlation may be positive, negative, or absent (zero correlation) (McCombes, 2019).

Population and Sampling Technique

The respondents in this study were dentistry students from a private university in Silang, Cavite, Philippines. The criteria for inclusion were male or female; 1) dentistry students who were officially enrolled at the Adventist University of the Philippines, 2) Filipino, and 3) 18 years old and above.

The researchers employed simple random sampling, randomly selecting a subset of the population as respondents where each member of the population had equal chance of being selected (Thomas, 2020). Selecting respondents by random controlled for bias in the study.

The researchers used the website Online Random Picker to select 175 names from dentistry students at all year levels of study. An additional 8 students were added subsequently for a total of 183 respondents.

Demographic Profile

The respondents provided demographic information including age, gender, and year level. The distribution is depicted in the graphs below.

Age. Of the respondents, 13% were 18 years old, 22% were 19 years old, 18% were 20 years old, 5% were 21 years old, 16% were 22 years old, 11% were 23 years old, 11% were 24 years old, 3% were 25 years old, 0.5 % were 26 years old, and 0.5% were 28 years old. Most respondents were 19 years old.

Gender. There were 129 female respondents (71%) and 54 male respondents (29%) with a total of 183 respondents.

Year Level. DMD 2 had the largest number of respondents, 22%. Others were, 16% in DMD 1, 22% in DMD 2, 17% in DMD 3, 6% in DMD 4; 11% in 3rd Year Proper, 20% in 4th Year Proper, and 8% in Residency.

Instrumentation

The researchers used google forms to collect data from the dentistry students because it was simple and easy to distribute. The questions were adapted from three questionnaires, the questions simple, to avoid confusion, and the responses confidential.

The form was divided into four parts. The first part introduced the study to the participant. The first page had the names of the researchers, described participant selection, explained that participation was voluntary, responses confidential, the purpose of the research, procedures, and the benefits of the study to the respondents. The second part of the form addressed consent. The participants typed their student numbers for confirmation of their consent. The third part of the form asked for personal information such as age, gender, and year of study) while the last part included 34 questions from three sets of questionnaires used to assess academic procrastination, self-esteem, and resiliency in respondents. A two-point Likert scale was used for self-esteem and five-point Likert scales were used for procrastination and resiliency. The respondents were asked to answer by selecting the box that corresponded to their best answer.

Academic Procrastination Scale (Short Form). The researchers adapted the short form of the Academic Procrastination Scale (APS) which is a five-item Likert-type scale ranging from 1 (agree) to 5 (disagree). The items were originally selected from the 25-item full-length scale. Higher scores on the scales indicate a greater tendency to procrastinate on academic tasks.

Yockey (2016) found that the APS-S is a unidimensional assessment of academic procrastination with strong reliability and convergent validity of internal accuracy estimates.

Table 1. *Table of Specification for Academic Procrastination*

Response Scale	Degree of Intensity	Mean Interval	Qualitative Descriptor
1	Agree	4.50-5.00	Very High
2	Somewhat Agree	3.50-4.49	High
3	Neutral Somewhat	2.50-3.49	Average
4	Disagree	1.50-2.49	Low
5	Disagree	1.00-1.49	Very Low

Coopersmith Self-Esteem Inventory (School Short Form). The researchers adapted the Coopersmith Self-Esteem Inventory (CSEI) which is one of the most used questionnaires for self-reporting for adolescents and adults. CSEI is designed to measure attitudes toward the self in a variety of areas (family, peers, school, and general social activities) (Potard, 2017). According to Hills, Francis, and Jennings (2011), the correlation between the original 25-item form of the instrument and the new 19-item scale is high ($r = .97$) and it shows evident variables relating to personal self-esteem and self-esteem derived from parents and peers. This 19-item questionnaire was answered yes or no.

Table 2. *Table of Specification for Self-Esteem*

Statements	Response Scale	Score	Scoring Interval	Qualitative Descriptor
Positive Statements	Yes	1	16-19	Very High
	No	0	12-15	High
Negative Statements	Yes	0	8-11	Average
	No	1	4-7	Low
			0-3	Very Low

Connor–Davidson Resilience Scale. The researchers adapted the Connor-Davidson Resilience Scale (CD-RISC) developed by Kathryn M. Connor and Jonathan RT. Davidson. The test evaluates resilience or how well people recover from traumatic incidents, disasters, or trauma (Riopel, 2020). The study used the CD-RISC 10-item, five-point Likert-type scale test developed by Drs. Campbell-Sills and Stein because the researchers thought them to be a better reflection of the ability to bounce back from the variety of challenges that can arise in life (Riopel, 2020). A higher score signifies greater resilience (Notario-Pacheco et al., 2011). Additionally, CD-RISC has high adequate internal consistency, test-retest reliability, and convergent and divergent validity (Scali et al., 2012) showed that the.

Table 3. *Table of Specification for Resiliency*

Response Scale	Degree of Intensity	Mean Interval	Qualitative Descriptor
1	True Nearly All the Time	4.50-5.00	Very High
2	Often True	3.50-4.49	High
3	Sometimes True	2.50-3.49	Average
4	Rarely True	1.50-2.49	Low
5	Not True at All	1.00-1.49	Very Low

Data Gathering Procedures

The researchers wrote to the dean of the dentistry program requesting permission to perform the study. The researchers obtained all the names of the dentistry students enrolled in the college so that they could conduct basic random sampling. Data was collected online using three sets of standardized questionnaires. The researchers used an online platform called Facebook Messenger to communicate with every batch president of each year level so they could inform their classmates – the selected dentistry students – through their group chats on Facebook. The researchers shared an image of the approved letter to perform the study, which was signed by the research adviser and the college dean. The researchers followed this up with the Google Forms link to the questionnaires.

Once the participants accessed the link, they were informed about the intent, purpose, and importance of the research study on the first page. The respondents were encouraged to approach the researchers in case they had trouble understanding any item from the questionnaire. The second page explained the consent and whether the respondent will allow the researchers to obtain personal data from them. The last page was the three sets of questionnaires for screening the participants' academic procrastination, self-esteem, and resiliency. After all the important data were collected, the researchers and statistician analyzed the data over a zoom meeting.

Analysis of Data

The researchers utilized descriptive statistics in this study.

In the data analysis, three types of tests were used to answer the research questions in the statement of the problem. The first set of tests measured the mean and standard deviation which determined the level of self-esteem and resiliency. The second test was the Pearson's Correlation Coefficient which determined if there were significant relationships, and the third test was the One-Way ANOVA which determined if the level of academic procrastination differs with different ages, gender, and year of study.

Mean and Standard Deviation. The "mean is the sum of all values divided by the total number of values" (Bhandari, 2021, para. 1) and is computed by adding the scores and dividing the sum by the total of scores (Cherry, 2020). Standard deviation statistics is one way to explain the outcomes of a set of measurements and can briefly provide a detailed explanation of the characteristics of the data set (Salkind, 2010). These tests helped determine the levels of academic procrastination and resiliency and provided the answers to research questions two and three.

Pearson's Correlation Coefficient. The *Pearson correlation coefficient* is a measure of the relationship between two quantitative variables and the degree to which the two variables coincide (Allen, 2017,

para. 1). The online statistics library Libretexts (2021) further explained that “if the relationship between the variables is not linear, then the correlation coefficient does not adequately represent the strength of the relationship between the variables” (para. 1). This test helped determine if there was a significant relationship between academic procrastination and (1) self-esteem and (2) resiliency. This test answered research questions four and five.

One-Way ANOVA. One-Way ANOVA examines and compares the mean of two or more independent groups to see if the related population means differ statistically (Kent State University, 2022; Laerd Statistics, n.d.). The ANOVA employs the F-test for statistical significance. Because the error is calculated for the entire set of comparisons rather than each two-way comparison, this enables the simultaneous comparison of multiple means (Bevans, 2021). This test was used to answer question six which asked whether academic procrastination differs with age, gender, and year of study.

Ethical Considerations

The researchers assured the respondents that their information would be confidential and their identities would remain hidden and protected. The researchers did not coerce anyone to answer the questionnaire and treated all respondents respectfully. The subjects were informed about the purpose of the study and consented to the use of their given information. The researchers made sure that the information that was gathered was used in the study alone.

Results and Discussion

This chapter discusses the results and findings from the questionnaires submitted by 183 participants that fit the inclusion criteria. The researchers answer the research questions stated in Chapter I with a presentation, analysis, and interpretation of data regarding the academic procrastination, self-esteem, and resiliency of the selected dentistry students.

Self-Esteem

Respondents self-esteem levels are depicted in Figure 8. The scores of respondents from the *School Short Form Coopersmith Self-Esteem Inventory* questionnaire were tallied and categorized as very low, low, average, high, or very high. The majority of the participants had low self-esteem ($n = 56$) and average self-esteem ($n = 55$). Of the remaining participants, 38 had high self-esteem, 22 had very high self-esteem and only 12 had very low self-esteem. Most dentistry students' self-esteem ranges from low to average.

Mustafa et al. (2015) reported that university students had low self-esteem. Furthermore, a multi-center study conducted by Ketata et al. (2021) found an alarming rate of low self-esteem among university students and that students suffering from low self-esteem tend to live in an urban region, study in a private university, and don't take part in leisure activities. Students with low self-esteem are overwhelmed with negativity and some of the reasons for this include lack of motivation and lack of family support (Maheswari & Maheswari, 2016).

Table 4 shows the data analysis for self-esteem. The positive statements “*I am a lot of fun to be with*” (No. 4) and “*My parents usually consider my feelings*” (No. 7) were the most commonly chosen with $N = 141$ and $N = 134$, respectively. Mayo Clinic (2020) explained that a person with healthy self-esteem tends to feel positive about oneself and that close relationships such as those with parents are important for self-esteem especially when these close relationships are strong and provide positive feedback to the person, allowing them to see themselves as valuable. On the other hand, 131 and 119 respondents answered “yes” to the negative statements “*I give up every easily*” (No. 8) and “*I can't be depended on*” respectively. People struggling with their self-esteem often feel incompetent and

inadequate, lacking confidence in what they can do (WebMD, 2020). They tend to be more negative and critical of themselves, believing they are not capable of taking on life's challenges (NHS website, 2021).

Resiliency

The results indicate the students had high levels of resiliency. Interestingly, statement number 6 *"I believe I can achieve my goals, even if there are obstacles"* scored the highest mean (\bar{x} = 4.32), implying participants are willing to attain their goals whatever challenges they face. Additionally, statement number 5 *"I tried to bounce back after illness, injury, or other hardships"* scored the second-highest mean (\bar{x} = 3.97) and statement number 1 *"I am able to adapt when changes occur"* with mean (\bar{x} = 3.87) indicated high levels of consistency throughout the 183 participants. The overall mean of \bar{x} = 3.81 suggests that most participants can adjust when they are out of their comfort zone and that the students have high resiliency based on the Connor-Davidson Resilience Scale scoring guide. These results imply that dentistry students can recover from the difficulties they face.

McGillivray and Pidgeon (2015) stated that students with high levels of resilience reported much lower levels of psychological distress. Studies by Coşkun, Garipağaoğlu, and Tosun (2013) and Wilson et al. (2017) found high levels of resiliency among university students. Moreover, students with high resiliency have social skills, are curious, diligent, cooperative, and patient; they are also less afraid, dependent, and nervous (Wilson et al., 2017). Australia's leading youth mental health website ReachOut (n.d.) stated that being resilient allows individuals to face challenges head-on, recover from setbacks, and have the best chance of success; it enables kids to learn and grow in a variety of contexts – two abilities that are critical for their overall well-being and development. Individuals also benefit from resilience since it enables them to approach new events, people, or experiences with confidence and a positive outlook, increasing their chances of success.

Academic Procrastination

The overall results indicate the students had average levels of academic procrastination. Statement number 3 *"I get distracted by other, more fun things when I am supposed to do my schoolwork"* scored the highest mean (\bar{x} = 3.58) which implies that the participants delay doing their schoolwork when they are presented with the opportunity to do something else, they find more entertaining. Statement number 1 *"I put off projects until the last minute"* scored the second-highest mean (\bar{x} = 3.08) which implies that students tend to delay doing schoolwork nearing the deadline. The participants' overall academic procrastination result was a mean of \bar{x} = 2.94 which indicates average academic procrastination based on the Academic Procrastination Scale (Short Form) scoring guide. We can thus conclude the participants had an average level of procrastination and that dentistry students tend to procrastinate regularly.

According to Visser, Korthagen, and Schoonenboom (2018), students with average procrastination set no preconditions for beginning their academic activities, and they are hopeful that they would manage and expected to eventually finish although they procrastinate. They also discovered that average procrastinators continue to complete tasks even when they are unappealing, indicating these individuals can manage their procrastination. Furthermore, Steel and Klingsieck (2016) reported that students postpone work because they want to do something else that is more exciting or a chance to mingle with friends. Afzal and Jami (2018) found that task aversion is the number one reason why students delay their schoolwork. Aversion is determined by the work or situation and could be due to a task being fundamentally unpleasant; it could also be the result of more profound feelings about the activity, such as self-doubt or low self-esteem (Lieberman, 2019). Steel (2007) discovered that distractions are one of the major factors contributing to procrastination because the inability to focus on the task at hand did not lead to success.

Relationship Between Self-Esteem and Academic Procrastination

Self-esteem and academic procrastination have a statistically significant ($p = <.001$) relationship. Self-esteem has a weak negative correlation with academic procrastination ($r = -0.283$). This means that whenever self-esteem increases, academic procrastination decreases, and when self-esteem decreases, academic procrastination increases. The null hypothesis in this study that states there is no significant relationship between self-esteem and academic procrastination was rejected the p -value from analysis of the data was $<.001$, indicating a significant relationship. It was therefore concluded that a student's self-esteem affects the tendency to procrastinate.

Relationship Between Resiliency and Academic Procrastination

The findings of this study were consistent with the study of Ko and Chang (2018) who found no correlation between resiliency and academic procrastination. They also suggested that resilient individuals usually believe in their own ability to achieve tasks or manage situations, and they embrace the attitude, *"This is not difficult; I am going to make it."* According to Ko and Chang (2008), this belief is reflected in resilient individuals reporting less fear of failure and reductions in their tendency to delay tasks. Resilient individuals have a positive self-view and are confident in their strengths and abilities. This could explain why delaying tasks does not affect their resiliency.

Difference in the Level of Academic Procrastination When the Moderating Variables are Considered

The section presents the significant difference in the level of academic procrastination when the moderating variables which are age, gender, and year level are considered.

The Influence of Age on the Level of Academic Procrastination. The result is shown in Table 9. Using the One-Way ANOVA (Welch's), it was determined that there is no significant difference in academic procrastination for participants of different ages ($p = 0.457$).

Few studies have looked at the relationship between procrastination and age. However, studies by Grunschel, Patrzek, and Fries (2012) and Akkaya (2007) found there are no differences in academic procrastination between students of different ages. Moreover, Beutel et al. (2016) found that people aged 14-29 years old regularly procrastinate.

Gender Influence on the Level of Academic Procrastination. Using the One-Way ANOVA (Welch's), the researchers determined that there is a significant gender difference in academic procrastination. The findings of this study were consistent with Balkis and Duru (2017) who reported that male students are more at risk for procrastination, achieving lower grades, and dissatisfaction with academic life. Similarly, Steel and Ferarri (2013) showed males tended to procrastinate more than females and suggested that male procrastinators lack self-discipline. Beutel et al. (2016) further adds that male students procrastinate more and were linked to higher stress, sadness, anxiety, exhaustion, and lower satisfaction in all aspects of life. Pala, Akyıldız, and Bağcı (2011) found similar findings in their study, male students procrastinate more and are likely to be less academically successful. Girls have significantly higher self-control than boys (Shoenberger & Rocheleau, 2017; Hamama & Hamama-Raz, 2019; Zavala, Sphon, & Alarid, 2019) and self-control is a good predictor of procrastination (Saed, 2019). Boys are more susceptible to distraction and more likely to delay tasks because they have lower self-control.

Year of Study Influence on the Level of Academic Procrastination. Using the One-Way ANOVA (Welch's), the researchers determined that there is no significant difference in levels of academic procrastination by year of study ($p = 0.318$).

Few studies have looked at the relationship between year of study and procrastination. In one of the few studies carried out, Pala, Akyıldız, and Bağcı (2011) observed no differences in academic procrastination among grade levels however, Karimi Moonaghi and Baloochi Beydokhti (2017) stated

that academic procrastination is prevalent throughout all educational levels. Procrastination is widespread among university undergraduate students with some studies estimating that more than 70% of college students postpone frequently (Schraw, Wadkins, & Olafson, 2007). According to Kui and Sheng-Lun (2020), one of the most common reasons for university students' delays is that they don't perceive their homework as being relevant to what they are doing at the time or what they hope to accomplish in the future implying that university students are more inclined to try harder to complete their academic activities and are less likely to put them off when they find them fascinating, relevant, and beneficial.

Based on the results of this study, we determined that there is no significant difference in the level of academic procrastination by age or year of study. However, there was a significant difference between the genders, $p = 0.007$, showing male dentistry students are more likely to procrastinate compared to female dentistry students.

Intervention Program for Dentistry Students

Phases of the Action Plan	Goals/ Objectives	Activities/ Strategies	Persons Involved
Phase I: Selection and Orientation of participants	1. To assess the level of academic procrastination, self-esteem, and resiliency of selected dentistry students.	Data collection using survey questionnaires.	
	2. To give orientation on the importance of knowing the relationship and level of academic procrastination, self-esteem, and resiliency of selected dentistry students in AUP	Selection of students in College of Dentistry Orientation of students through online meeting.	Researchers, Mental Health Workers and Students
Phase II: Conduct (Actual Implementation of Intervention Program)	To reduce the occurrence of academic procrastination among dentistry students. To increase self- esteem of dentistry students Goals To establish rapport with students and gain their trust To promote awareness of the level of self- esteem To create a friendly, cooperative, and healthy	Self-monitoring protocol Setting priorities Establishing routines Setting a regular working timeframe Consideration of personal gratification Identifying and dealing with personal distractions Identification of personal ABC model Identification of personal goals with SMART Praise and acknowledge accomplishments Create realistic expectations Embrace a growth mindset Increase sense of ownership	Researchers, Mental Health Workers and Students

	environment in which one may accept one's strengths and weaknesses equally	Don't compare one student to another	
Phase III: Evaluation	To determine whether the student's self-esteem has improved. To determine if their academic procrastination has changed.	Evaluation of student's level of academic procrastination and self- esteem.	Researchers and Mental Health Workers

The key findings are summarized according to the research objectives by offering an overview of the study. The conclusions are established from the literature studies in chapters two and three, as well as the research findings in chapter four. The conclusions were drawn in line with the research questions that the study sought to answer and the recommendations based on the data from this study aim for future researchers and education stakeholders to create and implement an intervention program.

Summary of Findings

The data show that the dentistry students in Silang, Cavite had low to average levels of self-esteem, high levels of resiliency, and average levels of academic procrastination. Moreover, this study revealed that the student's self-esteem and academic procrastination are negatively correlated meaning when a student's self-esteem increases, the student's academic procrastination decreases, and when self-esteem decreases, academic procrastination increases. This research also examined the relationship between resiliency and academic procrastination and found no correlation. However, there was a significant difference in academic procrastination when genders were compared; male dentistry students scored higher in procrastination which indicated that they are most likely to procrastinate, compared to female dentistry students. There was no significant difference in academic procrastination when the other two moderating variables – age and year of study – were considered.

Conclusion

This study revealed that most dentistry students have a low opinion and value of themselves. The students said they had the tendency to easily quit tasks and that they didn't see themselves as reliable. However, positive feedback from professors and strong social connections can help improve a student's self-esteem. The study also demonstrated that dentistry students have great capacity to bounce back from challenges and difficulties they faced. The students felt like they could accomplish their objectives no matter the circumstances, which is a great outlook in life because students who have this quality are more likely to succeed in the dental program. Dentistry students were found to frequently postpone academic tasks until the last minute or just before the deadline. Finally, the students revealed they were distracted by more enjoyable things when they were meant to be doing their academics. These tendencies show a lack of self-control which is detrimental to academic performance.

On the other hand, students' perception of themselves affects their tendency to procrastinate. They do not postpone their academic tasks when they have a positive view of themselves but will when they have a negative opinion of themselves. Students' perceptions of themselves and their capabilities influence their decisions to complete projects ahead of time or afterward.

Resiliency did not seem to affect students' procrastination; whether a student recovered from adversity did not influence their decision to postpone their work. Furthermore, academic procrastination differed dramatically comparing male and female students, with male students procrastinating significantly more than female students due to a lack of discipline. No significant differences in academic procrastination were observed when the variables were age and year of study; therefore, the student's age and college year of study did not determine their inclination to delay academic tasks. University students can reduce their tendency to procrastinate if they employ tactics like defining basic and attainable objectives, dividing large activities into smaller ones, eliminating distractions, and avoiding social media sites such as Facebook or TikTok because students waste time on these sites that could instead be used for studying. A high sense of self-esteem, resiliency and a low tendency to procrastinate are all associated with academic success.

Recommendations

The research findings from this study led the researchers to make the following recommendations:

Future studies should have an equal number of male and female respondents for unbiased more accurate results.

Explore different variables that may predict and influence the level of academic procrastination such as time management, lack of motivation, self-regulation, and others. This will give future researchers a better understanding of the aspects that directly affect the student's procrastination.

Explore different populations of dentistry students. Examining dentistry students from other universities in the Philippines can provide further insights into these variables. It is necessary to be able to compare the differences and similarities among dentistry students and to strengthen the scope of the findings of this study.

Analyze the variables from a different angle by describing them using different theories.

The theories employed in this study may not fully explain how each of the independent variables (self-esteem and resiliency) behave. Exploring several ideas that address various aspects of self-esteem and resiliency will ensure that the topic is well covered.

Students should adopt a positive attitude, recognizing that they have a problem and should try to seek a solution on their own for their well-being and academic success. Students should be pro-active in improving their self-esteem in order to decrease their academic procrastination.

Students can improve their self-esteem by developing a strong support system with close friends and family. They should stop comparing themselves to other people and reward themselves on a job well done.

Students may decrease their procrastination using strategies such as creating simple and realistic goals, breaking down large tasks into smaller ones, creating to-do lists and prioritizing important tasks at hand, removing distractions, and avoiding social media since they consume time that can be spent on studying instead.

The researchers recommend mental health workers use this study as a baseline for an intervention program for students to improve their procrastination.

References

- [1] Ackerman, C.E. (2020). *What is Self-Esteem? A Psychologist Explains*. Positive Psychology. <https://positivepsychology.com/self-esteem/>
- [2] Abiola, T., & Udofia, O. (2011). Psychometric assessment of the Wagnild and Young's resilience scale in Kano, Nigeria. *BMC Research Notes*, 4(1). <https://doi.org/10.1186/1756-0500-4-509>
- [3] Afzal, S., & Jami, H. (2018). Prevalence of academic procrastination and reasons for academic procrastination in university students. *Journal of Behavioural Sciences*,

- 28(1). <https://bit.ly/3vI7LPX>
- [4] Akkaya, E. (2007). *Academic procrastination among faculty of education students: the role of gender, age, academic achievement, perfectionism and depression* (Master's thesis, Middle East Technical University). <https://bit.ly/3khpulN>
- [5] Akpur, U. (2020). The Effect of Procrastination on Academic Achievement: A Meta-Analysis Study. *International Journal of Educational Methodology*, 6(4), 681–690. <https://doi.org/10.12973/ijem.6.4.681>
- [6] Alija, S., & Deari, F. (2016). Factors affecting Student's Motivation: A Case Study from South East European University. *International Business Information Management Association (IBIMA)*. <https://bit.ly/383GdKB>
- [7] Alipio, M. (2020, April 15). Predicting Academic Performance of College Freshmen in the Philippines using Psychological Variables and Expectancy-Value Beliefs to Outcomes-Based Education: A Path Analysis. <https://doi.org/10.35542/osf.io/pr6z>
- [8] Allan, J. F., McKenna, J., & Dominey, S. (2013). Degrees of resilience: profiling psychological resilience and prospective academic achievement in university inductees. *British Journal of Guidance & Counselling*, 42(1), 9–25. <https://doi.org/10.1080/03069885.2013.793784>
- [9] Allen, M. (2017). Correlation, Pearson. *The SAGE Encyclopedia of Communication Research Methods*. <https://doi.org/10.4135/9781483381411.n99>
- [10] Almunandar, I. D., Tewu, N. A., & Al-Ghaniyy, A. (2017). Analyzing Needs for Training on Academic Procrastination Behavior of College Students. *New Trends and Issues Proceedings on Humanities and Social Sciences*, 4(7), 111–119. <https://doi.org/10.18844/prosoc.v4i3.2636>
- [11] AlQudah, M. F., Alsubhien, A. M., & Heilat, M. Q. A. (2014). The relationship between the academic procrastination and self-efficacy among sample of King Saud University Students. *Journal of education and practice*, 5(16), 101-111.
- [12] Arshad, M., Zaidi, S. M. I. H., & Mahmood, K. (2015). Self-Esteem & Academic Performance among University Students. *Journal of Education and Practice*, 6(1), 156-162. <https://bit.ly/3sjhHiP>
- [13] Aryana, M. (2010). Relationship Between Self-esteem and Academic Achievement Amongst Pre-University Students. *Journal of Applied Sciences*, 10(20), 2474–2477. <https://doi.org/10.3923/jas.2010.2474.2477>
- [14] Babu, P., Chandra, K. M., Vanishree, M. K., & Amritha, N. (2019). Relationship between academic procrastination and self-esteem among dental students in Bengaluru City. *Journal of Indian Association of Public Health Dentistry*, 17(2), 146. <https://bit.ly/3vhUqih>
- [15] Balkis, M. & Duru, E. (2017). Gender Differences in the Relationship between Academic Procrastination, Satisfaction with Academic Life and Academic Performance. *Electronic Journal of Research in Educational Psychology*. 15(1), 1696-2095. <https://doi.org/10.14204/ejrep.41.16042>
- [16] Banatao, E. J. (2011). Educational Resilience: The Relationship between School Protective Factors and Student Achievement. *Online Submission*.
- [17] Batool, S.S., Khursheed, S., & Jahangir, H. (2017). Academic Procrastination as a Product of Low Self-Esteem: A Mediational Role of Academic Self- efficacy. *Pakistan Journal of Psychological Research*, 32.
- [18] Beiter, R., Nash, R., McCrady, M., Rhoades, D., Linscomb, M., Clarahan, M., & Sammut, S. (2015). The prevalence and correlates of depression, anxiety, and stress in a sample of college students. *Journal of Affective Disorders*, 173, 90–96. <https://doi.org/10.1016/j.jad.2014.10.054>
- [19] Beutel, M. E., Klein, E. M., Aufenanger, S., Brähler, E., Dreier, M., Müller, K. W., Quiring, O., Reinecke, L., Schmutzer, G., Stark, B., & Wölfling, K. (2016).

- Procrastination, Distress and Life Satisfaction across the Age Range – A German Representative Community Study. *PLOS ONE*, 11(2), e0148054.
<https://doi.org/10.1371/journal.pone.0148054>
- [20]Bevans, R. (2021, January 7). *An introduction to the one-way ANOVA*. Scribbr.
<https://www.scribbr.com/statistics/one-way-anova/>
- [21]Bhatt, S., & Bahadur, A. (2018). Importance of self-esteem & self-efficacy for college students. *Indian Journal of Community Psychology*, 14(2), 409-419.
<https://bit.ly/3kRPoBF>
- [22]Bhandari, P. (2021, December 13). *An introduction to descriptive statistics*. Scribbr.
<https://www.scribbr.com/statistics/descriptive-statistics/>
- [23]Bhandari, P. (2021, December 3). *How to find the mean*. Scribbr.
<https://www.scribbr.com/statistics/mean/>
- [24]Bleidorn, W., Arslan, R. C., Denissen, J. J., Rentfrow, P. J., Gebauer, J. E., Potter, J., & Gosling, S. D. (2016). Age and gender differences in self-esteem—A cross-cultural window. *Journal of personality and social psychology*, 111(3), 396.
<http://dx.doi.org/10.1037/pspp0000078>
- [25]Bolinski, F., Boumparis, N., Kleiboer, A., Cujipers, P., Ebert, D., & Riper, H. (2020). The Effect of e-mental health interventions on academic performance in university health interventions on academic performance in university and college students: A meta-analysis of randomized controlled trials. *Internet Interventions*, 20, 100321.
<https://doi.org/10.1016/j.invent.2020.100321>
- [26]Bradberry, T. (2015). *10 Toxic People You Should Avoid At All Costs*. Forbes.
<https://bit.ly/328WQRA>
- [27]Buslig, S.M.C.A. (2019). The academic resilience of college students in Kalinga. *International Journal of Humanities and Social Science*. 9(6), 1-14.
<https://bit.ly/3yBgWmh>
- [28]Cassidy, S. (2015). Resilience Building in Students: The Role of Academic Self-Efficacy. *Frontiers in Psychology*, 6. <https://doi.org/10.3389/fpsyg.2015.01781>
- [29]Cassidy, S. (2016). The Academic Resilience Scale (ARS-30): A New Multidimensional Construct Measure. *Frontiers Psychology*. 7(1787), 1-11.
<https://doi.org/10.3389/fpsyg.2016.01787>
- [30]Cheng, V. & Catling, J. (2015). The role of resilience, delayed gratification, and stress in predicting academic performance. *Psychology Teaching Review*. 21(1), 13-24.
<https://files.eric.ed.gov/fulltext/EJ1146513.pdf>
- [31]Cherry, K. (2020, May 30). *What Is Procrastination?* Verywell Mind.
<https://bit.ly/3s21q0H>
- [32]Cherry, K. (2020, March 24). *What You Need to Do in Order to Calculate the Mean, Median, or Mode*. Verywell Mind. <https://bit.ly/3xZ7LxS>
- [33]Crocker, J., Karpinski, A., Quinn, D. M., & Chase, S. K. (2003). When Grades Determine Self-Worth: Consequences of Contingent Self-Worth for Male and Female Engineering and Psychology Majors. *Journal of Personality and Social Psychology*, 85(3), 507–516. <https://doi.org/10.1037/0022-3514.85.3.507>
- [34]Coşkun, Y. D., Garipağaoğlu, A., & Tosun, L. (2014). Analysis of the Relationship between the Resiliency Level and Problem Solving Skills of University Students. *Procedia - Social and Behavioral Sciences*, 114, 673– 680.
<https://doi.org/10.1016/j.sbspro.2013.12.766>
- [35]Debois, S. (2019). *10 Advantages and Disadvantages of Questionnaires*. Survey Anyplace. <https://surveyanyplace.com/questionnaire-pros-and-cons/>
- [36]Di Giunta, L., Alessandri, G., Gerbino, M., Kanacri, P. L., Zuffiano, A., & Caprara, G. V. (2013). The determinants of scholastic achievement: The contribution of personality traits, self-esteem, and academic self-efficacy. *Learning and Individual Differences*,

- 27, 102-108. <http://dx.doi.org/10.1016/j.lindif.2013.07.006>
- [37]D'Mello, L., Monteiro, M., & Pinto, N. (2018). A Study on the Self Esteem and Academic Performance among the Students. *International Journal of Health Sciences and Pharmacy*, 2(1), 1-7. <https://bit.ly/3q8DFIQ>
- [38]Duru, E., & Balkis, M. (2017). Procrastination, self-esteem, academic performance, and well-being: A moderated mediation model. *International Journal of Educational Psychology*, 6(2), 97. <https://doi.org/10.17583/ijep.2017.2584>
- [39]Duru, E., & Balkis, M. (2014). The roles of academic procrastination tendency on the relationships among self doubt, self esteem and academic achievement. *Egitim ve Bilim*, 39(173). <https://bit.ly/3Lxf4ka>
- [40]Estrito, M.C.R. & Victor, A.J.T. (2019). Bukas Na Lang! : A Study On The Level And Reasons For Academic Procrastination Of Selected 1st Year Students In Different Programs Of URs. *Academia*. 1-42. <https://bit.ly/3raRijm>
- [41]Field, T., Diego, M., Pelaez, M., Deeds, O., & Delgado, J. (2012). Depression and related problems in university students. *College Student Journal*, 46(1), 193– 202.
- [42]Gafni, R., & Geri, N. (2010). Time management: Procrastination tendency in individual and collaborative tasks. *Interdisciplinary Journal of Information, Knowledge, and Management*. 5, 115-125. <https://bit.ly/2L7Z9il>
- [43]Galanakis, M., Palaiologou, A., Patsi, G., Velegraki, I-M., & Darviri, C. (2016). A Literature Review on the Connection between Stress and Self-Esteem. *Scientific Research Publishing*. 7, 687-694. <http://dx.doi.org/10.4236/psych.2016.75071>
- [44]Ghazi, S.R., Ali, R., Saqib, S. & Hukamdad, H. (2010). Parental Involvement in Children Academic Motivation. *Asian Social Science*. 6(4). 1-7. <http://doi.org/10.5539/ass.v6n4p93>
- [45]Grunschel, C., Patrzek, J., & Fries, S. (2012). Exploring reasons and consequences of academic procrastination: an interview study. *European Journal of Psychology of Education*, 28(3), 841–861. <https://doi.org/10.1007/s10212-012-0143-4>
- [46]Gustavson, D. E., & Miyake, A. (2017). Academic procrastination and goal accomplishment: A combined experimental and individual differences investigation. *Learning and Individual Differences*, 54, 160–172. <https://doi.org/10.1016/j.lindif.2017.01.010>
- [47]Hajloo, N. (2014). Relationships between self-efficacy, self-esteem and procrastination in undergraduate psychology students. *Iranian journal of psychiatry and behavioral sciences*, 8(3), 42.
- [48]Hamama, L., & Hamama-Raz, Y. (2019). Meaning in Life, Self-Control, Positive and Negative Affect: Exploring Gender Differences Among Adolescents. *Youth & Society*, 53(5), 699–722. <https://doi.org/10.1177/0044118x19883736>
- [49]Harackiewicz, J.M., Smith, J.L. & Priniski, S.J. (2016). Interest Matters: The Importance of Promoting Interest in Education. *Policy Insights Behav Brain Sci*. 3(2). 220-227. <http://doi.org/10.1177/2372732216655542>
- [50]Harlow, T. (2009). Norman Garmezy, resilience theory pioneer. *Star Tribune*, November 25.
- [51]Hartling, L. M. (2008). Strengthening Resilience in a Risky World: It's All About Relationships. *Women & Therapy*, 31(2–4), 51–70. <https://doi.org/10.1080/02703140802145870>
- [52]Hayat, A.S., Kojuri, J., & Amini, M. (2020). Academic procrastination of medical students: The role of Internet addiction. *Journal of Advances in Medical Education and Professionalism*. 8(2), 83-89. <https://doi.org/10.30476/JAMP.2020.85000.1159>
- [53]He, S. (2017). A Multivariate Investigation into Academic Procrastination of University Students. *Open Journal of Social Sciences*, 05(10), 12–24. <https://doi.org/10.4236/jss.2017.510002>

- [54] Hills, P. R., Francis, L. J., & Jennings, P. (2011). The School Short-Form Coopersmith Self-Esteem Inventory: Revised and Improved. *Canadian Journal of School Psychology*, 26(1), 62–71. <https://doi.org/10.1177/0829573510397127>
- [55] Hussain, I., & Sultan, S. (2010). Analysis of procrastination among university students. *Procedia - Social and Behavioral Sciences*, 5, 1897–1904. <https://doi.org/10.1016/j.sbspro.2010.07.385>
- [56] Jiao, Q. G., DaRos-Voseles, D. A., Collins, K. M., & Onwuegbuzie, A. J. (2011). Academic procrastination and the performance of graduate-level cooperative groups in research methods courses. *Journal of the Scholarship of Teaching and Learning*, 11(1), 119-138.
- [57] Karimi Moonaghi, H., & Baloochi Beydokhti, T. (2017). Academic procrastination and its characteristics: A Narrative Review. *Future of medical education journal*, 7(2), 43-50. https://fmej.mums.ac.ir/article_9049.html
- [58] Kay, K., & Shipman, C. (2015, August 27). *The Confidence Gap*. The Atlantic. <https://www.theatlantic.com/magazine/archive/2014/05/the-confidence-gap/359815/>
- [59] Kent State University. (2022). *LibGuides: SPSS Tutorials: One-Way ANOVA*. <https://libguides.library.kent.edu/spss/onewayanova>
- [60] Ketata, N., ben Ayed, H., Baklouti, M., Trigui, M., Yaich, S., Abdelmoula, M., Feki, H., & Damak, J. (2021). Self-esteem and university students: Findings from a multi-center study. *European Journal of Public Health*, 31(Supplement_3). <https://doi.org/10.1093/eurpub/ckab165.593>
- [61] Kim, K. R., & Seo, E. H. (2015). The relationship between procrastination and academic performance: A meta-analysis. *Personality and Individual Differences*, 82, 26–33. <https://doi.org/10.1016/j.paid.2015.02.038>
- [62] Kui, X., & Sheng-Lun, C. (2020, November 28). *How college students can avoid procrastinating with online work*. Ohio State News. Retrieved April 27, 2022, from <https://bit.ly/3xYoy4g>
- [63] Khalaf, M. A. (2014). Validity and reliability of the academic resilience scale in Egyptian context. *US China Educ. Rev. B*, 4, 202-210.
- [64] Khalid, A., Zhang, Q., Wang, W., Ghaffari, A. S., & Pan, F. (2019). The relationship between procrastination, perceived stress, saliva alpha-amylase level and parenting styles in Chinese first year medical students. *Psychology Research and Behavior Management*, Volume 12, 489–498. <https://doi.org/10.2147/prbm.s207430>
- [65] Khan, M. J., Arif, H., Noor, S. S., & Muneer, S. (2014). Academic procrastination among male and female university and college students. *FWU Journal of Social Sciences*, 8(2). <https://bit.ly/3y3IS56>
- [66] Kharsah, W.S. and Latada, F. (2016). The Correlation between Levels of Self- Esteem, University Commitment and Academic Performance among Undergraduate Students. *The National Conference of Postgraduate Research 2016*. 200-205. <https://core.ac.uk/download/pdf/159190438.pdf>
- [67] Kong, F., Ding, K., & Zhao, J. (2015). The relationships among gratitude, self-esteem, social support and life satisfaction among undergraduate students. *Journal of Happiness Studies*, 16(2), 477-489. <https://doi.org/10.1007/s10902-014-9519-2>
- [68] Ko, C. Y. A., & Chang, Y. (2018). Investigating the Relationships Among Resilience, Social Anxiety, and Procrastination in a Sample of College Students. *Psychological Reports*, 122(1), 231–245. <https://doi.org/10.1177/0033294118755111>
- [69] Kotzé, M., & Lamb, S. (2012). The Influence of Personality Traits and Resilience on Burnout among Customer Service Representatives in a Call Centre. *Journal of Social Sciences*, 32(3), 295–309. <https://doi.org/10.1080/09718923.2012.11893074>

- [70]Laerd Statistics. (n.d.). *One-way ANOVA - An introduction to when you should run this test and the test hypothesis* / Laerd Statistics. Retrieved April 25, 2022, from <https://statistics.laerd.com/statistical-guides/one-way-anova-statistical-guide.php>
- [71]Libretexts. (2021, January 11). 4.2: *Values of the Pearson Correlation*. Statistics LibreTexts. <https://bit.ly/32e5DnT>
- [72]Lieberman, C. (2019). Why You Procrastinate (It Has Nothing to Do with Self-Control). *The New York Times*. <https://nyti.ms/2I9f9P9>
- [73]Liu, R. & Chiang, Y. (2019). Who is more motivated to learn? The roles of family background and teacher-student interaction in motivating student learning. *The Journal of Chinese Sociology*. 6(6). 1-17. <http://doi.org/10.1186/s40711-019-0095-z>
- [74]Maheswari, R., & Maheswari, K. (2016). A study on self-esteem among the college students. *IOSR Journal of Humanities and Social Science*, 21(10), 8-10. <https://bit.ly/3vPo0Lj>
- [75]Malik, S., & Saida, J. (2013). Gender differences in self-esteem and happiness among university students. *International Journal of Development and Sustainability*, 2(1), 445-54.
- [76]Masten, A.S. (2015). Pathways to Integrated Resilience Science. *Psychology Inquiry*. 26, 187- 196. <https://doi.org/10.1080/1047840X.2015.1012041>
- [77]Martin, A.J. (2013). Academic buoyancy and academic resilience: exploring 'everyday' and 'classic' resilience in the face of academic adversity. *School Psychology International*. 34(5), 488–500. <http://doi.org/10.1177/0143034312472759>
- [78]Maximo, S. I., & Carranza, J. S. (2016). Parental Attachment and Love Language as Determinants of Resilience Among Graduating University Students. *SAGE Open*, 6(1), 215824401562280. <https://doi.org/10.1177/2158244015622800>
- [79]Mayo Clinic. (2020). *Self-esteem check: Too low or, just right?* Mayo Clinic. <https://mayoclinic.in/2HXKOD4>
- [80]McCombes, S. (2019). *Descriptive research*. Scribbr. <https://www.scribbr.com/methodology/descriptive-research/>
- [81]McCombes, S. (2019). *Correlational research*. Scribbr. <https://www.scribbr.com/methodology/correlational-research/>
- [82]McLafferty, M., Mallet, J., & McCauley, V. (2012). Coping at university: the role of resilience, emotional intelligence, age and gender. *J. Quant. Psychol. Res*, 1, 1-6.
- [83]McGillivray, C. J., & Pidgeon, A. M. (2015). Resilience Attributes Among University Students: A Comparative Study of Psychological Distress, Sleep Disturbances and Mindfulness. *European Scientific Journal, ESJ*. 11(5), 33-48. <https://eujournal.org/index.php/esj/article/view/5174>
- [84]Moore, C. (2020). Resilience Theory: What Research Articles in Psychology Teach Us. Positive Psychology. <https://positivepsychology.com/resilience-theory/>
- [85]Moksnes, U. K., Moljord, I. E., Espnes, G. A., & Byrne, D. G. (2010). The association between stress and emotional states in adolescents: The role of gender and self-esteem. *Personality and Individual Differences*, 49(5), 430–435. <https://doi.org/10.1016/j.paid.2010.04.012>
- [86]Motivating Students. (n.d.). Teach. <https://bit.ly/3jTZ0KG>
- [87]Mustafa, S., Melonashi, E., Shkempi, F., Besimi, K., & Fanaj, N. (2015). Anxiety and Self-esteem among University Students: Comparison between Albania and Kosovo. *Procedia - Social and Behavioral Sciences*, 205, 189–194. <https://doi.org/10.1016/j.sbspro.2015.09.057>
- [88]Mwangi, C.N., Okatcha, F.M., Kinai, T.K., & Ireri, A.M. (2015). Relationship between Academic Resilience and Academic Secondary School Students in Kiambu County,

- Kenya. *International Journal of School and Cognitive Psychology*. 1-5.
<https://doi.org/10.4172/2469-9837.S2-003>
- [89]Mwangi, C. N., Ireri, A. M., & Mwaniki, E. W. (2017). Correlates of academic resilience among secondary school students in Kiambu County, Kenya. *Interdisciplinary Education and Psychology*, 1(1), 4.
<https://doi.org/10.31532/interdiscipeducpsychol.1.1.004>
- [90]Nayler, C. (2010). *What is Self-Esteem? 3 Theories on the Function of Self-Esteem*. Positive Psychology. <http://positivepsychology.org.uk/self-esteem-theory/>
- [91]NHS website. (2021, November 24). *Raising low self-esteem*. NHS. UK.
<https://www.nhs.uk/mental-health/self-help/tips-and-support/raise-low-self-esteem/>
- [92]Nguyen, D. T., Wright, E. P., Dedding, C., Pham, T. T., & Bunders, J. (2019). Low Self-Esteem and Its Association With Anxiety, Depression, and Suicidal Ideation in Vietnamese Secondary School Students: A Cross-Sectional Study. *Frontiers in Psychiatry*, 10. <https://doi.org/10.3389/fpsyt.2019.00698>
- [93]Notario-Pacheco, B., Solera-Martinez, M., Serrano-Parra, M.D., Bartolome-Gutierrez, R., Garcia-Campayo, J., & Martinez-Vizcaino, V. (2011). Reliability and validity of the Spanish version of the 10-item Connor-Davidson Resilience Scale (10- item CD-RISC) in young adults. *Health and Quality of Life Outcomes*. 9(11), 1-6.
<https://doi.org/10.1186/1477-7525-9-63>
- [94]Ogihara, Y., & Kusumi, T. (2020). The Developmental Trajectory of Self-Esteem Across the Life Span in Japan: Age Differences in Scores on the Rosenberg Self-Esteem Scale From Adolescence to Old Age. *Frontiers in Public Health*, 8.
<https://doi.org/10.3389/fpubh.2020.00132>
- [95]Ojo, A. (2019). The impact of procrastination on student's academic performance in secondary schools. *European Centre for Research Training and Development*. (5)1, 17-22. <https://bit.ly/34PB3A5>
- [96]Olea, M. T., & Olea, A. N. (2015). Perceptiveness and sense impression of procrastination across correlates. *International Research Journal of Social Sciences*, 4(1), 37-43.
- [97]Orth, U., & Robins, R. W. (2014). The Development of Self-Esteem. *Current Directions in Psychological Science*, 23(5), 381–387.
<https://doi.org/10.1177/0963721414547414>
- [98]Orth, U., Trzesniewski, K. H., & Robins, R. W. (2010). Self-esteem development from young adulthood to old age: A cohort-sequential longitudinal study. *Journal of Personality and Social Psychology*, 98(4), 645–658.
<https://doi.org/10.1037/a0018769>
- [99]Pala, A., Akyildiz, M., & Bağcı, C. (2011). Academic Procrastination Behaviour of Pre-service Teachers' of Celal Bayar University. *Procedia - Social and Behavioral Sciences*, 29, 1418–1425. <https://doi.org/10.1016/j.sbspro.2011.11.381>
- [100] Price, D. (2020, July 15). Laziness Does Not Exist - Human Parts. Medium.
<https://humanparts.medium.com/laziness-does-not-exist-3af27e312d01>
- [101] Poorolajal J, Ghaleiha A, Darvishi N, Daryaei S, Panahi S. The Prevalence of Psychiatric Distress and Associated Risk Factors among College Students Using GHQ-28 Questionnaire. *Iran J Public Health*. 2017;46(7):957-963.
<https://bit.ly/3OL7e8y>
- [102] Potard, C. (2017). Self-Esteem Inventory (Coopersmith). *Encyclopedia of Personality and Individual Differences*. (1-3). https://doi.org/10.1007/978-3-319-28099-8_81-1
- [103] Raab, D. (2019). Bouncing Back from Adversity. *Psychology Today*.
<https://bit.ly/38nk5uS>

- [104] Ratanasiripong, P., China, T., & Toyama, S. (2018). Mental Health and Well-Being of University Students in Okinawa. *Education Research International*, 2018, 1–7. <https://doi.org/10.1155/2018/4231836>
- [105] Ratanasiripong, P., & Rodriguez, A. (2011). Promoting Wellness for Thai College Students. *Journal of College Student Development*, 52(2), 217–223. <https://doi.org/10.1353/csd.2011.0028>
- [106] ReachOut. (n.d.). *What is resilience?* Student Wellbeing | ReachOut Schools. Retrieved April 27, 2022, from <https://schools.au.reachout.com/articles/what-is-resilience>
- [107] Rebetez, M. M. L., Rochat, L., & van der Linden, M. (2015). Cognitive, emotional, and motivational factors related to procrastination: A cluster analytic approach. *Personality and Individual Differences*, 76, 1–6. <https://doi.org/10.1016/j.paid.2014.11.044>
- [108] Rekha Gohain, R., Gogoi, S., & Moni Saikia, J. (2021). Academic Procrastination among College Students of Jorhat- An Explorative Study. *Academic Procrastination among College Students of Jorhat- An Explorative Study*, 39(11), 365–375. <https://doi.org/10.9734/AJAEES/2021/v39i1130762>
- [109] Research Connections. (n.d.). *Descriptive Statistics*. Research Connections. <https://bit.ly/3pEepT0>
- [110] Riopel, L. (2020). *The Connor Davidson + Brief Resilience Scale*. Positive Psychology. <https://positivepsychology.com/connor-davidson-brief-resilience-scale/>
- [111] Roberts, E. (2013). *How Toxic Friends Affect Our Self-Esteem?* Healthy Place. <https://bit.ly/2TO8woi>
- [112] Rogerson, C. and Scott, E. (2010). The Fear Factor: How it Affects Students Learning to Program in a Tertiary Environment. *Journal of Information Technology Edition*, 9, 147- 141. <https://doi.org/10.28945/1183>
- [113] Rozental, A., & Carlbring, P. (2014). Understanding and Treating Procrastination: A Review of a Common Self-Regulatory Failure. *Psychology*, 05(13), 1488– 1502. <https://doi.org/10.4236/psych.2014.513160>
- [114] Saed, O. (2019). The Roles of Self-Regulation and Self-Control in Procrastination. *Psychology and Behavioral Science International Journal*, 13(2). <https://doi.org/10.19080/pbsij.2019.13.555863>
- [115] Schraw, G., Wadkins, T., & Olafson, L. (2007). Doing the things we do: A grounded theory of academic procrastination. *Journal of Educational Psychology*, 99(1), 12– 25. <https://doi.org/10.1037/0022-0663.99.1.12>
- [116] Serrano Sarmiento, N., Sanz Ponce, R., & González Bertolín, A. (2021). Resilience and COVID-19. An Analysis in University Students during Confinement. *Education Sciences*, 11(9), 533. <https://doi.org/10.3390/educsci11090533>
- [117] Shin, Y. J., & Kelly, K. R. (2015). Resilience and Decision-Making Strategies as Predictors of Career Decision Difficulties. *The Career Development Quarterly*, 63(4), 291–305. <https://doi.org/10.1002/cdq.12029>
- [118] Shoenberger, N., & Rocheleau, G. C. (2017). Effective Parenting and Self-Control: Difference by Gender. *Women & Criminal Justice*, 27(5), 271–286. <https://doi.org/10.1080/08974454.2016.1261071>
- [119] Sima, M. W., & Singh, D. P. (2017). College Students' Friendship Quality. *IOSR Journal of Humanities and Social Science*, 22(02), 85–89. <https://doi.org/10.9790/0837-2202038589>
- [120] Shore, K. (n.d.). The Student with Low Self-Esteem. <https://bit.ly/2l0wGcP>
- [121] Southwick, S. M., Bonanno, G. A., Masten, A. S., Panter-Brick, C., & Yehuda, R. (2014).

- Resilience definitions, theory, and challenges: interdisciplinary perspectives. *European Journal of Psychotraumatology*, 5(1), 25338.
<https://doi.org/10.3402/ejpt.v5.25338>
- [122] Splan R.K., Brooks R.M., Porr S., & Broyles T.W. (2011). Resiliency and Achievement Goal Orientation among Agricultural Students. *NACTA Journal*. 55(4), 31–38.
<https://bit.ly/360UcOG>
- [123] Stanford Encyclopedia of Philosophy Archive. (2019). *David Hume*. Stanford Encyclopedia of Philosophy.
<https://plato.stanford.edu/archives/sum2019/entries/hume/>
- [124] Steel, P. (2007). The nature of procrastination: A meta-analytic and theoretical review of quintessential self-regulatory failure. *Psychological Bulletin*, 133(1), 65–94. <https://doi.org/10.1037/0033-2909.133.1.65>
- [125] Steel, P., & Klingsieck, K. B. (2016). Academic Procrastination: Psychological Antecedents Revisited. *Australian Psychologist*, 51(1), 36–46.
<https://doi.org/10.1111/ap.12173>
- [126] Theron, L. C. (2016). Toward a Culturally and Contextually Sensitive Understanding of Resilience. *Journal of Adolescent Research*, 31(6), 635–670.
<https://doi.org/10.1177/0743558415600072>
- [127] Tian, L., Yu, T., & Huebner, E.S (2017). Achievement Goal Orientations and Adolescents' Subjective Well-Being in School: The Mediating Roles of Academic Social Comparison Directions. *Frontiers Psychology*. 8(37).
<https://doi.org/10.3389/fpsyg.2017.00037>
- [128] The University of Texas at Austin Counseling and Mental Health Center. (n.d.) Self-Esteem. <https://cmhc.utexas.edu/selfesteem.html>
- [129] Thomas, L. (2020). *An introduction to simple random sampling*. Scribbr.
<https://www.scribbr.com/methodology/simple-random-sampling/>
- [130] Ullah, M.I., Sagheer, A., Sattar, T., & Khan, S. (2013). Factors Influencing Students Motivation to Learn in Bahauddin Zakariya University, Multan (Pakistan). *International Journal of Human Resource Studies*. 3(2), 1-20.
<http://dx.doi.org/10.5296/ijhrs.v3i2.4135>
- [131] van Breda, A. (2018). A CRITICAL REVIEW OF RESILIENCE THEORY AND ITS RELEVANCE FOR SOCIAL WORK. *Social Work*, 54(1). <https://doi.org/10.15270/54-1-611>
- [132] Visser, L., Korthagen, F. A. J., & Schoonenboom, J. (2018). Differences in Learning Characteristics Between Students With High, Average, and Low Levels of Academic Procrastination: Students' Views on Factors Influencing Their Learning. *Frontiers in Psychology*, 9. <https://doi.org/10.3389/fpsyg.2018.00808>
- [133] Wazid, S. W., Shahnawaz, M. G., & Gupta, D. (2016). Procrastination among students: The role of gender, perfectionism and self-esteem. *The Indian journal of social work*, 77(2), 191-210. <https://bit.ly/3vOPz7z>
- [134] Wilson, C. A., Plouffe, R. A., Saklofske, D. H., di Fabio, A., Prince-Embury, S., & Babcock,
- [135] S. E. (2017). Resiliency Across Cultures: A Validation of the Resiliency Scale for Young Adults. *Journal of Psychoeducational Assessment*, 37(1), 14–25.
<https://doi.org/10.1177/0734282917740017>
- [136] WebMD. (2020, November 25). *Signs of Low Self-Esteem*. <https://wb.md/39ck5jT>
- [137] Yazon, A.D. (2016). Self-Esteem, Self-Efficacy, and Academic Performance of Teacher Education Students in one State University in the Philippines. *International Journal of Science and Research (IJSR)*. 7(11). 1-5.
<http://doi.org/10.21275/ART20193188>

- [138] Ye, W., Strietholt, R., & Blömeke, S. (2021). Academic resilience: underlying norms and validity of definitions. *Educational Assessment, Evaluation and Accountability*, 33(1), 169–202. <https://doi.org/10.1007/s11092-020-09351-7>
- [139] Yockey, R.D. (2016). Validation of the Short Form of the Academic Procrastination Scale *Psychological Reports*. 118(1), 171-191.
<https://doi.org/10.1177%2F0033294115626825>
- [140] Zavala, E., Spohn, R. E., & Alarid, L. F. (2019). Gender and Serious Youth Victimization: Assessing the Generality of Self-control, Differential Association, and Social Bonding Theories. *Sociological Spectrum*, 39(1), 53–69.
<https://doi.org/10.1080/02732173.2019.1608341>

Sexual Behaviors and Family Planning Practices of Married Individuals during the Covid-19 Pandemic

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Abstract: This study examines the influence of the lockdown caused by the COVID-19 pandemic on the sexual behaviors and family planning practices of married individuals in Silang, Cavite. Using purposive sampling, 200 married individuals participated in the study. A self-structured and modified questionnaire, validated by a pilot study, was distributed via email and Facebook messenger. The results showed that the respondents had a positive overall sexual behavior with a mean score of 3.60 (SD = .40) and moderate overall family planning practices with a mean of 3.43 (SD=.81). There was a moderate positive correlation ($r=.312$) between sexual behaviors and family planning practices ($p<.01$). There was no significant difference in family planning practices when considering age ($p=.903$), employment status ($p=.461$), and length of marriage ($p=.058$). However, there was a significant difference in family planning practices when considering gender ($p=.001$), educational attainment ($p=.002$), and religion ($p=.001$). This implies that the situation brought about by the pandemic requires the need for family planning. It is recommended that family planning programs be reinforced or continued in the community.

Keywords: *sexual behaviors, family planning practices, Covid-19 pandemic*

Introduction

Coronavirus disease (COVID-19) is an infectious disease caused by a newly discovered coronavirus. Symptoms of the disease include fever, sore throat, and cough, as well as mild to moderate or severe respiratory illness. Individuals who are older or have underlying medical conditions such as cardiovascular disease, diabetes, chronic respiratory disease, or cancer are at a higher risk of developing severe symptoms. To prevent and slow the spread of COVID-19, it is important to stay informed about the virus, how it spreads, and the best ways to protect yourself and others. The Center for Disease Control (CDC) and the World Health Organization (WHO) recommend actions such as frequently washing your hands or using an alcohol-based rub, avoiding touching your face, and properly wearing face masks (CDC, 2020).

During the COVID-19 pandemic, governments have asked people to practice "social distancing" or stay at home to limit physical contact and the spread of the virus. This has raised questions about the effect of the pandemic on the sexuality and family planning practices of married couples who are now stuck together all day and everyday due to quarantine. Research on sexuality, sexual well-being, and intimacy during the pandemic has found that there is a lack of literature on the subject, but it has concluded that due to physical distancing, travel restrictions, high human-to-human transmission rates, misinformation and uncertainty about sexual transmission, and fear about intimacy, sexuality, and safe sexual practices have increased significantly (Banerjee & Rao, 2020). Studies have shown conflicting results on sexual behavior during the pandemic, with some studies showing an increase in sexual behavior, while others show a decrease. Additionally, there have been varying predictions about birth rates after the pandemic, with some sources stating that birth rates will drop (Gupta, 2020), while in the Philippines, health experts predict that around 214,000 babies from unplanned pregnancies will be born next year due to the enhanced community quarantine brought on by the pandemic (Crisostomo, 2020). This is why researchers want to study the sexual behaviors and family planning practices of married individuals during the pandemic. One study finds that quarantine measures imposed by governments have decreased opportunities for casual sex but increased

opportunities for couples in stable relationships, particularly married couples. For many individuals, sexual activity has decreased, and physical contact between couples has been reduced (Eleuteri & Terzitta, 2021).

It is widely believed that problems with sex stem from a lack of closeness. A study on how COVID-related stressors impact sexual desires in romantic relationships suggests that they can also lead to decreased sexual desires (Balzarini et al., 2021). When the COVID-19 pandemic began, factors such as anxiety, worry, and fear brought on by job loss, fear of infection, and uncertainty about when the pandemic will end, further decreased sex drive. When stay-at-home orders were put in place, couples were forced to live together in one roof, which led to increased anxiety. Even couples who were previously contented were affected by the new normal. This is when closeness between couples, or lack thereof, became an issue. Depending on how it is viewed, the way closeness is constructed can reduce the sense of freedom and autonomy needed for sexual pleasure. When intimacy becomes too close, it can impede desire. Furthermore, being stuck together in the confined space of the home with limited opportunities for separation can lead to a decline in the drive for intimacy and a reduction in sexual frequency.

Throughout the COVID-19 pandemic, the World Health Organization Director General (WHO, 2020) has emphasized that “all countries must strike a fine balance between protecting health, minimizing economic and social disruption, and respecting human right.” With reduced mobility and limited access to clinics and hospitals, ensuring quality and timely reproductive health care is crucial during the pandemic lockdown. Health experts warn that family planning and reproductive health services should not be ignored during this time, as they are already being impacted in some countries due to disruptions to contraceptive supply chains, closures of health clinics, and public fear of visiting health facilities. The WHO and the Philippines' Department of Health (DOH) are working to continue providing reproductive health education online during quarantine or lockdown. This study aims to provide information that can help healthcare institutions create programs that help families better understand the benefits of family planning services, fulfilling one of the United Nations Sustainable Development Goals of eradicating poverty through basic health care, security, and education (UNSDG, 2021). Additionally, this study aims to fulfill the UN Sustainable Development Goal of ensuring healthy lives and promoting well-being for all ages (Martin, 2021).

Methodology

Research Design

This study employed a quantitative research design using the descriptive correlational method, with the aim of gathering numerical data to generalize and analyze the relationship between sexual behaviors and family planning practices among the respondents. The purpose of this study was to determine if sexual behaviors influenced the family planning practices of the respondents.

As explained by the University of Southern California Libraries, the goal in conducting a quantitative research study is to determine the relationship between the independent variable to the dependent or outcome variable within a population (Labaree, 2021). As cited in Research Methodology discussion, the descriptive method, also known as statistical research, is used to define the data and attributes of the sample or phenomena being studied. This method is used to compile information to answer questions about the subject of the study. It involves describing, recording, analyzing, and interpreting how a person, group, or thing functions under given conditions (Course Hero, 2019).

This study used a correlational design to predict and explain the relationship between variables. The researchers aimed to determine the influence and relationship of sexual behaviors and family planning practices among the respondents during the COVID-19 pandemic.

Population and Sampling

The study used purposive sampling to select 200 married individuals from Silang, Cavite as participants. These individuals were legally of age and capable of answering an online survey

questionnaire. The goal of purposive sampling is to focus on specific characteristics of a population that are of interest to the researchers (Laerd Statistics, 2018), which enabled the researchers to answer their research questions. The inclusion criteria for this study were being a married individual residing in Silang, Cavite, the ability to give informed consent, and the ability to answer the online survey questionnaire.

Instrumentation

The researchers used an adapted and modified version of the Snell, Fisher, & Walters' Multidimensional Sexuality Questionnaire, which had an average Cronbach alpha score of 85% (Snell et al., 1993), to assess the sexual behavior of the respondents. Additionally, a self-structured survey questionnaire for family planning practices was used, which had previously undergone validity and reliability testing. The questionnaire was sent to the respondents via Google Form through email or Facebook Messenger. It was divided into three sections: the demographic profile of the respondents, their sexual behavior during the COVID-19 pandemic, and their family planning practices during the pandemic.

Data Gathering Procedures

The pilot study was conducted to test, improve and identify any errors in the nursing research questions used in the survey questionnaire. The study collected data from 50 respondents. The data was encoded using SPSS version 2.0, and only questions with an average Cronbach's alpha score of 82% were included in the analysis.

After obtaining permission from a team of experts to use the questionnaire, the researchers distributed the survey questionnaire online to married individuals in Silang, Cavite, as quarantine protocols during the COVID-19 pandemic did not permit in-person data collection. The questionnaire included an informed consent for the respondents and explained the nature and purpose of the study to ensure transparency and accuracy of data. The researchers were able to gather data from 200 participants.

Ethical Considerations

Ethical approvals were obtained from the Ethical Research Board. Confidentiality and anonymity were ensured for the respondents through the informed consent form in the beginning of the online survey questionnaire. Respondents were informed that they have the right to withdraw from the study at any time without any negative consequences.

Analysis of Data

The researchers used descriptive statistics, including mean and standard deviation, to characterize the respondents' profile. They also used the Shapiro-Wilk test to assess the normality of the data. To measure the strength of association between sexual behaviors and family planning practices, they used Spearman's Rho correlation coefficient. The Mann-Whitney U test was used to determine the significant difference in family planning practices when considering moderating variables. This test is a non-parametric statistical method appropriate for this type of data. The Kruskal-Wallis H test and one-way ANOVA on ranks were also used to determine the significant difference of family planning practices among two or more groups of an independent variable on a continuous or ordinal dependent variable.

FINDINGS

Extent of Sexual Behaviors Among the Respondents

Table 1 shows that the respondents displayed positive overall sexual behaviors with a mean score of 3.60 ($SD = .40$).

Table 1. Extent of Sexual Behaviors Among the Respondents

	Mean	SD	Interpretation
1. I am confident about the sexual aspects of my life.	3.91	.62	Positive
2. I think about sex more than anything else.	3.59	.89	Positive
3. I am strongly motivated to devote time and effort to sex.	3.78	.83	Positive
4. I am worried about the sexual aspects of my life.	3.08	1.14	Neutral
5. Thinking about the sexual aspects of my life leaves me with an uneasy feeling.	3.12	1.10	Neutral
7. Anxiety and other problems hinder the sexual activity with my husband/wife.	3.08	1.09	Neutral
8. I am motivated to be sexually active.	3.77	.855	Positive
9. I am satisfied with the way my sexual needs are currently being met.	3.69	.91	Positive
10. I am confident about myself as a sexual partner.	3.78	.85	Positive
11. I am aware of my sexual motivations.	3.80	.81	Positive
12. I am not happy about the quality of my sex life.	3.18	1.10	Neutral
13. I have emotional satisfaction with my relationship with my husband/wife.	3.82	.81	Positive
14. I love to have sexual activity with my husband/wife.	3.87	.85	Positive
15. When it comes to sex, I usually ask for what I want.	3.68	.80	Positive
16. I am aware of my sexual actions.	3.77	.81	Positive
17. I would rate myself favorably as a sexual partner.	3.82	.75	Positive
18. I feel nervous when I think about the sexual aspects of my life.	3.13	1.07	Neutral
19. I'm very alert to changes in my sexual desires.	3.68	.89	Positive
20. It's really important to me that I involve myself in sexual activity.	3.76	.81	Positive
Overall Sexual Behavior	3.60	.40	Positive

Legend: 4.50-5.00 Strongly Agree (**Very Positive**), 3.50-4.49 Agree (**Positive**), 2.50-3.49 Uncertain (**Neutral**), 1.50-2.49 Disagree (**Negative**), 1.00-1.49 Strongly Disagree (**Very Negative**)

Extent of the Family Planning Practices of the Respondents During the COVID-19 Pandemic

Table 2 illustrates that the overall family planning practices of the respondents had a mean of 3.43 and a standard deviation of 0.81. This suggests that the respondents were aware and knowledgeable about family planning methods, and that they utilized the majority of the Philippines' family planning options.

Table 2. Family Planning Practices of the Respondents

	Mean	SD	Interpretation
1. I or my partner practice family planning despite the pandemic.	3.59	.86	High
2. The pandemic intensifies my need to do family planning.	3.60	.91	High
3. I use male condom or female condom.	3.51	1.11	High
4. I use oral contraceptives (pills).	3.28	1.23	Moderate
5. We practice withdrawal method.	3.62	1.03	High
7. We use the calendar method.	3.42	1.16	Moderate
8. We use injectable as contraceptives.	3.25	1.22	Moderate
9. I use skin implant contraceptive.	3.25	1.23	Moderate
10. I practice other form of birth control method not mentioned above.	3.42	1.17	Moderate
Overall Family Planning Practices	3.43	.81	Moderate

Legend: 4.50-5.00 Strongly Agree (**Very High**), 3.50-4.49 Agree (**High**), 2.50-3.49 Uncertain (**Moderate**), 1.50-2.49 Disagree (**Low**), 1.00-1.49 Strongly Disagree (**Very Low**)

Relationship Between Sexual Behaviors and Family Planning Practices

The table illustrates that there is a moderate ($r = .312$), positive correlation ($p < .01$) between the sexual behaviors and the family planning practices of the respondents. The p-value of .001, at a significance level of 0.05, indicates that the null hypothesis that there is no significant relationship between the sexual behaviors and the family planning practices is rejected.

Table 3. Relationship between Sexual Behavior and Family Planning Practices

Variable	Components	Family Planning Practices
Sexual Behaviors	Spearman's rho	.312**
	p-value	.001
	N	200
	Verbal Interpretation	Significant

**Correlation is significant at the 0.05 level (2-tailed)

Difference in the Family Planning Practices Considering Age, length of Marriage and Educational Attainment

Table 4 indicates that there is no significant difference between family planning practices and age, with a P-value of .908. However, there is a significant difference between family planning practices and the length of marriage, educational attainment, and religion, with P-values of .058, .002, and .001, respectively.

Table 4. Difference in the Family Planning Practices Considering Age, length of Marriage, Educational Attainment and Religion

	N	Mean Rank	H	p-value	Interpretation
Family Planning Practice	age				
	15-30	24	102.73		
	31-45	108	102.52		
	46-60	53	95.63	.548	.908
	61-75	15	99.57		
	Total	200			
	Length of Marriage				
	1-5 years	55	104.91		
	6-10 years	44	18.10		
	11-15 years	27	91.91		
	16 and above	74	89.89	7.495	.058
	Total	200			
	Educational Attainment				
	High School	37	96.77	12.284	.002
	College	157	104.42		
	Postgraduate	6	20.83		
	Total	200	107.21		
	Religion				
	Born Again	38	123.34		
	Iglesia ni Cristo	34	121.25		
	Jehovah's Witness	12	105.76		
	Roman Catholic	71	44.75		

SDA	24	85.33	31.66	.001	significant
Others	21				
Total	200				

Difference in the Family Planning Practices Considering Gender and Employment Status

Table 5 illustrates a significant difference when considering gender. Specifically, the male group practiced family planning more frequently than the female group. However, there was no significant difference found in the results when examining the employment status of the respondents, with a p-value of .461.

Table 5. *Difference in the family Planning Practices considering Gender and Employment Status*

		N	Mean Rank	Mann-Whitney U	z	p-value	Interpretation
Gender							
Family Planning Practices	Male	112	114.24				
	Female	88	83.02	3390	-3.793	.001	Significant
	Total	200					
Employment Status							
	Employed	167	105.56				
	Unemployed	33	74.88	1910	-2.788	.461	Not Significant

Post Hoc Analysis of the Significant Difference of Family Planning Practices when Educational Attainment is Considered

According to the post-hoc analysis, Table 9 shows that there is strong evidence of a significant difference in the family planning practices among respondents with postgraduate and college degrees ($p < 0.008$, adjusted using the Bonferroni correction) and between respondents who had postgraduate and high school degrees ($p < 0.002$, adjusted using the Bonferroni correction). The median family planning practice for the group with postgraduate degrees is 20.83, for the group with college degrees is 104.42, and for respondents with high school degrees, 96.77. This indicates that those with college degrees had a very high level of family planning practices compared to respondents with high school and postgraduate degrees.

Table 9. *Post Hoc Analysis of the Significant Difference of Family Planning Practices when educational attainment is Considered*

Each node shows the sample average rank of EducAttainment.

Sample1-Sample2	Test Statistic	Std. Error	Std. Test Statistic	Sig.	Adj.Sig.
Postgraduate-High School	75.937	25.430	2.986	.003	.008
Postgraduate-College	83.590	24.036	3.478	.001	.002
High School-College	-7.653	10.559	-.725	.469	1.000

Each row tests the null hypothesis that the Sample 1 and Sample 2 distributions are the same.
Asymptotic significances (2-sided tests) are displayed. The significance level is .05.

Post Hoc Analysis of Significant Differences of Family Planning Practices when Religion is Considered

Table 11 provides strong evidence of a significant difference in family planning practices among Seventh-day Adventist (SDA) and Roman Catholic respondents ($p < 0.000$, adjusted using the

Bonferroni correction), as well as between SDA and Born Again ($p < 0.001$, adjusted using the Bonferroni correction), between SDA and Jehovah's Witnesses ($p < 0.003$, adjusted using the Bonferroni correction), and between SDA and Iglesia ni Cristo ($p < 0.000$, adjusted using the Bonferroni correction). The median family planning practices for the SDA group is 44.85, for Roman Catholics is 105.76, for Born Again is 107.21, for Jehovah's Witnesses is 121.25, and for Iglesia ni Cristo is 123.34. This indicates that respondents in the Iglesia ni Cristo group had a very high level of family planning practices compared to those in the SDA, Roman Catholic, Born Again, and Jehovah's Witnesses groups. The difference in family planning practices among the religions of the respondents showed that the SDA group had the most significant difference.

Table 11. Post Hoc Analysis of Significant Differences of Family Planning Practices when Religion is Considered

Each row shows the sample average rank of religion.

Sample1-Sample2	Test Statistic	Std. Error	Std. Test Statistic	Sig.	Adj.Sig.
SDA-others	-40.479	17.265	-2.345	.019	.286
SDA-Roman Catholic	60.906	13.643	4.464	.000	.000
SDA-Born Again	62.356	15.066	4.139	.000	.001
SDA-Jehovah's witness	76.396	20.429	3.740	.000	.003
SDA-Iglesia ni Cristo	78.484	15.405	5.095	.000	.000
others-Roman Catholic	20.427	14.353	1.423	.155	1.000
others-Born Again	21.877	15.711	1.392	.164	1.000
others-Jehovah's witness	35.917	20.910	1.718	.086	1.000
others-Iglesia ni Cristo	38.005	16.037	2.370	.018	.267
Roman Catholic-Born Again	1.450	11.614	.125	.901	1.000
Roman Catholic-Jehovah's witness	15.489	18.035	.859	.390	1.000
Roman Catholic-Iglesia ni Cristo	17.578	12.051	1.459	.145	1.000
Born Again-Jehovah's witness	-14.039	19.133	-.734	.463	1.000
Born Again-Iglesia ni Cristo	-16.128	13.640	-1.182	.237	1.000
Jehovah's witness-Iglesia ni Cristo	2.088	19.402	.108	.914	1.000

Discussion

Extent of Sexual Behavior of the Respondents

Sexual behaviors have a significant impact on overall marital well-being. Positive sexual behaviors among married couples are linked to higher positive and lower negative marriage quality, as well as reduced relationship strain. A study by Dfarhud and Malmir (2014) attributes this to the fact that sexual activities stimulate feelings of love, relaxation, and social attachment, which help people release dopamine, endorphins, and oxytocin, which relieve anxiety and stress. On the other hand, decreased sexual frequency is strongly associated with poor relationship quality and poor mental health outcomes, indicating a negative effect on mental health through unfulfilled sexual desire or feeling overwhelmed by a partner's sexual desire (Galinsky & Waite, 2014; Orr et al., 2019; Zhang & Liu, 2019).

Extent of the Family Planning Practices of the Respondents During the COVID-19 Pandemic

The respondents in this study were more likely to use the withdrawal method than other contraceptives or family planning methods, which contradicts findings from recent surveys by the United Nations (2019) and New Zealand Family Planning, where the withdrawal method accounts for only 5% and 6% of the contraceptive methods used by respondents, respectively (Contraception-Use-Survey-2020, 2020). It is worth noting that the withdrawal method is one of the least effective forms of contraception, resulting in a 20% rate of unwanted pregnancies per 100 women (World Health

Organization (Geneva) et al., 2018). In addition to the withdrawal method, Table 4 also indicates the least used contraceptive/family planning methods, which are injectables and skin implants, similar to the aforementioned surveys, where the percentage of respondents who used these contraceptives is relatively low (8% for injectables and 2% for implants in the U.N. Survey and 7% for injectables and 10% for implants in the NZFP Survey).

Relationship Between Sexual Behaviors and Family Planning Practices

The data suggests that as sexual behaviors increased, the extent of family planning practices among respondents also increased. This significant relationship is supported by a cross-sectional study in Southwest Nigeria that found that sexually active respondents used modern contraceptives (Olaleye et al., 2020). This study examined the factors associated with sexual and reproductive health behavior among street-involved young people.

Difference in the Family Planning Practices Considering Age, length of Marriage, Educational Attainment and Religion

The age of the respondents in this research was not uniformly distributed, with the majority of participants being in their reproductive years. A study on sociodemographic variables of contraceptive practice in 2011 in Sikkim, India also found a similar outcome in the age variable when participants were limited to those in their reproductive age of 15-49 years old (Chankapa et al., 2011). Despite the limited research on differences in family planning practices when the length of marriage is considered, the results of this study may be attributed to the government's efforts to raise awareness. Health workers are responsible for informing couples about family planning services from the first day of prenatal consultation, and even in pre-marriage counseling, family planning is sometimes discussed. According to Republic Act 10354: The Responsible Parenthood and Reproductive Health Act of 2012, section 3, "each family shall have the right to determine its ideal family size: provided, however, that the State shall equip each parent with the necessary information on all aspects of family life, including reproductive health and responsible parenthood, in order to make that determination. Also, that there shall be no demographic or population targets and the mitigation, promotion and/or stabilization of the population growth rate is incidental to the advancement of reproductive health" (Philippine Commission on Women, 2012). Furthermore, educational attainment or level of education plays a vital role in the acceptance and preference of methods in family planning. This is evident in a study conducted in Nepal from 1996-2006, comparing family planning preferences of husbands and wives with different educational status, which showed different method preferences between husband and wife (Gubhaju and Bina, 2010). Religion also plays a very important role in the acceptance and preference of family planning methods among married couples. Religious acceptability of family planning methods is of central importance, though participants may differ in their interpretations of their religion's stance on this question (Sundararajan et al., 2019).

The Philippines, a major Christian country, and predominantly Roman Catholic, has many other religions flourishing. These different Christian religions have varying attitudes and preferences towards family planning methods, which are often based on their denominational stance. The individual's stance on reproductive practices varies according to their Christian denomination. For example, the Vatican does not recognize the practice of assisted procreation, but it may be practiced by Protestants, Anglicans, and other denominations. According to Roman Catholic dogma, the basic goal of marriage is reproduction. Contraceptive acts are seen as killing the ability for sexual intercourse to produce new life, thus breaching the purpose of marriage and being a sin against nature (J.G Schenker, 2000). However, Table 11 shows that the Roman Catholic respondents in this research had a high mean rank of 105.76, indicating that they supported the family planning methods asked by the researchers. The data also showed that the SDA group had a low mean rank of 44.85, indicating less likelihood of using any of the family planning methods asked by the researchers. This highlights the need for further research in this area.

Difference in the Family Planning Practices Considering Gender

Some may argue that because contraception is often viewed as a woman's responsibility, men may not seek out contraceptive information because they do not want to be diverted from their traditional roles, such as being the primary breadwinner. This argument assumes a significant gender disparity in reproductive behavior, which may exist in some countries. According to a study of couples in Sub-Saharan Africa, involving men in survey research has yielded interesting results. It has been found that men and women have different fertility aspirations, attitudes, and ambitions. Variations in reproductive choices are generally attributed to differences in the individual values placed on children, as well as perceived costs and benefits (Ibisomi & Odimegwu, 2011).

The great challenges of maintaining the government's family planning and women's health programs during the pandemic have affected everyone, regardless of employment status. The Philippine national government and the Department of Health (DOH) have tried to find ways to continue providing health services, including family planning services. However, these efforts have been hindered by several challenges. According to an article, "Some staff are unable to report for duty as public transport is currently discontinued, and the limited transportation also puts a strain on the delivery of family planning commodities. These are just some of the common challenges that health facilities encountered as they work to continue providing these services" (Mendoza and Ombao, 2020). Due to these challenges of accessibility and logistics, there is a tendency for couples to resort to natural methods of contraception, such as withdrawal, as they are more easily accessible to both employed and unemployed individuals.

Limitations and Implications

This study was conducted in Silang, Cavite during the COVID-19 pandemic. 200 married individuals responded to the survey questionnaire, which may not be representative of the entire population of the municipality. The results of this study will contribute to the existing knowledge on sexuality and family planning practices of married individuals during the COVID-19 pandemic.

Conclusion

The purpose of this study is to investigate the relationship between sexual behavior and family planning practices of married individuals during the COVID-19 pandemic. Findings showed that the respondents had a positive overall sexual behavior and moderately high family planning practices. There was a significant relationship between sexual behavior and family planning practices. There was no significant difference in family planning practices when age, length of marriage, and employment status were considered. However, when gender, educational attainment, and religion were taken into account, findings revealed a significant difference in family planning practices.

References

- [1] Althof, S. E., & Needle, R. B. (2013). Psychological and interpersonal dimensions of sexual function and dysfunction in women: An update. *Arab Journal of Urology*, 11(3), 299–304.
<https://doi.org/10.1016/j.aju.2013.04.010>
- [2] ASHA. (2020). *Sex in the Time of COVID-19*. American Sexual Health Association.
<https://www.ashasexualhealth.org/sex-in-the-time-of-COVID-19/>
- [3] Balzarini, R. N., Muise, A., Zoppolat, G., Gesselman, A. N., Lehmillier, J., Garcia, J. R., Slatcher, R. B., & Mark, K. (2021). *Sexual Desire in the Time of COVID-19: How COVID-Related Stressors are Associated with Sexual Desire in Romantic Relationships*. PsyArXiv.
<https://doi.org/10.31234/osf.io/nxkgp>
- [4] Banerjee, D., & Rao, T. S. S. (2020). Sexuality, sexual well being, and intimacy during COVID-19 pandemic: An advocacy perspective. *Indian Journal of Psychiatry*, 62(4), 418–426.
https://doi.org/10.4103/psychiatry.IndianJPsychiatry_484_20

- [5] Casterline, J. B., Perez, A. E., & Biddlecom, A. E. (1997). Factors underlying unmet need for family planning in the Philippines. *Studies in Family Planning*, 28(3), 173–191.
- [6] CDC. (2020). *Coronavirus Disease 2019 (COVID-19) | Disease or Condition of the Week | CDC*. Centers for Disease Control and Prevention. <https://www.cdc.gov/dotw/COVID-19/index.html>
- [7] Chankapa, Y. D., Tsering, D., Kar, S., Basu, M., & Pal, R. (2011). Sociodemographic variables of contraceptive practice in Sikkim. *Journal of Pharmacy And Bioallied Sciences*, 3(3), 368. <https://doi.org/10.4103/0975-7406.84439>
- [8] Cocci, A., Giunti, D., Tonioni, C., Cacciamani, G., Tellini, R., Polloni, G., Cito, G., Presicce, F., Di Mauro, M., Minervini, A., Cimino, S., & Russo, G. I. (2020). Love at the time of the COVID-19 pandemic: Preliminary results of an online survey conducted during the quarantine in Italy. *International Journal of Impotence Research*, 1–2. <https://doi.org/10.1038/s41443-020-0305-x>
- [9] *Contraception-use-survey-2020_final.pdf*. (n.d.). Retrieved February 3, 2022, from https://www.familyplanning.org.nz/media/304436/contraception-use-survey-2020_final.pdf
- [10] Course Hero. (2019). *CHAPTER III - CHAPTER III RESEARCH METHODOLOGY This Chapter describes the research method used and the operational framework of the research | Course Hero*. <https://www.coursehero.com/file/13051386/CHAPTER-III/>
- [11] Crisostomo, S. (2020, June 21). *214,000 lockdown babies to be born next year | Philstar.com*. Philstar Global. <https://www.philstar.com/headlines/2020/06/21/2022393/214000-lockdown-babies-be-born-next-year>
- [12] Dariush DFARHUD, Maryam MALMIR. (2014, November). *Happiness & Health: The Biological Factors- Systematic Review Article*. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4449495/>
- [13] Eleuteri, S., & Terzitta, G. (2021). Sexuality during the COVID-19 pandemic: The importance of Internet. *Sexologies*, 30(1), e55–e60. <https://doi.org/10.1016/j.sexol.2020.12.008>
- [14] Escoda, I. (2020, June 17). *Lockdown and sex*. INQUIRER.Net. <https://opinion.inquirer.net/130857/lockdown-and-sex>
- [15] for the FLURISK-INVESTIGATORS, Mertz, D., Lo, C. K.-F., Lytvyn, L., Ortiz, J. R., & Loeb, M. (2019). Pregnancy as a risk factor for severe influenza infection: An individual participant data meta-analysis. *BMC Infectious Diseases*, 19(1), 683. <https://doi.org/10.1186/s12879-019-4318-3>
- [16] Galinsky, A. M., & Waite, L. J. (2014). Sexual Activity and Psychological Health As Mediators of the Relationship Between Physical Health and Marital Quality. *The Journals of Gerontology: Series B*, 69(3), 482–492. <https://doi.org/10.1093/geronb/gbt165>
- [17] Gleason, N., Banik, S., Braverman, J., & Coleman, E. (2021). The Impact of the COVID-19 Pandemic on Sexual Behaviors: Findings From a National Survey in the United States. *The Journal of Sexual Medicine*, 18(11), 1851–1862. <https://doi.org/10.1016/j.jsxm.2021.08.008>
- [18] González, Á. A. O., García, J. F. C., Sandoval, L. C. P., Cuevas, J. R. T., Ibarra, S. A. H., Sandoval, D. A. C., González, E. C., Chica, K. S. G., Lozano, J. S. P., & Rico, M. del C. M. (2022). Depressive symptomatology in adults during the COVID-19 pandemic. *Journal of Investigative Medicine*, 70(2), 436–445. <https://doi.org/10.1136/jim-2021-001992>
- [19] Gubhaju, Bina. (2010, January 4). *The Influence of Wives' and Husbands' Education Levels On Contraceptive Method Choice in Nepal, 1996-2006*. Guttmacher Institute. <https://www.guttmacher.org/journals/ipsrh/2009/12/influence-wives-and-husbands-education-levels-contraceptive-method-choice>
- [20] Gupta, Rahul. (2020, June 16). Opinion | Expect a baby bust, not a boom, from the coronavirus pandemic. *Washington Post*. <https://www.washingtonpost.com/opinions/2020/06/16/expect-baby-bust-not-boom-coronavirus-pandemic/>

- [21]Gurney, K. (2020, May 10). Sexual healing: Using lockdown to ignite desire. *The Guardian*. <https://www.theguardian.com/lifeandstyle/2020/may/10/sexual-healing-using-lockdown-to-ignite-desire>
- [22]Ibisomi, L., & Odimegwu, C. (2011). *Understanding resolution of differential fertility preferences among couples in Nigeria*. 2(4), 8.
- [23]J.G Schenker. (2000, July). *Women's reproductive health: Monotheistic religious perspectives—Schenker—2000—International Journal of Gynecology & Obstetrics—Wiley Online Library*. <https://obgyn.onlinelibrary.wiley.com/doi/full/10.1016/S0020-7292%2800%2900225-3>
- [24]Labaree, R. V. (2021). *Research Guides: Organizing Your Social Sciences Research Paper: Quantitative Methods* [Research Guide]. <https://libguides.usc.edu/writingguide/quantitative>
- [25]Laerd Statistics. (2018). *Mann-Whitney U Test in SPSS Statistics | Setup, Procedure & Interpretation | Laerd Statistics*. <https://statistics.laerd.com/spss-tutorials/mann-whitney-u-test-using-spss-statistics.php>
- [26]Martin. (2021). Health. *United Nations Sustainable Development*. <https://www.un.org/sustainabledevelopment/health/>
- [27]NUHRA.pdf. (n.d.). Retrieved January 31, 2022, from <https://doh.gov.ph/sites/default/files/publications/NUHRA.pdf>
- [28]Olaleye, A. O., Obiyan, M. O., & Folayan, M. O. (2020). Factors associated with sexual and reproductive health behaviour of street-involved young people: Findings from a baseline survey in Southwest Nigeria. *Reproductive Health*, 17(1), 94. <https://doi.org/10.1186/s12978-020-00937-4>
- [29]Ophelia Mendoza, Rosana Ombao. (2020, May 12). *Evidence for Action: Assessing the Availability of Essential Family Planning Services During COVID-19 in the Philippines*. RTI. <https://www.rti.org/insights/family-planning-services-phillipines-COVID-19>
- [30]Philippine Commission on Women. (2012). *Republic Act 10354: The Responsible Parenthood and Reproductive Health Act of 2012 | Philippine Commission on Women*. <https://pcw.gov.ph/republic-act-10354/>
- [31]Snell, W., Fisher, T., & Walters, A. (1993). The Multidimensional Sexuality Questionnaire: An Objective Self-Report Measure of Psychological Tendencies Associated With Human Sexuality. *Annals of Sex Research*, 6, 27–55. <https://doi.org/10.1007/BF00849744>
- [32]Sundararajan, R., Yoder, L. M., Kihunrwa, A., Aristide, C., Kalluvya, S. E., Downs, D. J., Mwakiso, A. H., & Downs, J. A. (2019). How gender and religion impact uptake of family planning: Results from a qualitative study in Northwestern Tanzania. *BMC Women's Health*, 19(1), 99. <https://doi.org/10.1186/s12905-019-0802-6>
- [33]United Nations. (2019). *Contraceptive Use by Method 2019: Data Booklet*. UN. <https://doi.org/10.18356/1bd58a10-en>
- [34]UNPFA. (2021, March). *Impact of COVID-19 on Family Planning: What we know one year into the pandemic*. United Nations Population Fund. <https://www.unfpa.org/resources/impact-COVID-19-family-planning-what-we-know-one-year-pandemic>
- [35]UNSDG. (2021). *Goal 1: End poverty in all its forms everywhere—United Nations Sustainable Development*. Sustainable Development Goals. <https://www.un.org/sustainabledevelopment/poverty/>
- [36]WHO. (2020, March). *WHO Director-General's opening remarks at the media briefing on COVID-19—11 March 2020*. <https://www.who.int/director-general/speeches/detail/who-director-general-s-opening-remarks-at-the-media-briefing-on-COVID-19---11-march-2020>
- [37]World Health Organisation (Geneva), D. of R. H. and R., Johns Hopkins Center for Communication Programs, K. for H., United States Agency for International Development (Washington, D. C.). B. for G. H., & Office of Population and Reproductive Health. (2018). *Family planning a global handbook for providers: Evidence-based guidance developed through worldwide collaboration*. World Health Organization.

Study on Attitude, Anxiety and Mental Health Perception in Nursing Students During the Covid-19 Pandemic

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Abstract: 1) Background: The pandemic posed not only a risk of death from a viral infection but also a psychological strain on people all over the world. The spread of this epidemic, strict isolation, the background of disease and death data, and delaying the start of schools and universities in various countries affect the mental health of everyone on earth, including students, who have feelings of great anxiety and fear about the situation in today's world. The purpose of the study was to investigate the extent of the attitudes, anxiety, and mental health perceptions of nursing students during the covid-19 pandemic. **2) Method:** used an observational, descriptive-analytic approach as well as a cross-sectional design. **3) Results** of the study: It was found that the students had very good attitudes, especially in washing their hands to reduce the risk of being infected with the virus; then, it was found that the anxiety of nursing faculty students was in the moderate category as indicated. Talk about the coronavirus with friends on occasion; never be afraid, and never act inappropriately toward someone in connection with the coronavirus; avoid social contact; and always wear masks. Furthermore, the students had a good perception of the need for mental health services, as indicated by the statement that they felt the need to get mental health assistance if someone felt panicked because of this pandemic situation. Recommendations for further research can examine anxiety and coping strategies in nursing students during the covid -19 pandemic.

Keywords: *anxiety, attitude, mental health needs.*

Introduction

Putri (2020) stated that the emergence of the coronavirus was first detected in China in early December 2019. At that time, a number of patients came to the hospital in Wuhan with symptoms of an unknown disease. It is known that the first patients had access to the Huanan fish market, which also sells wild animals. The study found that the bat coronavirus is 96% genetically similar to the coronavirus currently infecting people around the world.

WHO states that Coronavirus Disease (COVID-19) is an infectious disease caused by the newly discovered Coronavirus. The majority of people infected with the COVID-19 virus will experience mild to moderate respiratory illness and will recover without the need for special care. The elderly and those with medical problems such as cardiovascular disease, diabetes, chronic respiratory disease, and cancer are more likely to develop serious illnesses. The COVID-19 virus is spread mainly through droplets of saliva or fluid from the nose when an infected person coughs or sneezes.

Bairah (2020) added that this coronavirus is classified as sadistic because it can be deadly or can cause permanent injuries to the lungs of patients who have been infected and healed. In general, fever, flu, cough, and shortness of breath within a certain time limit are the symptoms of Covid-19 disease, and there must be vigilance and good cooperation with family or co-workers during activities at home, in the living room, at work, and in the community. The existence of the deadly Covid-19 has captured the world's attention. Government regulations and policies have a significant impact on all sectors, including the economy and social life in society. In addition, the impact of the influence of the coronavirus (Covid-19) on people's social lives, including the emergence of suspicion and loss of trust in people around us or whom we just met.

According to Cigna, the coronavirus is a family of viruses found in humans and animals. Some of the viruses can infect humans and cause various diseases, ranging from common illnesses such as the flu

to more fatal diseases, such as Middle East Respiratory Syndrome (MERS) and Severe Acute Respiratory Syndrome (SARS).

Putri (2020) stated that the World Health Organization (WHO) officially declared the Covid-19 outbreak a global pandemic. In less than three months, Covid-19 has infected more than 126,000 people in 123 countries, including Asia, Europe, the US, and South Africa. "In the past two weeks, the number of cases outside China has increased thirteen times, and the number of affected countries has tripled." The number of cases and deaths is changing every hour, surpassing at least 126,141 with 4,627 deaths worldwide.

The Republic of Indonesia Ministry of Health (2020) said that the government had designated the Corona Virus Outbreak, or Covid-19, as a national disaster. This was reported in March. The president also helped form a task force to accelerate the handling of Covid-19.

This pandemic not only risks death from viral infection but also avoidable psychological stress for everyone around the world. The spread of this epidemic, strict isolation, and delaying the start of schools and universities in various countries are affecting the mental health of students. This study found that the epidemic impacts the general public, patients, medical staff, children, and elderly adults (Dong & Zheng, 2020).

The background of the disease and the existing death data make everyone on this earth very anxious and afraid of the current state of the world. This also affects young people, especially students and college students who are currently studying.

Where is the impact of the COVID pandemic on their learning process, which used to be face-to-face at university but now has to be done online? Research conducted by Pratiwi (2020) stated that one of the problems found was an inadequate internet network that hampered the online teaching and learning process.

Research methods

This study used a descriptive-analytic approach and a cross-sectional design. The instrument used in this study was a questionnaire on perceptions of mental health adopted by Roy, Tripathy, Kar, Sharma, Verma, and Kaushal. (2020), and an anxiety questionnaire (General Anxiety Disorder) was adopted from Trossaint et al. (2020) with a Cronbach alpha of 0.911. Instruments will be shared via Google Forms, WA, or other social media to reach respondents.

a. Attitude: There are 5 statements regarding preventive measures taken to avoid the risk of being exposed to the coronavirus, including; frequency of hand washing, self-isolation, travel abroad, social distancing, and corona-positive people in a community. This questionnaire uses a Likert scale (1-5) for statements no1-4. Score 1 = strongly disagree, score 2 = disagree, score 3 = neutral, score 4 = agree, score 5 = strongly agree. And for statement no.5 using (scale 1-3), 1= yes, 2= stay be= fixed, 3= no

b. Anxiety: there are 18 statements about how often to avoid situations or events that are at risk of being exposed to the coronavirus. This questionnaire uses a Likert scale (1-5), from never (1), rarely (2), sometimes (3), often (4), and always (5).

c. Mental Health: there are 4 statements about concerns about the viral covid -19, the need or not to get help in connection with the pandemic situation, and the need to get help from professional health workers. This questionnaire uses Likert (1 -3), of which 1 = disagree, 2 = neutral, and 3 = agree.

Subjects of Participants in Research

The participants in this study were junior nursing students in Semester I 2020/2021, able to work together and give approval, have a cellphone/laptop, and participate in the teaching online program.

Population and Sample

The population in this study was all level 3 nursing students. The sampling technique used was purposive.

Inclusion criteria:

Participate in online learning activities

Participants can work well together

Third-level nursing students and students for the 2020/2021 academic year

Taking Palliative courses

Exclusion Criteria:

Not attending the online class during collected the data

Did not fill out the questionnaire data due to quota/network problems

RESULTS

Table 1. *The attitude of nursing students*

<i>Attitude</i>	
Mean	3,94
Count	81
Confidence Level(95,0%)	0,1

The results in Table 1 show that the description of the attitude of Unklab nursing students during the Covid 19 pandemic has an average value of 3.94, which means that they are in the category of very good attitudes in terms of prevention and adapting to the pandemic that is hitting the world today.

Table 2. *The frequency of the Respondent's Attitude*

Scale/Question	1	2	3	4	5
1(Strongly disagree)	29,6	0,0	0,0	2,5	0,0
2 (Disagree)	0,0	2,5	2,5	4,9	1,2
3 (Neither agree nor disagree)	14,8	9,9	23,5	25,9	11,1
4 (Agree)	0,0	48,1	58,0	51,9	35,8
5 (Strongly agree)	55,6	39,5	16,0	14,8	51,9

In table 2, it can be seen that 55.6% of respondents believe that hand washing can reduce the risk of being infected with the coronavirus, then 58% of respondents believe that currently traveling to a country is safe, and then there are 51.9% of respondents for each who stated that keeping a distance is important to stop the spread of the coronavirus and also agree with the statement that patients who have recovered from Covid may be allowed to live in the midst of society. Lastly, 39.5% of respondents believe they should practice self-isolation if they have a cough and fever during this pandemic.

The conclusion from the results of this data analysis is that the attitude of students during the covid 19 pandemic was the highest compared to other attitudes, which was in the attitude of washing hands to reduce the risk of being infected with the virus.

Discussion

The function of attitude, according to Kazt in Firmansyah (2018), includes the function of knowledge. Attitude helps a person organize the vast amount of information that is exposed to him every day. From all that information, a person sorts out the information that is relevant and irrelevant to his needs. The knowledge function can also help reduce individual uncertainty and confusion, Attitudes also have different functions depending on the conditions that surround a person. The function played will affect the overall evaluation of an object. And this function will determine the

action to be taken and the perception that will develop in a person. Therefore, efforts to influence someone through advertisements or theories obtained in education need to pay attention to a person's attitude in terms of function. In this study, the respondents had a very good attitude, and many chose to wash their hands during this pandemic.

This is related to the knowledge gained through education and the practice performed before and after performing a procedure in the laboratory, creating the perception of students to always wash their hands in order to reduce microorganisms and become infected with the coronavirus. This is also supported by the protocol to prevent the spread of the coronavirus recommended by the government, which has been prepared in every public place where you always carry sanitizer or wash your hands. The results of this study, supported by Roy, Tripathy, Kar, Sharma, Verma, and Kaushal (2019), found that healthcare providers showed a good attitude towards Covid 19 where they voluntarily followed government protocols during a pandemic.

Furthermore, research from Shi, Wang, Yang, Wang, Wang, Hashimoto, Zhang, and Liu (2020) stated that nurses showed a good attitude toward serving, which was seen as a willingness to serve patients suffering from Covid-19 with good knowledge and training. The hospital has provided training in dealing with covid. Apart from training from hospitals, nurses also get knowledge from the internet, magazines, and television.

Unklab Nursing Student Anxiety during the Covid 19 pandemic

Table 3. *The anxiety of the Nursing Student*

<i>Anxiety</i>	
Mean	2,93
Count	81
Confidence Level(95,0%)	0,1

The results of the data analysis in table 5 shows that the average anxiety of nursing faculty students during the Covid-19 pandemic is at a value of 2.93 which means moderate anxiety.

Table 4. *The frequency of the form of the Respondent's Anxiety*

Question/Category	Never	Rarely	Sometime	Often	Always	
	5	24		23	22	7
2	15	24	32	9	1	
3	7	4	30	25	15	
4	8	10	43	17	3	
5	4	15	32	20	10	
6	16	15	16	16	18	
7	9	25	27	17	3	
8	47	20	11	3	0	
9	14	33	23	10	1	
10	14	32	21	13	1	
11	11	14	29	21	6	
12	8	14	34	22	3	
13	2	10	17	27	25	
14	1	5	12	39	24	

15	7	14	27	28	5
16	1	2	7	30	41
17	45	11	15	8	2
18	24	21	24	11	1

Based on table 4, it shows that there are 47 people (58.0%) who sometimes talk about the coronavirus with friends in the last week, followed by 45 people (55.5%) who show they are never afraid and don't do bad behavior. There were 43 people (53.0%) who in the last week sometimes avoided social contact, and the last one was 41 people (50.6%) who always used a mask even though there were no signs or obvious signs of infection.

Discussion

Swearingen (2016) states that anxiety disorders are a group of conditions characterized by anxiety symptoms and behavioral efforts to avoid these symptoms. It is the most common psychiatric disorder in the United States.

Anxiety has always been part of the stress response. Typically, a person experiencing mild to moderate anxiety uses voluntary behaviors called coping skills, namely intentional avoidance, and information seeking. In this study, the highest results showed that the students had moderate anxiety by not talking too much about the coronavirus with friends in the past week. This could be due to the fact that students studied online, which limited the time for meeting and telling stories to one another; also, the case data found that those affected by the coronavirus at that time had decreased, plus students were in the lecture process and needed more time to study and learn. create tasks. Then students are never afraid to hear about the coronavirus, never act inappropriately toward others, and sometimes avoid social contact because the government already runs a vaccination program, particularly on university campuses.

while the lowest result in this anxiety questionnaire shows students always use masks even though there are no clear signs and symptoms of infection. This could be due to the health protocol from the government, which recommends that everyone wear a mask when in public to prevent exposure to or transmission of the coronavirus. In this study, the results showed that there were students who showed moderate anxiety when facing a pandemic that was sweeping across the world by carrying out health protocols, namely wearing masks and avoiding social contact. Nursing students are given health information to help them meet their basic human needs while also preventing the spread of what they learn in the nursing curriculum. This is consistent with the theory, which states that someone experiencing mild to moderate anxiety uses voluntary behavior, specifically coping skills, to seek information, in this case, about health, particularly those related to COVID-19.

Savitsky, Findling, Erel, and Hendel (2019) stated that anxiety is very common among nursing students, even under normal circumstances. In Israel during the COVID-19 pandemic and the lockdown period, nursing students are facing new realities such as economic uncertainty, fear of infection, challenges of online education, a lack of personal protective equipment (PPE) in the workplace, and others. A cross-sectional study was conducted among all 244 students in the nursing department during the third week of lockdown.

The level of anxiety is considered moderate. Factor analysis was used to identify the components of coping. The prevalence of moderate and severe anxiety was 42.8% and 13.1%, respectively. Gender, lack of PPE, and fear of infection were significantly associated with higher anxiety scores.

Recommendations for this study Nursing department staff can contribute to reducing student anxiety by maintaining a stable educational framework, providing high-quality distance education, and encouraging and supporting students through this challenging period.

In the study of Roy, Tripathy, Kar, Sharma, Verma, and Kaushal (2019), it was found that the level of depression was high. More than 80% of people are preoccupied with covid-19 thinking, and 72% report the need to use gloves and hand sanitizer.

Perception of the need for mental health services for Unklab nursing students during the Covid-19 pandemic

Perceptions of the need for mental health services during the Covid-19 pandemic can be seen in table 5

Table 5. Perceived mental health service needs

<i>Perceived mental health service needs</i>	
Mean	2,746875
Count	81
Confidence Level(95,0%)	0,057704584

The results of the statistical data in table 5 state the perception of the need for mental health services for Unklab nursing students during the Covid-19 pandemic at an average value of 2.74. It means that respondents have a good perception of the need for mental health services during Covid 19. To find out more about the number of frequencies, see table 6.

Table 6. The frequency of Mental Health Service Needs

Category/ Question	1	2	3	4
Disagree	4	0	0	0
Neutral	43	9	11	10
Agree	34	72	70	71

Table 6 shows the perception of the need for mental health services for nursing students at Unklab during the Covid-19 pandemic, which was mostly in question number 2 with as many as 72 people (88.8%) who stated that students felt that they needed to get mental health assistance if someone panicked because of the pandemic situation; followed by question number 4 with as many as 71 people (87.6%) who stated that the respondent would give the advice to get health assistance to people who were greatly affected by the Covid-19 pandemic. The last one was in question number 3, where as many as 70 people (86.4%) stated that respondents felt that it would be beneficial if mental health experts helped people deal with the current Covid-19 pandemic situation.

The conclusion is that services to meet mental health needs during this pandemic are important.

Discussion

This is supported by the Inter-Agency Standing Committee (IASC) (2020), which states that mental health and psychosocial support (DKPJS) in emergency situations are either external or local in nature and aim to protect or improve psychological well-being or prevent or treat mental health conditions. The global humanitarian system uses the term DKJPS to become an umbrella term for various parties responding to emergencies such as the COVID-19 outbreak, including those working with biological and sociocultural approaches in the health, social, education, and community fields, and to "underline the need for approaches that are diverse and complementary in providing appropriate support."

The intervention pyramid for mental health and psychosocial support can be seen in Figure 1

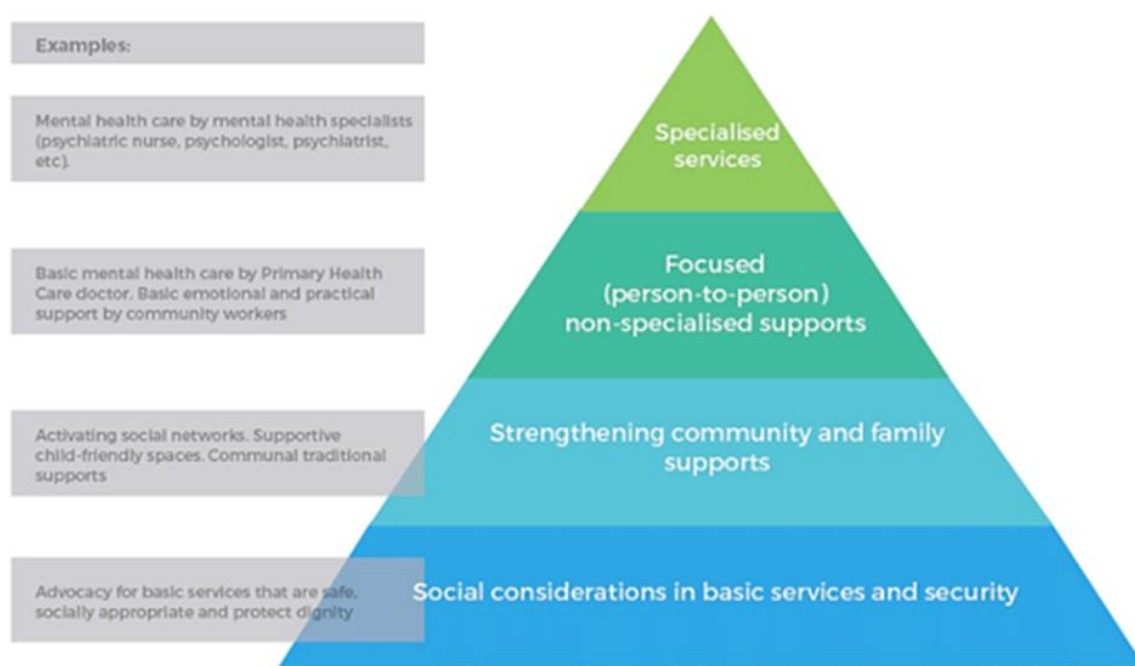


Figure 1. *Pyramid of interventions for mental health and psychosocial support*

From the pyramid picture, it can be seen that the specialist services in question are mental health services provided by mental health nurses, psychologists, psychiatrists, and others. Then there's the basic emotional and practical support from medical personnel. It also strengthens community and family support by activating social relationships, creating supportive child-friendly spaces, and obtaining traditional community support. And the lowest part of the pyramid emphasizes social considerations in basic services and security while emphasizing the advocacy of basic services that are safe, acceptable to society, and protect self-esteem.

Mental health and psychosocial responses to COVID-19

The factors that contribute to the special pressure of the COVID-19 outbreak, which can have an impact on the community, include: 1. the risk of being infected and infecting others, especially if the mode of transmission of COVID-19 is not 100% known; 2). Common symptoms such as other health problems (e.g., fever) can be mistaken for COVID-19 and lead to fear of infection. 3). Caregivers can become more and more worried about their children, who live in their own homes (because schools are closed) without proper care and support. 4). Risk of decreased physical and mental health in vulnerable groups such as the elderly (Intervention 1) and persons with disabilities (Intervention 2) if caregivers are quarantined and other services and support are not available.

Some of these fears and reactions arise from actual danger, but many of them arise from a lack of knowledge, rumors, and misinformation.

Limitations and Implications

In the future, we can conduct in-depth interviews to find out more specifically the things that can make students anxious and what kind of solutions are expected from schools to maintain good mental health. Implications for this study include that health practitioners can provide counseling as well as pay attention to and further study the attitudes, anxiety, and mental health needs of adolescents at the school or university level.

Conclusion

Based on the results of the study, it was found that attitudes, anxiety, and perceptions of mental health needs were to the following extents:

The attitude of Unklab nursing students during the Covid 19 pandemic was at an average value of 3.94, which means they were in the category of very good attitudes in terms of prevention and adapting to the pandemic that is hitting the world today. The attitude of students during the COVID-19 pandemic, which was the highest among other attitudes, was in the attitude of washing hands to reduce the risk of being infected with the virus, and the lowest respondents felt it was not safe to cross a country during this pandemic.

Anxiety in nursing faculty students while facing the Covid-19 pandemic is at a value of 2.9 which means moderate anxiety. The forms of anxiety shown by students include: Sometimes talking about the coronavirus with friends, never being afraid and don't do inappropriate behavior to someone in connection with the coronavirus, avoiding social contact, and always the use of masks.

Perceptions of the need for mental health services for Unklab nursing students during the Covid-19 pandemic were at an average value of 2.74, which means they were in a good category. The conclusion is that services to meet mental health needs during this pandemic are important

References

- [1] Austin, W., Kunyk, D., Taylor, C.A.P & Boyd, M.A. (2019) *Psychiatric and mental health nursing for Canadian practice*. Fourth ed. China: Wolters Kluwer.
- [2] Bairah, C. (2020) <https://aceh.tribunnews.com/2020/03/21/pengaruh-corona-terhadap-kehidupan-sosial-masyarakat>
- [3] Cao, W., Fang, Z., Hou, G., Han, M., Xu, X., Dong, J. & Zheng, J. (2020) The Psychological impact of the covid-19 epidemic on college students in China. *Journal psychiatric research*. Vol. 287. 1-5.
- [4] Firmansyah (2018). *Perilaku Konsumen (sikap dan Pemasaran)* . Jakarta: CV Budi Utama. diakses melalui [https:// books.google.co.id](https://books.google.co.id).
- [5] Gani, I. & Amalia, S. (2015). *Alat analisis data; aplikasi statistic untuk penelitian bidang ekonomi dan sosial* Yogyakarta: Andi offset.
- [6] IASC (2020). https://www.who.int/docs/default-source/searo/indonesia/covid19/catatan-tentang-aspek-kesehatan-jiwa-dan-psikososial-wabah-covid-19-feb-2020-indonesian.pdf?sfvrsn=e8ae5645_2
- [7] Kemenkes, R.I. (2020) <https://www.kemkes.go.id/article/view/20031500003/status-wabah-corona-di-indonesia-ditetapkan-sebagai-bencana-nasional.html>
- [8] Pratiwi, E.W. (2020) Dampak Covid-19 terhadap Kegiatan Pembelajaran Online di sebuah PT Kristen di Indonesia. *Journal Perspektif Ilmu Pendidikan* - Vol. 34 No. 1 April 2020. 1-8.
- [9] Putri, G.S. (2020) <https://www.kompas.com/sains/read/2020/03/12/083129823/who-resmi-sebut-virus-corona-covid-19-sebagai-pandemi-global?page=all>
- [10] Putri, P. (2020) <https://news.detik.com/berita/d-4966701/asal-usul-virus-corona-berasal-dari-mana-sebenarnya>
- [11] Roy, D., Tripathy, S. Kar, S.K., Sharma, N., Verma, S.K., & Kaushal, V. (2020) Study of knowledge, attitude, anxiety & perceived mental healthcare need. *Asian Journal of Psychiatric*. Vol. 51. 1-7.
- [12] Savitsky, B., Finding, Y., Erel, A., & Hendel, T. (2020) Anxiety and coping strategies among nursing students during the covid-19 pandemic. *Nurse ducation in practice*. Vol. 46. 1-7.
- [13] Swearingen, P.L. (2016) All in One Nursing Care Planning Resource. Canada: Elsevier
- [14] Shi, W., Wang, J., Yang, Y., Wang, Z., Wang, G., Hashimoto, K., Zhang, K., & Liu, H. (2020) Knowledge and attitude of medical staff in Chinese psychiatric hospital regarding Covid-19
- [15] WHO (2021) Corona virus https://www.who.int/health-topics/coronavirus#tab=tab_
- [16] Zheng, J., Cao, W., Fang, Z., Hou, G., Han, M., Xu, X., & Dong, J. (2020) The psychological impact of the COVID-19 epidemic on college students in China. *Journal Psychiatric research*. Vol. 287. 1-5

Association of Health Conditions with the Severity of COVID-19 Symptoms: A Cross-sectional Study

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Abstract: The coronavirus disease 2019 (COVID-19) pandemic has raised global health concerns. Several studies were carried out to investigate the epidemiological and clinical characteristics of COVID-19 patients. However, the risk factors for the severity of symptoms have not been sufficiently investigated. Thus, this study examined the association of four health conditions; high cholesterol, hypertension, diabetes, and high Body Mass Index (BMI) with COVID-19 severity of symptoms among adults who were COVID-19 survivors in the United States. A cross-sectional study using the dataset from the 2020 National Health Interview Survey (NHIS) was carried out. Findings suggest that survivors with high cholesterol and hypertension were more likely to experience moderate to severe symptoms compared to those without these conditions. The confounding-adjusted analysis suggested that individuals with high cholesterol, hypertension, overweight, and obesity were significantly more likely to present moderate to severe symptoms. Moreover, with combined conditions, results from unadjusted and confounding-adjusted models demonstrated that those with three or four conditions have greater odds (OR=2.36, 95%CI: 1.39–4.01; OR=1.93, 95%CI: 1.06–3.52, respectively) of experiencing moderate to severe symptoms. This study demonstrates that possessing these health conditions can contribute to the severity of the symptoms caused by COVID-19.

Keywords: *COVID-19, health conditions, COVID-19 severity of symptoms*

Introduction & Literature Review

Novel coronavirus SARS-Cov-2 is a highly pathogenic β -coronavirus which infects human and is the cause of the coronavirus disease 2019 (COVID-19) global pandemic [1]. This pandemic raised global health concerns. Globally, as of August 1st 2022, there are 6.4 million deaths reported to the World Health Organization (WHO), and a total of 1.02 million deaths in the United States (U.S.) [2]. The COVID-19 epidemic in the U.S. is widespread and caused varying degrees of illness. Therefore, the prevention and treatment of this disease is an important priority of global health. Vaccines were developed to address this problem, but new waves of COVID-19 cases caused by the highly transmissible delta variant exacerbate the worldwide public health crisis leading to the need for booster doses among vaccinated populations [3].

Simultaneously, the world also lived with other pandemics. Noncommunicable diseases such as diabetes, heart disease, and kidney disease were the leading causes of death globally in 2019 [4]. Some studies have shown that COVID-19 diagnoses were higher in proportion among patients possessing hypertension, diabetes, obesity, cardiovascular diseases, or kidney disease than those without [5, 6, 7, 8, 9, 10, 11]. Hence, these conditions were considered risk factors for developing COVID-19 from SARS-CoV-2 infection. Furthermore, the association between age, gender, and smoking status with COVID-19 diagnosis has also been demonstrated [6, 8, 9, 10, 11, 12].

According to the Centers for Disease Control and Prevention (CDC), symptoms of COVID-19 display a wide range of severity from mild to severe illness [13]. Symptoms tend to appear 2 to 14 days after being exposed to the virus. The World Health Organization (WHO) stated that these symptoms were non-specific, and the disease presentation can range from having no symptoms (asymptomatic) to severe pneumonia and death [14]. Several studies have investigated the epidemiological and clinical characteristics of patients diagnosed with COVID-19. However, the risk factors for the severity of

symptoms have not been sufficiently investigated. Thus, this study examined the association of four health conditions; high cholesterol, hypertension, diabetes, and high Body Mass Index (BMI) with COVID-19 severity of symptoms among adults who were COVID-19 survivors in the United States.

Methodology

Data sources and selection criteria

The dataset from the National Health Interview Survey (NHIS) in 2020 (n= 31,568), a cross-sectional household interview survey, was used in this study. This was the principal source of information on the health of the civilians from the noninstitutionalized population of the United States (U.S.). NHIS is a major data collection program of the National Center for Health Statistics (NCHS) under the CDC. This survey included residents of households and noninstitutional groups including quarters like homeless shelters, rooming houses, and group homes. The main objective of the survey was to monitor the health of the U.S. population through the collection and analysis of data for a broad range of health topics. Moreover, a major strength of this survey lies in its ability to categorize health characteristics by demographics and socioeconomic characteristics [15].

The 2020 NHIS data contains three analytic data files for adult samples: Sample Adult Annual, Sample Adult Longitudinal, and Sample Adult Partial. The data were collected through telephone interviews in March of 2020 due to restrictions from the pandemic and was able to continue in-person interviews in July 2020 and then continued mostly by telephone through December 2020.

In this study, individuals younger than 18 years of age were excluded. Respondents who never tested positive for COVID-19 were also excluded from the study. The final sample consisted of 630 participants.

Study design

A retrospective cross-sectional study to investigate the association between the severity of COVID-19 symptoms with health conditions was performed on respondents who had COVID-19.

Variables

The NHIS interviews surveyed the respondents' health conditions namely high cholesterol, hypertension, diabetes mellitus, and body mass index. These were coded as "CHLEV_A", "HYPEV_A", "DIBEV_A", and "BMICAT_A" respectively. The severity of COVID-19 symptoms was coded as "CVDSEV_A". The sex of sample adults, age at survey in years, and smoking status were coded "AGEP_A", "SEX_A", and "SMKEV_A" respectively. The population consists of those who tested for COVID-19, they are coded as "COVIDTEST_A".

The outcome or dependent variable in this study was the severity of COVID-19 symptoms which was categorized as "no to mild" and "moderate to severe". The exposure or independent variables were the health conditions namely high cholesterol, hypertension, diabetes mellitus, and body mass index. From these conditions, a combined health condition variable was formulated and added as exposure. The variables high cholesterol, HPN, and DM were categorized by "No" if the respondent does not possess the stated health condition(s) and "Yes" if the respondent possessed the health condition(s). The BMI was categorized into three categories: "Normal" if the BMI is 18.5 to less than 25, "Overweight" if the BMI is 25 to less than 30, and "Obese" if the BMI is 30 and above. The combined health condition was categorized as "0" if the respondent possess no health conditions, "1" if the respondent possess one of any of the health conditions, "2" if the respondents possess two of any of the health conditions, and "3-4" if the respondents possess 3 or 4 health conditions. Potential confounders or third variables were identified and adjusted in the analyses due to their influence on both the independent and dependent variables. These were identified as age at the survey (years), sex, and smoking status.

Statistical analyses

This study was characterized by comparisons between age, sex, smoking status, and severity of symptoms, with the possession of health conditions using the Chi-square test and the one-way ANOVA. Logistic regression was performed to assess the association between the health conditions and the severity of symptoms. In the crude model (model 1), simple logistic regression was employed to analyze the focal relationships. The second model (model 2) employed multiple logistic regression to estimate the odds ratio for the severity of COVID-19 symptoms according to specified characteristics of health conditions adjusted for age, sex, and smoking status. The third model (model 3) employed multiple logistic regression to estimate the odds ratio for the severity of COVID-19 symptoms according to the combined health conditions, adjusted for age, sex, and smoking status. The last model (model 4) analyzed the relationship of all the health conditions including the combined health conditions variable, with the severity of symptoms adjusted for age, sex, and smoking status. Statistical analyses were performed using Stata software version 14.0 with the level of significance set at < 0.05 for a 95% confidence interval.

Table 1. Descriptive analysis of individuals diagnosed with COVID-19 by health conditions

Variable	Individuals diagnosed with COVID-19, n = 630								P-value
	High	HPN	DM	BMI		Combined Conditions			
				Normal??	Obese??	1??	2??	3 or 4??	
Total number, n (%)	170 (27)	198 (31.4)	64 (10.2)	217 (34.4)	224 (35.6)	256 (40.6)	136 (21.6)	105 (16.7)	
Age at survey (years), mean (SD)	58.52 (14.7)	59.05 (15.2)	58.5 (14.5)	50.54 (16.7)	48.37 (15.7)	42.89 (13.8)	54.27 (16.4)	62.13 (12.7)	<0.001#
Sex, n (%)									0.02†
Female	81 (47.6)	101 (51.0)	29 (45.3)	110 (50.7)	124 (55.4)	157 (61.3)	66 (48.5)	48 (45.7)	
Male	89 (52.4)	97 (49.0)	35 (54.7)	107 (49.3)	100 (44.6)	99 (38.7)	70 (51.5)	57 (54.3)	
Smoking status, n (%)									0.3†
Non-currently smoking	156 (91.8)	186 (94)	61 (95.3)	189 (87.1)	211 (94.2)	225 (87.9)	128 (94.1)	98 (93.3)	
Currently smoking	14 (8.2)	12 (6.0)	3 (4.7)	28 (12.9)	13 (5.8)	31 (12.1)	8 (5.9)	7 (6.7)	
Severity of COVID-19 Symptoms, n (%)									0.16†
No to mild	62 (36.5)	72 (36.4)	27 (42.2)	99 (45.6)	90 (40.2)	113 (44.1)	63 (46.3)	35 (98.1)	
Moderate to severe	108 (63.5)	126 (63.6)	37 (57.8)	118 (54.4)	134 (59.8)	143 (55.9)	73 (53.7)	70 (1.9)	

Abbreviations: SD=standard deviation; BMI=Body Mass Index; HPN=Hypertension; DM=Diabetes Mellitus.

BMI=[Weight (kg)/[Height(m) squared]]; Normal is BMI 18.5 to <25; Overweight is BMI >= 25 to <30; Obese is BMI >= 30.

Data presented in Mean (SD), frequency (%); [†]Chi-square test, [‡]One-way ANOVA.

Findings/Results

The NHIS 2020 identified 5,113 adults that were tested positive for COVID-19 in the United States. From this sample population, 630 individuals were characterized as possessing health conditions and experienced symptoms. These individuals fulfilled the inclusion criteria and were therefore included in this study for analysis. Table 1 illustrated the distribution of characteristics among respondents according to health conditions. More respondents were obese

(35.6%) and as for the combined health condition, more respondents possess only one health condition than those with two or more. Most respondents were in their 50s. Those with only one health condition were mostly females (61.3%), but those having two or more health conditions were mostly males (51.5% and 54.3%). Moreover, most of the respondents reported non-currently smoking across all health conditions. Lastly, the descriptive analysis compared the severity of COVID-19 symptoms across different health conditions. Most of the respondents experienced moderate to severe symptoms.

Table 2. Analysis for the association of the health conditions and the severity of COVID-19 symptoms in a complete-case analysis

Variable	Model 1 ^a	Model 2 ^b	Model 3 ^c	Model 4 ^d
	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)
High cholesterol				
No	(1.00)	(1.00)	–	(1.00)
Yes	1.61 (1.12 – 2.31)*	1.37 (.899 – 2.09)	–	5.84 (1.70 – 20.04)**
Hypertension				
No	(1.00)	(1.00)	–	(1.00)
Yes	1.67 (1.18 – 2.36)**	1.29 (.852 – 1.95)	–	6.17 (1.80 – 21.19)**
Diabetes				
No	(1.00)	(1.00)	–	(1.00)
Yes	1.13 (0.67 – 1.91)	.774 (.435 – 1.38)	–	1.94 (0.68 – 5.53)
BMI (yes)				
Normal	(1.00)	(1.00)	–	(1.00)
Overweight	1.18 (0.80 – 1.74)	1.12 (.740 – 1.68)	–	3.88 (1.10 – 13.69)*
Obese	1.47 (1.00 – 2.18)	1.37 (.091 – 2.06)	–	4.72 (1.34 – 16.61)**
Combined health condition				
0 health conditions	(1.00)	–	(1.00)	(1.00)
1 health condition	1.49 (0.98 – 2.28)	–	1.48 (0.96 – 2.28)	.339 (0.09 – 1.23)
2 health conditions	1.37 (0.85 – 2.21)	–	1.21 (0.72 – 2.04)	.050 (.005 – .535)*
3-4 health conditions	2.36 (1.39 – 4.01)**	–	1.93 (1.06 – 3.52)*	.013 (.0003 – .520)*
Age at survey	–	1.01 (1.00 – 1.02)*	1.01 (1.00 – 1.02)*	1.01 (1.00 – 1.02)*
Sex				
Female	–	(1.00)	(1.00)	(1.00)
Male	–	.616 (.443 – .857)*	.628 (.452 – .873)*	.628 (.450 – .877)*
Smoking status				
Non- currently smoking	–	(1.00)	(1.00)	(1.00)
Currently smoking	–	.784 (.436 – 1.41)	.736 (.343 – 1.05)	.733 (.406 – 1.32)

OR, odds ratio; CI, confidence interval; ref, reference. * $p < 0.05$, ** $p < 0.01$, and *** $p < 0.001$.

^aModel 1. Logistic Regression on the focal relation of health conditions and severity of COVID-19 symptoms (crude model).

^bModel 2: Multiple logistic regression on the first model except for the combined health condition adjusted for age, sex, and smoking status.

^cModel 3. Multiple logistic regression on the combined health condition adjusted for age, sex, and smoking status.

^dModel 4. Multiple logistic regression on the relation of health conditions including the combined and severity of COVID-19 symptoms after adjusting age, sex, and smoking status (full adjusted model).

Table 2 displayed several models. Model 1 showed the result for the unadjusted or crude model. The result showed those possessing high cholesterol and hypertension have significantly higher odds of experiencing moderate to severe symptoms compared to those who do not have health conditions, with an odds ratio (OR) of 1.61 (95% CI: 1.12 – 2.31) and 1.67 (95% CI: 1.18 – 2.36) respectively. There was a statistically significant difference between those who possess three or four health conditions and those who do not have health conditions, with an OR of 2.34 (95% CI: 1.39 – 4.01). However, after adjusting for confounders (age, sex, and smoking status), the odds of moderate to severe symptoms experienced across all the health conditions were not statistically significant as shown in Model 2. In addition, an increase of one year in age was associated with higher odds (OR=1.01, 95% CI: 1.00 – 1.02) of experiencing moderate to severe symptoms in females compared to lowered odds (OR=0.61, 95% CI: .443 – .857) in males.

Another analysis was performed to understand the relationship between the combined health condition and the severity of COVID-19 symptoms. Model 3 showed a directly proportional relationship between those experiencing moderate to severe symptoms followed by an increase in health conditions. The OR of moderate to severe symptoms experienced between those with three or four health conditions and those with no health condition is 1.93 (95% CI: 1.06 – 3.52). Model 4 was a fully adjusted model for all variables. Diabetes was the only variable that was not statistically significant (OR=1.94, 95% CI: 0.68 – 5.53) among all health conditions. Having high cholesterol, hypertension, and being overweight or obese were associated with experiencing moderate to severe COVID-19 symptoms with an OR of 5.84 (95% CI: 1.70 – 20.04), 6.17 (95% CI: 1.80 – 21.19), 3.88 (95% CI: 1.10 – 13.69), and 4.72 (95% CI: 1.34 – 16.61) respectively. However, in the combined health conditions, it was surprising that having more health conditions resulted in lowered odds of experiencing moderate to severe COVID-19 symptoms.

The observed factors with the most significant effect on the severity of symptoms were the presence of high cholesterol, hypertension, and 3-4 health conditions. Additionally, the odds of having moderate to severe symptoms significantly increased along with an increase in age (OR=1.01, 95% CI: 1.00 – 1.02). It was also observed in all the adjusted models (Models 2 to 4) that males were about 40% less like to experience moderate to severe COVID-19 symptoms than females. For smoking status, we observed that current smokers have lowered odds in all the adjusted models (Models 2 to 4).

Discussion

To our knowledge, this study was the only research that evaluated the association of health conditions and the severity of COVID-19 symptoms using the most recent NHIS dataset. Our findings have provided further evidence with extensive coverage of adults across the U.S., to consider baseline health conditions in the severity of symptoms among respondents who have been diagnosed with COVID-19. This cross-sectional study of 630 respondents diagnosed with COVID-19, high cholesterol, and hypertension showed that individuals with these conditions may face greater risks of developing moderate to severe symptoms. Increased age, females, and possessing 3-4 health conditions also affected the severity of the symptoms caused by COVID-19.

Our findings are congruent with emerging reports of high cholesterol and hypertension being associated with severe illness among COVID-19 patients and subsequently a higher rate of hospitalization and death [6, 8, 9, 17-19, 21, 22, 25, 26]. Studies have shown that obesity increased

the risk of hospitalization, ICU admission, and mortality among patients with COVID-19 [9, 28, 29], and it was suggested that obesity was an underappreciated risk factor for COVID-19 [27]. Although the results of diabetes mellitus in this study contradicted other studies that present a statistically significant association with COVID-19 severity [6, 16- 23], diabetes remains one of the most serious comorbidities linked to the severity of SARS-CoV-2 [6]. Some studies had even demonstrated that diabetes was a risk factor for COVID-19 mortality [8, 9, 24].

Older age and the male sex categories showed increased epidemiological evidence of risk associations in the severity and prognosis of COVID-19 [8, 10, 11, 21]. Our findings concerning sex contradicted the results of these studies. Concerning smoking status, our findings showed different results compared to previous studies where it was observed that smoking was associated with higher COVID-19 mortality, a higher risk of infection, was considered a risk factor for disease progression, and/or a greater risk of progression into a critical or mortal condition [9, 21, 30]. In terms of the combined health conditions, a study suggested that a higher hazard ratio was observed among those who have two or more comorbidities compared to just one [25]. A greater number of comorbidities is correlated with poorer clinical outcomes. This finding was consistent with what was observed in models 1 and 3.

Limitations and Implications

There were several limitations to be acknowledged in this study. Firstly, the study failed to identify specific symptoms that the respondents experienced and the basis for the classification of these symptoms in the NHIS survey. Secondly, medications for the stated health conditions were not taken into consideration which could potentially play a role in the focal relationship. Thirdly, the study design used could not establish whether the association was causal. Lastly, there were only three identified confounders, while other potential variables that could affect the focal relationship were excluded such as alcohol consumption and other social determinants of health. Despite these limitations, our findings may carry important public health implications in the context of the increasing numbers of COVID-19 cases with severe symptoms leading to poorer clinical outcomes and death and proposed that people with health conditions such as high cholesterol and hypertension, as well as those with more than one health conditions, should be considered high priorities of access to the health care services.

Conclusion

In conclusion, individuals with high cholesterol and hypertension were more likely to experience moderate to severe symptoms as shown in the unadjusted and adjusted models. Having three or four conditions, older age, and belonging to the male sex category were significantly associated with moderate to severe symptoms. It can be observed that health conditions affect the severity of COVID-19 symptoms. Therefore, patients with these conditions should be given additional attention to prevent the worst of their condition. The study efforts help target public health interventions, such as health education and promotion among adults possessing health conditions. In addition, other health conditions such as cancer, kidney disease, comorbidities, as well as social determinants of health must be further studied to evaluate its relationship to COVID-19 severity.

References

- [1] Seyed Hosseini, E., Riahi Kashani, N., Nikzad, H., Azadbakht, J., Hassani Bafrani, H., & Haddad Kashani, H. (2020). The novel coronavirus Disease-2019 (COVID-19): Mechanism of action, detection and recent therapeutic strategies. *Virology*, 551, 1–9.
<https://doi.org/10.1016/j.virol.2020.08.011>
- [2] WHO. (2022). WHO Dashboard. <https://covid19.who.int/region/amro/country/us>
- [3] Krause, P. R., Fleming, T. R., Peto, R., Longini, I. M., Figueroa, J. P., Sterne, J. A., ... & Henao-Restrepo, A. M. (2021). Considerations in boosting COVID-19 vaccine immune responses. *The Lancet*, 398(10308), 1377-1380.

- [4] WHO. (December 9, 2020). The Top 10 causes of death. <https://www.who.int/news-room/fact-sheets/detail/the-top-10-causes-of-death>
- [5] Huang, Songjiang; Wang, Jianwen; Liu, Fen; Liu, Jiacheng; Cao, Guijuan; Yang, Chongtu; Liu, Wei; Tu, Chao; Zhu, Muxin; Xiong, Bin (2020). *COVID-19 patients with hypertension have more severe disease: a multicenter retrospective observational study. Hypertension Research*, (), -.doi:10.1038/s41440-020-0485-2
- [6] Zaki, N., Alashwal, H., & Ibrahim, S. (2020). Association of hypertension, diabetes, stroke, cancer, kidney disease, and high-cholesterol with COVID-19 disease severity and fatality: A systematic review. *Diabetes & metabolic syndrome*, 14(5), 1133–1142. <https://doi.org/10.1016/j.dsx.2020.07.005>
- [7] Mirjalili, H., Dastgheib, S. A., Shaker, S. H., Bahrami, R., Mazaheri, M., Sadr-Bafghi, S. M. H., ... & Neamatzadeh, H. (2021). Proportion and mortality of Iranian diabetes mellitus, chronic kidney disease, hypertension, and cardiovascular disease patients with COVID-19: a meta-analysis. *Journal of Diabetes & Metabolic Disorders*, 20(1), 905-917.
- [8] Mohammad Parohan, Sajad Yaghoubi, Asal Seraji, Mohammad Hassan Javanbakht, Payam Sarraf & Mahmoud Djalali (2020) Risk factors for mortality in patients with Coronavirus disease 2019 (COVID-19) infection: a systematic review and meta-analysis of observational studies, *The Aging Male*, 23:5, 1416-1424, DOI: 10.1080/13685538.2020.1774748
- [9] Mahamat-Saleh Y, Fiolet T, Rebeaud ME, Mulot M, Guihur A, El Fatouhi D, Laouali N, Peiffer-Smadja N, Aune D, Severi G. Diabetes, hypertension, body mass index, smoking and COVID-19-related mortality: a systematic review and meta-analysis of observational studies. *BMJ Open*. 2021 Oct 25;11(10):e052777. doi: 10.1136/bmjopen-2021-052777. PMID: 34697120; PMCID: PMC8557249.
- [10] Gupta R., Ghosh A., Kumar A. S., Misra A. Clinical considerations for patients with diabetes in times of COVID-19 epidemic. *Diabetes & Metabolic Syndrome: Clin Res Rev* 2020;14(3):211e2.
- [11] Fang X, Li S, Yu H, Wang P, Zhang Y, Chen Z, Li Y, Cheng L, Li W, Jia H, Ma X. Epidemiological, comorbidity factors with severity and prognosis of COVID-19: a systematic review and meta-analysis. *Aging (Albany NY)*. 2020; 12:12493-12503. <https://doi.org/10.18632/aging.103579>
- [12] Clift, A. K., von Ende, A., San Tan, P., Sallis, H. M., Lindson, N., Coupland, C. A., ... & Hopewell, J. C. (2022). Smoking and COVID-19 outcomes: an observational and Mendelian randomisation study using the UK Biobank cohort. *Thorax*, 77(1), 65-73
- [13] CDC. (March 22, 2022). Symptoms of COVID_19. <https://www.cdc.gov/coronavirus/2019-ncov/symptoms-testing/symptoms.html>
- [14] WHO. (February 2020). Reports of the WHO-China Joint Mission on Coronavirus Disease 2019 (COVID-19). <https://www.who.int/docs/default-source/coronaviruse/who-china-joint-mission-on-covid-19-final-report.pdf>
- [15] CDC. (2022). 2020 National Health Interview Survey. <https://www.cdc.gov/nchs/nhis/2020nhis.htm>
- [16] Bornstein SR, Rubino F, Khunti K, Mingrone G, Hopkins D, et al. Practical recommendations for the management of diabetes in patients with COVID-19. *Lancet* 2020;8(6):546e50. [https://doi.org/10.1016/S2213-8587\(20\)30152-2](https://doi.org/10.1016/S2213-8587(20)30152-2).
- [17] Guo, W., Li, M., Dong, Y., Zhou, H., Zhang, Z., Tian, C., Qin, R., Wang, H., Shen, Y., Du, K., Zhao, L., Fan, H., Luo, S., & Hu, D. (2020). Diabetes is a risk factor for the progression and prognosis of COVID-19. *Diabetes/metabolism research and reviews*, 36(7), e3319. Advance online publication. <https://doi.org/10.1002/dmrr.3319>
- [18] Tavakol, Z., Ghannadi, S., Tabesh, M. R., Halabchi, F., Noormohammadpour, P., Akbarpour, S., Alizadeh, Z., Nezhad, M. H., & Reyhan, S. K. (2021). Relationship between physical activity, healthy lifestyle and COVID-19 disease severity; a cross-sectional study. *Zeitschrift fur Gesundheitswissenschaften = Journal of public health*, 1–9. Advance online publication. <https://doi.org/10.1007/s10389-020-01468-9>

- [19]Zekavat SM, Honigberg M, Pirruccello J, Kohli P, Karlson EW, et al. Influence of blood pressure on pneumonia risk: epidemiological association and Mendelian randomisation in the UK Biobank. medRxiv; 2020. [https://doi.org/ 10.1101/2020.04.19.20071936](https://doi.org/10.1101/2020.04.19.20071936).
- [20]Peng, Y. D., Meng, K., Guan, H. Q., Leng, L., Zhu, R. R., Wang, B. Y., He, M. A., Cheng, L. X., Huang, K., & Zeng, Q. T. (2020). *Zhonghua xin xue guan bing za zhi*, 48(6), 450–455. <https://doi.org/10.3760/cma.j.cn112148-20200220-00105>
- [21]Zheng Z, Peng F, Xu B, et al. *Risk factors of critical & mortal COVID-19 cases: A systematic literature review and meta-analysis*. Journal of Infection. 2020;81(2):e16-e25.
- [22]Hu, Y., Sun, J., Dai, Z., Deng, H., Li, X., Huang, Q., Wu, Y., Sun, L., & Xu, Y. (2020). Prevalence and severity of corona virus disease 2019 (COVID-19): A systematic review and meta-analysis. *Journal of clinical virology : the official publication of the Pan American Society for Clinical Virology*, 127, 104371. <https://doi.org/10.1016/j.jcv.2020.104371>
- [23]Ebinger, J. E., Achamallah, N., Ji, H., Claggett, B. L., Sun, N., Botting, P., ... & Cheng, S. (2020). Pre-existing traits associated with Covid-19 illness severity. *PloS one*, 15(7), e0236240.
- [24]Yang X, Yu Y, Xu J, Huaqing S, Jia'an X, et al. Clinical course and outcomes of critically ill patients with SARS-CoV-2 pneumonia in Wuhan, China: a single- centered, retrospective, observational study. *Lancet Respir Med* 2020;2600(20).
- [25]Guan W, Liang W, Zhao Y, Liang H, Chen Z, et al. Comorbidity and its impact on 1590 patients with COVID-19 in China: a nationwide analysis. *Eur Respir J* 2020;55. <https://doi.org/10.1183/13993003.00547-2020>.
- [26]Huang, Songjiang; Wang, Jianwen; Liu, Fen; Liu, Jiacheng; Cao, Guijuan; Yang, Chongtu; Liu, Wei; Tu, Chao; Zhu, Muxin; Xiong, Bin (2020). *COVID-19 patients with hypertension have more severe disease: a multicenter retrospective observational study. Hypertension Research*, (), -.doi:10.1038/s41440-020-0485-2
- [27]Zhou, Y., Chi, J., Lv, W., & Wang, Y. (2021). Obesity and diabetes as high-risk factors for severe coronavirus disease 2019 (Covid-19). *Diabetes/metabolism research and reviews*, 37(2), e3377. <https://doi.org/10.1002/dmrr.3377>
- [28]Albashir A. (2020). The potential impacts of obesity on COVID-19. *Clinical medicine (London, England)*, 20(4), e109–e113. <https://doi.org/10.7861/clinmed.2020-0239>
- [29]Huang, Y., Lu, Y., Huang, Y. M., Wang, M., Ling, W., Sui, Y., & Zhao, H. L. (2020). Obesity in patients with COVID-19: a systematic review and meta-analysis. *Metabolism: clinical and experimental*, 113, 154378. <https://doi.org/10.1016/j.metabol.2020.154378>
- [30]Clift, A. K., von Ende, A., San Tan, P., Sallis, H. M., Lindson, N., Coupland, C. A., ... & Hopewell, J. C. (2022). Smoking and COVID-19 outcomes: an observational and Mendelian randomisation study using the UK Biobank cohort. *Thorax*, 77(1), 65-73.

The Big Five Personality Traits and Perceived Stress of Nurses During the COVID-19 Pandemic

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Abstract: The COVID-19 Pandemic resulted in changes in healthcare institutions and workers, causing psychological impact and affecting their stress level and their personality traits. This study explored the Big Five personality traits and the perceived stress level of nurses during the COVID-19 pandemic. This quantitative study was conducted among 120 registered male and female nurses who have or have been in contact with COVID-19 patients in the hospitals here in the Philippines with a work experience of 3 months to 10 years and an age range of 22–60. An online survey was conducted through Google forms and was distributed among the qualified nurses. The study employed descriptive, correlational, and comparative research designs, and the respondents were chosen using a purposive sampling technique.

The result of the study shows that nurses do experience moderate stress level during a pandemic and hospital units is a significant variable that contributes to the stress of nurses. It also shows that personality traits of nurses were in moderate level but there is a significant negative correlation between conscientiousness ($p=.024$; $r=-.207$), agreeableness ($p=.003$; $r=-.273$), and emotional stability/neuroticism ($p=.000$; $r=-.518$) to the perceived stress level. Meaning as conscientiousness, agreeableness, and emotional stability/neuroticism increase, the perceived stress level decreases.

Keywords: *personality, stress, Covid 19*

Introduction

The World Health Organization announced the outbreak of COVID-19 as a world pandemic on the 11th of March, 2020 (WHO, 2020). Frontline nurses who treat COVID-19 patients are usually exposed to a greater risk of infection due to intimate, regular contact with patients, longer working hours, and a heavier workload than what is normal due to the dramatic increase of positive COVID-19 patients, thus reported of having a higher prevalence rate for both anxiety and depression compared to physicians (Lai et al., 2020). This epidemic crisis poses a major threat to the nurses' general state of well-being and greatly impacts their psychological state (Huang et al., 2020).

Both personality and stress affect how an individual copes with stressors and change how a person approaches situations. (Karimzade & Besharat, 2011) In quick-thinking situations that call for immediate action, the individual undergoes mental tension that builds up over time, thus known as stress. This acts as a stressor that will affect an individual's way of handling situations in the future. (Hosseini et al., 2014)

This study explored the Big Five personality traits, namely openness, conscientiousness, extraversion, agreeableness, and neuroticism, and the perceived stress level of nurses during the COVID-19 pandemic.

Methodology

The research uses the quantitative research design in order to investigate the characteristics of a single population group of nurses within the Philippine Sectarian hospitals, specifically, descriptive comparative, descriptive correlational, and descriptive evaluative.

Population and Sampling Design

The researchers used a purposive sampling technique. The respondents for this study were 120 registered nurses by Professional Regulation Commission (PRC) from different units in Adventist hospitals who have or had contact with COVID-19 patient(s) between the ages 22-60. They also had a work experience of at least 1 year to 10 years and currently worked at the hospitals within the last 3 to 6 months. Of the 120 registered nurses, 35 (29.2%) were male, and 85 (70.8%) were female. One-hundred and two of the respondents (85%) belonged to the 22-40 y/o range and only 18 (15%) belonged to the 41-60 y/o range. Of the respondents, 66 (55%) have been working between 1-4 years, and 54 (45%) have been serving for 5 years or more. In order from the most to the least, 51 of the respondents (42.5%) worked within multiple areas of the hospital during this pandemic, 20 (16.7%), within an emergency unit followed by OPD with 14 (11.7%), 10 (8.3%) within a dialysis unit, 6 (5.0%) within a Pediatric unit, and 6 (5.0%) in the MSU. Five (4.2%) of the respondents work within the ICU and 5 (4.2%) within an OR/Surgical unit, 2 (1.7%) within the DR unit, and 1 respondent (.8%) within an OB unit.

Ethical Considerations

Before conducting the study, a letter, clearance, and permission were obtained from the Ethics Review Board (ERB) and selected Secretarian Hospitals. Consent forms stating the purpose and the objectives of the study were distributed via online platforms such as Google forms, messenger, and, or email. The privacy and confidentiality of information of the respondents collected in this study were kept private and confidential.

Instrumentation

The respondents were given a questionnaire with three parts. The first part asked for the respondents' demographics. The second part adopted questionnaires that evaluate the respondents' personality and perceived stress namely, the Big Five personality traits and Perceived Stress Scale questionnaires.

Data Gathering Procedure

The survey was conducted online and was done by having the questionnaire encoded onto an online platform called Google Forms. It was then distributed to potential participants at sectarian hospitals who are targeted to participate in the study.

Analysis of data

The first three questions employ a descriptive method and therefore utilized methods of statistical analysis such as mean and standard deviations of the entirety of the respondents' answers regarding their personality and perceived stress.

For research question number four, the researchers used inferential statistics utilizing Pearson's correlation coefficient to measure the statistical relationship between their personality and their perceived stress. The ANOVA test was applied to research question number five to determine the significant differences in perceived stress levels when the moderating variables of gender, age, years of service, and hospital units were considered.

Findings and Results

Big Five Personality Traits

Table 1. *Big Five Personality Traits*

	N	Mean	Std. Deviation	Verbal Interpretation
Openness to experience	120	33.82	3.93	Moderate Openness to experience
Extroversion	120	29.56	5.12	Moderate Extraversion
Conscientiousness	120	36.75	4.57	Moderate Conscientiousness
Agreeableness	120	37.47	3.70	Moderate Agreeableness
Emotional Stability/Neuroticism	120	31.56	5.44	Moderate Emotional Stability

10-20= low; 21-39=moderate; 40-50=high

Table 1 shows that nurses have a moderate level to all the Big Five Personality Traits with Openness to Experience having a mean of 33.82 (SD= 3.93), Extroversion with a mean of 29.56 (SD= 5.12), Conscientiousness with a mean of 36.74 (SD= 4.57), Agreeableness with a mean of 37.47 (SD= 3.70), and Emotional Stability/Neuroticism with a mean of 31.56 (SD= 5.44). The results reveal that the relationship between the Big Five Personality Traits to nurses during the pandemic is at a moderate level.

Perceived Stress

Table 2. *Level of Perceived Stress Among Nurses*

	N	Mean	Std. Deviation	Verbal Interpretation
Perceived Stress	125	18.19	3.92	Moderate Stress

Table 2 shows that nurses have a moderate level of stress, with an overall mean score of 18.19 (SD=3.92).

Personality Traits and Stress Level

Table 3. *Relationship Between Personality Traits and Stress Level*

Personality Traits	Pearson Correlation (r)	Stress Level p-value	Verbal Interpretation
Extroversion	.014	.882	Not Significant
Conscientiousness	-.207**	.024	Significant
Agreeableness	-.273**	.003	Significant
Emotional Stability/Neuroticism	-.518**	.000	Significant
Openness to Experience	-.077	.405	Not Significant

* Correlation is significant at the 0.05 level (2-tailed).

Table 3 shows that extraversion ($p=.882$) and openness to experience ($p=.4-5$) have no significant relationship in the perceived stress levels while conscientiousness has a weak ($r=-.207$) negative correlation ($p=.024$) in the perceived stress level of nurses. The finding shows that conscientiousness is negatively correlated to the perceived stress level, which means the higher the conscientiousness the lower the perceived stress level of nurses.

Stress Level Among Nurses According to Gender

Table 6. *Differences in Stress Level Among Nurses According to Gender*

	Gender	N	Mean Rank	Mann-Whitney U	z	p-value	Interpretation
Stress	Male	35	53.54	1244	-1.411	.158	Not Significant
	Female	85	63.36				
	Total	120					

level of significance = 0.05

The Mann-Whitney test revealed that there is no significant difference in the stress level between males (Mdn = 53.54) and females (Mdn = 63.36), $U = 1244$, $p = 0.158$ in table 6. Thus, the null hypothesis which stated that there was no significant difference between male and female respondents in their stress levels, is accepted.

Stress Level Among Nurses According to Age

Table 7. *Differences in Stress Level Among Nurses According to Age*

	Age	N	Mean Rank	Mann-Whitney U	z	p-value	Interpretation
Stress	22-40 years old	102	61.97	769	-1.103	.270	Not Significant
	41-60 years old	18	52.19				
	Total	120					

level of significance = 0.05

The Mann Whitney test revealed that there is no significant difference in the stress level between 22-40 years old (Mdn = 61.97) and 41-60 years old (Mdn = 52.19), $U = 769$, $p = 0.270$ in table 7. Thus, the null hypothesis which stated that there was no significant difference between age groups of respondents in their stress levels, is accepted.

Stress Level Among Nurses According to Years of Service

Table 8. *Differences in Stress Level Among Nurses According to Years of Service*

	Years of Service	N	Mean Rank	Mann-Whitney U	z	p-value	Interpretation
Stress	1 – 4 years	66	62.57	1646	-.723	.470	Not Significant
	5 years or more	54	57.97				
	Total	120					

level of significance = 0.05

The Mann-Whitney test revealed that there is no significant difference in the stress level between 1-4 years of service (Mdn = 62.57) and 5 or more years of service (Mdn = 57.97), $U = 1646$, $p = 0.470$ in table 8. Thus, the null hypothesis which stated that there was no significant difference between years of service of respondents in their stress levels is accepted.

Stress Level Among Nurses According to Hospital Unit

Table 9. *Differences in Stress Level Among Nurses According to Hospital Unit*

	Hospital Unit	N	Mean Rank	H	p-value	Interpretation
Stress	ICU	5	83.10	29.853	.000	Significant
	Pediatrics	6	95.67			
	ER	20	63.48			
	OR/Surgical	5	75.40			
	OPD	14	64.82			
	MSU	6	72.50			
	OB	1	78.00			
	DR	2	62.00			
	Dialysis	10	88.25			
	Multiple Units	51	43.08			
	Total	120				

level of significance = 0.05

Table 10. *Dunn-Bonferroni Post Hoc Analysis of Hospital Unit*

Sample 1 – Sample 2	Sig.	Adj. Sig	Verbal Interpretation
Multiple Units – Dialysis	.000	.007	Significant
Multiple Units – Pediatrics	.000	.020	Significant
Multiple Units – ICU	.014	.642	Not Significant
OR/Surgical – Pediatrics	.337	1.000	Not Significant
ER – OB	.683	1.000	Not Significant
OR/Surgical – ICU	.736	1.000	Not Significant
ER – MSU	.576	1.000	Not Significant
MSU – OB	.883	1.000	Not Significant
ER – OPD	.911	1.000	Not Significant
Dialysis – Pediatrics	.679	1.000	Not Significant
ER – OR/Surgical	.499	1.000	Not Significant
MSU – ICU	.620	1.000	Not Significant
MSU – Pediatrics	.247	1.000	Not Significant
DR – Dialysis	.328	1.000	Not Significant
ER – Dialysis	.065	1.000	Not Significant
MSU – OR/Surgical	.886	1.000	Not Significant
OPD – ICU	.317	1.000	Not Significant
DR – OB	.706	1.000	Not Significant
OPD – Pediatrics	.068	1.000	Not Significant
OR/Surgical – Dialysis	.502	1.000	Not Significant
OB – Dialysis	.770	1.000	Not Significant
OPD – OR/Surgical	.554	1.000	Not Significant
OR/Surgical – OB	.948	1.000	Not Significant
OPD – MSU	.650	1.000	Not Significant
OPD – OB	.713	1.000	Not Significant
ER – Pediatrics	.046	1.000	Not Significant
ER – ICU	.262	1.000	Not Significant

OPD – Dialysis	.103	1.000	Not Significant
Multiple Units – OR/Surgical	.046	1.000	Not Significant
Multiple Units – ER	.026	1.000	Not Significant
Multiple Units – OPD	.038	1.000	Not Significant
Multiple Units – MSU	.049	1.000	Not Significant
Multiple Units – OB	.319	1.000	Not Significant
Multiple Units – DR	.449	1.000	Not Significant
ICU – Pediatrics	.543	1.000	Not Significant
OB – ICU	.997	1.000	Not Significant
OB – Pediatrics	.637	1.000	Not Significant
DR – ER	.954	1.000	Not Significant
DR – OR/Surgical	.642	1.000	Not Significant
DR – OPD	.914	1.000	Not Significant
DR – MSU	.711	1.000	Not Significant
ICU – Dialysis	.778	1.000	Not Significant
DR – ICU	.471	1.000	Not Significant
MSU – Dialysis	.379	1.000	Not Significant
DR - Pediatrics	.234	1.000	Not Significant

Kruskal Wallis test revealed that there is a significant difference level of stress when hospital unit is considered [$H(9) = 29.853, p = .000$], with a mean rank of 83.10 for ICU, Mdn = 95.67 for Pedia, Mdn = 63.48 for ER, Mdn = 75.40 for OR/Surgical, Mdn = 64.82 for OPD, Mdn = 72.50 for MSU, Mdn = 78.00 for OB, Mdn = 62.00 for DR, Mdn = 88.25 for Dialysis and Mdn = 43.08 for nurses assigned in multiple areas in hospital. The group with the highest stress level consists of nurses assigned to pediatrics. Thus, the null hypothesis is rejected. Since there was a significant difference across groups, a post hoc analysis was conducted to determine the specific difference across groups. Table 10 shows that Dunn's pairwise tests were carried out. There was strong evidence of a difference between the group who are under multiple units and dialysis ($p < .007$, adjusted using the Bonferroni correction) and between those under multiple units and pediatrics ($p < .020$, adjusted using the Bonferroni correction) in terms of their level of perceived stress. The median stress level for the group under pediatrics was 95.67 and 88.25 under dialysis compared to nurses under multiple units 43.08. Among the other pairs, there was no evidence of a difference which means that nurses under multiple units have a low level of stress compared to nurses under pediatrics and dialysis units.

Discussion

The Big Five Personality of the Respondents

The result reveals that the relationship between the Big Five Personality Traits to nurses during the pandemic is at a moderate level. The result is in agreement with a study by Ranieri et al., (2021) which concluded that moderate level of emotional stability/ neuroticism, openness, extroversion, and agreeableness due to the fact that following a long period of the pandemic, nurses have used their own psychological resources (personality features) to counteract the harmful effects of the actual pandemic on mental health by adjusting their personal behavior to the environmental extended outbreak stressor. However, in the same study, it was concluded that nurses experience a high level of consciousness. In addition, a study by Aschwanden et al. (2021) discovered that higher neuroticism was associated with more concern and longer duration estimates of COVID-19 while higher extraversion was associated with shorter duration estimates, and higher conscientiousness was associated with more precautions. Higher neuroticism, in contrast to the preregistered predictions, was associated with fewer safeguards and was unrelated to preparation behaviors.

The Respondents Perceived Stress

According to the results the respondents experienced moderate stress during the pandemic. According to one study by Hu et al. (2020), approximately half of all nurses currently report moderate to high stress due to the fact that nurses have more self-efficacy and resilience, and they may encounter fewer mental health problems. In a study conducted in Hubei, China, among frontline healthcare workers, there is a reported moderate level of stress (<60%), which is related to the government interventions at the start of the pandemic requiring protection measures for frontline staff (Elbqry et al., 2021). In contrast to the result, a study by Chekole et al. (2020) found that nurses in their field were 8 times more likely than doctors to experience perceived stress on COVID-19. This conclusion is consistent with research on the perceived stress of COVID-19 among healthcare workers conducted in China (Que et al., 2020). Nurses are frontline healthcare workers who are directly involved in the diagnosis, treatment, and care of patients with COVID-19 and are paid more than other professions. Additionally, a study by Arshad & et al., (2020) found that healthcare personnel in Pakistan experienced higher levels of anxiety since they had no prior experience managing epidemics (like SARS). Furthermore, the availability of restricted health resources and a lack of training in epidemic management are likely factors for greater anxiety rates among Pakistani HCWs.

Personality Traits and Stress Level

The finding shows that conscientiousness is negatively correlated to the perceived stress level, which means the higher the conscientiousness the lower the perceived stress level of nurses. Working individuals with a high conscientiousness score are more trustworthy and organized, and more involved in their jobs. Zhang et al. (2021) said that working persons with a high level of conscientiousness can engage in work or other activities during the epidemic, potentially reducing the psychological impact of the pandemic. The table also presents that there is a weak ($r = -.273$) negative correlation ($p = .003$) between agreeableness and perceived stress. This means that the higher the agreeableness of the nurses, the lower the perceived stress. This was consistent with a study by Divinakumar et al. (2019) that discovered a link between this personality score and emotional weariness in those who work in human services and health care (burnout). With regards to emotional stability, the table shows that it has a moderate ($r = -.518$) negative correlation with the perceived stress of nurses. It shows that the higher the emotional stability, the lower the stress level. In contrast to the result, Sutin (2020) concluded that neuroticism rises when people are in a lot of pain, whether it's from a traumatic event or a depressive episode (Karsten et al., 2012). Long-term psychological effects of natural disasters, such as those following the Christchurch Earthquake, show a similar but weaker pattern (Milojevic et al., 2014). Neuroticism was found to be substantially related to rumination, anxiety, and depressive symptoms in a study of Finnish students. Neurotic people reported increased stress and were more likely to be diagnosed with clinical depression (Ervasti et al., 2019).

Stress Level Among Nurses According to Gender

The Mann-Whitney test revealed that there is no significant difference in the stress level between males (Mdn = 53.54) and females (Mdn = 63.36), $U = 1244$, $p = 0.158$ in table 6. Thus, the null hypothesis which stated that there was no significant difference between male and female respondents in their stress level, is accepted. In contrast, a study shows that women are linked to a higher level of stress. This is consistent with the research, which shows that the psychological reaction to COVID-19 (Liu & et al., 2021; Losada-Baltar & et al., 2020) and other epidemics differ by gender (Chew et al., 2020). Female health workers have higher anxiety and stress levels than males, according to a study done in Turkey (Akyol et al., 2021). Female nurses' anxiety about infecting their families and keeping away from them to prevent infection has a negative impact on their stress levels (Çınar et al., 2021). Females expressed different impacts, concerns, fears, and behaviors related to COVID-19 than males. These discrepancies could be explained by differences in underlying personality traits between men and women (AL-Omiri et al., 2021).

Stress Level Among Nurses to Age

The Mann-Whitney test revealed that there is no significant difference in the stress level between 22-40 years old (Mdn = 61.97) and 41-60 years old (Mdn = 52.19), $U = 769$, $p = 0.270$ in table 7. Thus, the null hypothesis which stated that there was no significant difference between age groups of respondents in their stress level, is accepted. In contrast, a study in Kashan was performed before the pandemic to analyze the level of general stress within Kashan hospitals. It was then rationalized that the highest rate of job stress was in the 25-29 age group while the age group with individuals above 35 experienced less job stress (Najimi et al., 2012). Another study was done during the start of the pandemic to determine the psychological impact and coping strategies of medical staff dealing with COVID-19 patients in Wuhan, China (Cai et al., 2020). Older staff aged 41 to 50 have shown to worry more about their own safety and the lack of personal protective equipment, and medical staff. The age group of individuals between 31 to 40 had more concerns about infecting their own families (Cai et al., 2020). In relation to the researcher's data, a study conducted by Ju-Yeon Lee et al. shows no significant difference in the stress level of nurses in regard to their age during the COVID-19 outbreak in Gwangju, South Korea (J.-Y. Lee et al., 2021).

Stress Level Among Nurses to Years of Service

The Mann-Whitney test revealed that there is no significant difference in the stress level between 1-4 years of service (Mdn = 62.57) and 5 or more years of service (Mdn = 57.97), $U = 1646$, $p = 0.470$ in table 8. Thus, the null hypothesis which stated that there was no significant difference between years of service of respondents in their stress level is accepted. In contrast, in a study conducted in Sweden before the pandemic regarding student nurses' who leave the profession after 5 years of service, 1 out of every 5 new nurses leave the profession due to burnout or exhaustion in their new profession (Rudman et al., 2014). Another study shows that even though stress is significantly higher among nurses during the COVID-19 pandemic in comparison to before the pandemic, nurses in Qatar with more than 5 years of service show a higher turnover intent than nurses working for less than 5 years (Nashwan et al., 2021).

Stress Level Among Nurses to Hospital Units

The median stress level for the group under pediatrics was 95.67 and 88.25 under dialysis compared to nurses under multiple units 43.08. There was no evidence of a difference between the other pairs. Meaning that those nurses under multiple units have low levels of stress compared to nurses in pediatrics and dialysis units. In contrast to the result, Sharma et al. (2014) found that the majority of nurses working in the emergency/ICU department felt stressed, with 2% of them being highly stressed. Staff nurses working in medicine, surgery, pediatrics, and obstetrics/gynecology departments were found to be less stressful than those working in the emergency/ICU department.

Cui et al. (2021) discovered that nurses who worked in the emergency room had greater stress levels, which is consistent with earlier research. Emergency room nurses in tertiary care hospitals have an added workload linked to identifying suspected COVID-19 patients. As gatekeepers to the healthcare system, they are likely to interact with confirmed patients, resulting in significant stress (Lee et al., 2021). However, the stress level was lower than that reported in recent Italian research on nurses caring for COVID-19 patients in the immediate aftermath of the pandemic (range 22–24) (Rossi, 2020). Dialysis nurses are under a great deal of pressure. Stress can be exacerbated by an increasing workload, which can lead to burnout and tiredness. The majority of the nurses in the survey had a modest level of stress, according to the findings (Karkar et al., 2015). Nurses working in HD units are frequently confronted with chronic HD patients who are verbally or physically violent or both. (Rowe & Sherlock, 2005). This is because dialysis patients might grow irritated in a variety of ways, which can lead to them being violent or aggressive. The heightened worry, and psychological and physical tiredness experienced by renal HCPs in the early stages of the outbreak, as evidenced by a qualitative finding of Mc Keaveney et al. (2021) led to issues in both their professional and personal life. Recent research of HCPs working in intensive care units (ICU) in the United Kingdom (UK) found a similar rate of emotional tiredness (38 percent), implying that renal HCPs are facing similar extraordinary workload demands as ICU (Vincent et al., 2019).

Limitations and Implications

Since the study was conducted during the pandemic, the study was restricted by health protocols and uncontrollable conditions that nurses experienced. The online survey resulted in poor engagement. The researchers believe that fewer restrictions and face-to-face data collection with a bigger sample size, specific moderating variables, and a more diverse population of nurses may result in more valid results.

Conclusion

The study was done to determine the relationship between the Big Five personality traits and the perceived stress of nurses during the COVID-19 pandemic. The result revealed a moderate level of the Big Five personality traits and perceived stress among nurses during COVID-19. There was a negative correlation between conscientiousness, agreeableness, and emotional stability/neuroticism to the perceived stress level. Furthermore, the stress level has no significant difference in age, gender, and years of service. However, results show that stress level has a significant difference in hospital units superficially between the *dialysis and multiple unit* and *pediatrics and multiple unit* relationships. The result of the study proved that nurses do experience moderate stress levels during a pandemic and that hospital units are a significant variable that contributes to the stress of nurses. It also proves that the personality traits of nurses were at moderate levels but that there is a significant negative correlation between conscientiousness, agreeableness, and emotional stability/neuroticism to the perceived stress level. Meaning as conscientiousness, agreeableness, and emotional stability/neuroticism increase, the perceived stress level decreases.

With the outcome of this study, nurses may be encouraged to identify their personality traits and stress level to improve themselves during pandemics and other stressful situations. The researchers concluded that nurses were able to overcome and adapt to the stimulus which is COVID-19 after 2 years since it stemmed in Wuhan, China. Based on our data in and in relation to a study by Sehularo et al. (2021), nurses show that they were able to overcome the stimuli and have developed their own coping mechanisms to manage stress. Nurses were able to lessen the effect of COVID-19 on their stress levels which is reflected in the moderate stress levels within the data. The result of the research displays that with a negative correlation as this, strengthening the notable traits, (Conscientiousness, Agreeableness, and Neuroticism) can result in lower stress levels. Conscientious individuals are known to be structured, detail-oriented, focused, thoughtful, and careful (Srivastava & John, 1999). Individuals with a dimension of agreeableness show traits such as confidence, empathy, love, and altruism. Neuroticism takes into account how likely a person can fall into depression, emotional

stability, moodiness, and one's ability to feel adverse emotions through difficult situations. (Power & Pluess, 2015). In a study by Shahzad et al., conscientiousness, agreeableness, and neuroticism traits are used as positive indicators of job performance in professions involving interpersonal interactions. Namely, the agreeableness and neuroticism traits are shown to be strongly related to jobs of performance where employees work interdependently with their peers (Shahzad, 2013). This may aid additional knowledge for awareness and understanding of nurses' own personalities which can help them manage their stress during pandemics and increase job performance overall. Nurses and administration of hospitals may also be inclined to improve services and or education to counter potential stressors that may increase one's stress level in relation to specific personality aspects such as conscientiousness, agreeableness, and emotional stability/neuroticism. This research may also be a foundation for other studies to further research about personality traits and stress levels of nurses during pandemic or stress-inducing situations.

References

- [1] Akyol, P. Y., Acar, H., Çakır, A., Saraçoğlu, G., & Topal, F. E. (2021). Determining the level and causes of anxiety related to pandemic of healthcare professionals working in the emergency department. *The American Journal of Emergency Medicine*.
<https://doi.org/10.1016/j.ajem.2021.09.010>
- [2] AL-Omiri, M. K., Alzoubi, I. A., Al Nazeh, A. A., Alomiri, A. K., Maswady, M. N., & Lynch, E. (2021). COVID-19 and Personality: A Cross-Sectional Multicenter Study of the Relationship Between Personality Factors and COVID-19-Related Impacts, Concerns, and Behaviors. *Frontiers in Psychiatry*, 12. <https://www.frontiersin.org/article/10.3389/fpsy.2021.608730>
- [3] Aschwanden, D., Strickhouser, J. E., Sesker, A. A., Lee, J. H., Luchetti, M., Stephan, Y., Sutin, A. R., & Terracciano, A. (2021). Psychological and behavioural responses to Coronavirus disease 2019: The role of personality. *European Journal of Personality*, 35(1), 51–66.
<https://doi.org/10.1002/per.2281>
- [4] Cai, H., Tu, B., Ma, J., Chen, L., Fu, L., Jiang, Y., & Zhuang, Q. (2020). Psychological Impact and Coping Strategies of Frontline Medical Staff in Hunan Between January and March 2020 During the Outbreak of Coronavirus Disease 2019 (COVID-19) in Hubei, China. *Medical Science Monitor : International Medical Journal of Experimental and Clinical Research*, 26, e924171-1-e924171-16. <https://doi.org/10.12659/MSM.924171>
- [5] Chekole, Y. A., Yimer Minaye, S., Mekonnen Abate, S., & Mekuriaw, B. (2020). Perceived Stress and Its Associated Factors during COVID-19 among Healthcare Providers in Ethiopia: A Cross-Sectional Study. *Advances in Public Health*, 2020, e5036861.
<https://doi.org/10.1155/2020/5036861>
- [6] Chew, N. W. S., Lee, G. K. H., Tan, B. Y. Q., Jing, M., Goh, Y., Ngiam, N. J. H., Yeo, L. L. L., Ahmad, A., Ahmed Khan, F., Napoleon Shanmugam, G., Sharma, A. K., Komalkumar, R. N., Meenakshi, P. V., Shah, K., Patel, B., Chan, B. P. L., Sunny, S., Chandra, B., Ong, J. J. Y., ... Sharma, V. K. (2020). A multinational, multicentre study on the psychological outcomes and associated physical symptoms amongst healthcare workers during COVID-19 outbreak. *Brain, Behavior, and Immunity*. <https://doi.org/10.1016/j.bbi.2020.04.049>
- [7] Çınar, D., Kılıç Akça, N., Zorba Bahçeli, P., & Bağ, Y. (2021). Perceived stress and affecting factors related to COVID-19 pandemic of emergency nurses in Turkey. *Journal of Nursing Management*, 29(7), 1916–1923. <https://doi.org/10.1111/jonm.13329>
- [8] Cohen, S. (n.d.). PERCEIVED STRESS SCALE. 5.
- [9] Coronavirus disease (COVID-19) outbreak. (n.d.). Retrieved November 29, 2020, from <https://www.euro.who.int/en/health-topics/health-emergencies/coronavirus-covid-19>
- [10] Cui, S., Jiang, Y., Shi, Q., Zhang, L., Kong, D., Qian, M., & Chu, J. (2021). Impact of COVID-19 on Anxiety, Stress, and Coping Styles in Nurses in Emergency Departments and Fever Clinics:

- A Cross-Sectional Survey. *Risk Management and Healthcare Policy*, 14, 585–594.
<https://doi.org/10.2147/RMHP.S289782>
- [11] Divinakumar, K. J., Bhat, P. S., Prakash, J., & Srivastava, K. (2019). Personality traits and its correlation to burnout in female nurses. *Industrial Psychiatry Journal*, 28(1), 24–28.
https://doi.org/10.4103/ipj.ipj_52_19
- [12] Elbqry, M. G., Elmansy, F. M., Elsayed, A. E., Mansour, B., Tantawy, A., Eldin, M. B., & Sayed, H. H. (2021). Effect of COVID-19 stressors on healthcare workers' performance and attitude at Suez Canal university hospitals. *Middle East Current Psychiatry*, 28(1), 4.
<https://doi.org/10.1186/s43045-021-00084-x>
- [13] Ervasti, M., Kallio, J., Määttä, I., Mäntylä, J., & Jokela, M. (2019). Influence of Personality and Differences in Stress Processing Among Finnish Students on Interest to Use a Mobile Stress Management App: Survey Study. *JMIR Mental Health*, 6(5), e10039.
<https://doi.org/10.2196/10039>
- [14] Hosseini, Z., Hazavehei, M. M., Imanzad, M., Ghanbarnezhad, A., & Gharlipour, Z. (2014). Occupational Stress and Mental Health Relationship in Nurses. *Advances in Nursing & Midwifery*, 23(82), 55–62.
- [15] Hu, D., Kong, Y., Li, W., Han, Q., Zhang, X., Zhu, L. X., Wan, S. W., Liu, Z., Shen, Q., Yang, J., He, H.-G., & Zhu, J. (2020). Frontline nurses' burnout, anxiety, depression, and fear statuses and their associated factors during the COVID-19 outbreak in Wuhan, China: A large-scale cross-sectional study. *EClinicalMedicine*, 100424.
<https://doi.org/10.1016/j.eclinm.2020.100424>
- [16] Huang, L., Xu, F. ming, & Liu, H. rong. (2020). Emotional responses and coping strategies of nurses and nursing college students during COVID-19 outbreak. *MedRxiv*, 2020.03.05.20031898. <https://doi.org/10.1101/2020.03.05.20031898>
- [17] Karkar, A., Dammang, M. L., & Bouhaha, B. M. (2015). Stress and burnout among hemodialysis nurses: A single-center, prospective survey study. *Saudi Journal of Kidney Diseases and Transplantation: An Official Publication of the Saudi Center for Organ Transplantation, Saudi Arabia*, 26(1), 12–18. <https://doi.org/10.4103/1319-2442.148712>
- [18] Karsten, J., Penninx, B. W. J. H., Riese, H., Ormel, J., Nolen, W. A., & Hartman, C. A. (2012). The state effect of depressive and anxiety disorders on big five personality traits. *Journal of Psychiatric Research*, 46(5), 644–650. <https://doi.org/10.1016/j.jpsychires.2012.01.024>
- [19] Lai, J., Ma, S., Wang, Y., Cai, Z., Hu, J., Wei, N., Wu, J., Du, H., Chen, T., Li, R., Tan, H., Kang, L., Yao, L., Huang, M., Wang, H., Wang, G., Liu, Z., & Hu, S. (2020). Factors Associated With Mental Health Outcomes Among Health Care Workers Exposed to Coronavirus Disease 2019. *JAMA Network Open*, 3(3), e203976–e203976.
<https://doi.org/10.1001/jamanetworkopen.2020.3976>
- [20] Lee, J.-Y., Kim, M., Jhon, M., Kim, H., Kang, H.-J., Ryu, S., Kim, J.-M., & Kim, S.-W. (2021). The association of gratitude with perceived stress among nurses in Korea during COVID-19 outbreak. *Archives of Psychiatric Nursing*, 35(6), 647–652.
<https://doi.org/10.1016/j.apnu.2021.10.002>
- [21] Lim, A. (2020). The Big Five Personality Traits.
- [22] Lowe, S., Mazure, C., & Pietrzak, R. (2020). Examining the Psychological Resilience of COVID-19 Health Care Providers. <https://medicine.yale.edu/news-article/examining-the-psychological-resilience-of-covid-19-health-care-providers/>
- [23] Mc Keaveney, C., Reid, J., Carswell, C., Bonner, A., de Barbieri, I., Johnston, W., Maxwell, A. P., O'Riordan, J., Strini, V., Walsh, I., & Noble, H. (2021). Experiences of renal healthcare practitioners during the COVID-19 pandemic: A multi-methods approach. *BMC Nephrology*, 22(1), 301. <https://doi.org/10.1186/s12882-021-02500-0>
- [24] Milojevic, P., Osborne, D., & Sibley, C. G. (2014). Personality resilience following a natural disaster. *Social Psychological and Personality Science*, 5(7), 760–768.
<https://doi.org/10.1177/1948550614528545>

- [25]Najimi, A., Goudarzi, A. M., & Sharifirad, G. (2012). Causes of job stress in nurses: A cross-sectional study. *Iranian Journal of Nursing and Midwifery Research*, 17(4), 301–305.
- [26]Nashwan, A. J., Abujaber, A. A., Villar, R. C., Nazarene, A., Al-Jabry, M. M., & Fradelos, E. C. (2021). Comparing the Impact of COVID-19 on Nurses' Turnover Intentions before and during the Pandemic in Qatar. *Journal of Personalized Medicine*, 11(6), 456.
<https://doi.org/10.3390/jpm11060456>
- [27]Power, R. A., & Pluess, M. (2015). Heritability estimates of the Big Five personality traits based on common genetic variants. *Translational Psychiatry*, 5(7), e604–e604.
<https://doi.org/10.1038/tp.2015.96>
- [28]Que, J., Shi, L., Deng, J., Liu, J., Zhang, L., Wu, S., Gong, Y., Huang, W., Yuan, K., Yan, W., Sun, Y., Ran, M., Bao, Y., & Lu, L. (2020). Psychological impact of the COVID-19 pandemic on healthcare workers: A cross-sectional study in China. *General Psychiatry*, 33(3), e100259.
<https://doi.org/10.1136/gpsych-2020-100259>
- [29]Ranieri, J., Guerra, F., Perilli, E., Passafiume, D., Maccarone, D., Ferri, C., & Di Giacomo, D. (2021). Prolonged COVID 19 Outbreak and Psychological Response of Nurses in Italian Healthcare System: Cross-Sectional Study. *Frontiers in Psychology*, 12.
<https://www.frontiersin.org/article/10.3389/fpsyg.2021.608413>
- [30]Rossi, R. (2020). Mental Health Outcomes Among Frontline and Second-Line Health Care Workers During the Coronavirus Disease 2019 (COVID-19) Pandemic in Italy | Critical Care Medicine | JAMA Network Open | JAMA Network.
<https://jamanetwork.com/journals/jamanetworkopen/fullarticle/2766378>
- [31]Rowe, M. M., & Sherlock, H. (2005). Stress and verbal abuse in nursing: Do burned out nurses eat their young? *Journal of Nursing Management*, 13(3), 242–248.
<https://doi.org/10.1111/j.1365-2834.2004.00533.x>
- [32]Rudman, A., Gustavsson, P., & Hultell, D. (2014). A prospective study of nurses' intentions to leave the profession during their first five years of practice in Sweden. *International Journal of Nursing Studies*, 51(4), 612–624. <https://doi.org/10.1016/j.ijnurstu.2013.09.012>
- [33]Sehularo, L. A., Molato, B. J., Mokgaola, I. O., & Gause, G. (2021). Coping strategies used by nurses during the COVID-19 pandemic: A narrative literature review. *Health SA Gesondheid*, 26, 1652. <https://doi.org/10.4102/hsag.v26i0.1652>
- [34]Shahzad, Y. (2013). Job Performance and Conscientiousness (SSRN Scholarly Paper ID 2478561). Social Science Research Network. <https://doi.org/10.2139/ssrn.2478561>
- [35]Sharma, P., Davey, A., Davey, S., Shukla, A., Shrivastava, K., & Bansal, R. (2014). Occupational stress among staff nurses: Controlling the risk to health. *Indian Journal of Occupational and Environmental Medicine*, 18(2), 52–56. <https://doi.org/10.4103/0019-5278.146890>
- [36]Srivastava, S., & John, O. (1999). The Big Five Trait Taxonomy: History, Management, and Theoretical Perspective. The Guilford Press, 2nd, 102–138.
- [37]Sutin, A. R., Luchetti, M., Aschwanden, D., Lee, J. H., Sesker, A. A., Strickhouser, J. E., Stephan, Y., & Terracciano, A. (2020). Change in five-factor model personality traits during the acute phase of the coronavirus pandemic. *PLoS ONE*, 15(8).
<https://doi.org/10.1371/journal.pone.0237056>
- [38]Vincent, L., Brindley, P. G., Highfield, J., Innes, R., Greig, P., & Suntharalingam, G. (2019). Burnout Syndrome in UK Intensive Care Unit staff: Data from all three Burnout Syndrome domains and across professional groups, genders and ages. *Journal of the Intensive Care Society*, 20(4), 363–369. <https://doi.org/10.1177/1751143719860391>
- [39]Zhang, X., Wang, Y., Lyu, H., Zhang, Y., Liu, Y., & Luo, J. (2021). The Influence of COVID-19 on the Well-Being of People: Big Data Methods for Capturing the Well-Being of Working Adults and Protective Factors Nationwide. *Frontiers in Psychology*, 12.
<https://www.frontiersin.org/article/10.3389/fpsyg.2021.681091>

Priestly Pressure: A Thematic Analysis of Seventh-day Adventist Pastor Stress Experience in Singapore During COVID-19 Pandemic

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Abstract: The impact of COVID-19 on mental health has received significant attention. However, the data remains limited when it comes to examining clergy persons. This study explores the stress experience of pastors in the ongoing COVID-19 pandemic. Six Seventh-day Adventist pastors currently working in Singapore were interviewed for the research. Using the thematic analysis approach, three specific themes emerged from the interview. Pastors experienced stress from three primary sources: people, policy, and perspective. Interaction with others, both professional and in private life, causes pastors to have stressful experiences. Second, the impact of COVID-19 on how the church operates during the pandemic creates stress for the pastor, particularly in ensuring that the church complies with the regulations imposed by the constantly changing authorities. Lastly, pastors develop stress from their personal view of their role in ministry, feeling insecure about themselves. The findings from this study contrast with similar studies from others, indicating a potential distinctive socioeconomic factor that may play some role in the type of stress a pastor undergoes.

Keywords: *pastoral ministry, stress, mental health, COVID-19, Singapore*

Introduction

Stress is a universal experience that affects everyone. In almost every aspect of life, an individual will encounter some form of stress of varying severity. Occupational-related stress easily comes as one area where an individual can experience stress. While pastoral ministry tends to place itself as a unique career field, it is not spared from encountering stress. On the contrary, due to their special place in society, the risk of stress for pastors can come from many angles.

As the world continues to battle the COVID-19 pandemic that has affected people across the globe, the virus has presented a distinctive challenge, especially in the areas of life that involve social interaction. The virus' easily transmissible nature through aerial droplets and close contact has severely affected human social interaction, particularly in areas of life that involve public gatherings and social activities. Across the world, constant lockdowns and the suspension of social gatherings have been mandated in one form or another. Some of the lockdowns even involved a nationwide shutdown of public activities. These changes have had a tremendous impact on how society runs, including how churches run their services and activities. In the last two years since the COVID-19 pandemic, worship services and religious activities across the world have been suspended. Navigating through all these changes is the pastor. The pastor is often perceived as the pillar of strength and hope in a crisis. In times of distress, people tend to look to their religious leaders for counsel and support. People frequently have high expectations and hopes for pastors. Yet, COVID-19 brings a set of challenges that are new and unique to the world of pastoral ministry.

The study on stress and the COVID-19 pandemic has emerged as one of the vital research areas. However, in the context of pastoral ministry, especially in Southeast Asia, the available data on the topic remains significantly limited.

This paper is designed to provide data on the experience of the Seventh-day Adventist (SDA) pastors to investigate the impact of the pandemic on the lives and ministries of clergy members, specifically related to the experience of stress among the pastors. The data collected in the study may be used to facilitate further research into understanding the mental health challenges that pastors are facing in

their service, specifically due to the COVID-19 pandemic, and designing an intervention step to help pastors function better in their ministry.

Literature Review

Pastoral Ministry during COVID-19 Pandemic

As the COVID-19 pandemic is still ongoing in 2022 (although quite limited) a steady emergence of literature about pastors and the pandemic can be observed. According to an Italian report, pastors were at the forefront of the battle against COVID-19, providing spiritual assistance, moral support, and religious rites to both patients and healthcare workers while serving without personal protective equipment (Chirico & Nucera, 2020). Osei-Tutu et al. (2021) indicated that pastors were actively preaching the message of hope to sustain the faith of their members while promoting hygienic practices and reducing the stigma toward those infected by the COVID-19 virus. In terms of religious rites and traditions in the church, such as baptismal and communion services, the pastor also needs to modify their way of conducting these rituals to reduce the risk of COVID-19 transmission (Budaev, 2021). Such adaptation may not come quickly for some since breaking tradition may be considered sinful. Such sentiment is naturally expected since, for Christians, rituals are the platform of transcendence with the divine (Norman & Reiss, 2020). Sandwiched between the two fields, pastors went through the tension of theological correctness with a public health concern. The concern over severe limitations for conducting religious rites is particularly significant in rituals such as funeral services. Bidding farewell to loved ones in normal circumstances can be challenging for many. Wake and funeral services provide a platform for those left behind to grieve and mourn. However, during the COVID-19 pandemic, such a platform was severely limited, leaving a stronger feeling of loss to those left behind (Fernández & González-González, 2022). The pastors often must conduct the funeral services on their own without the presence of anyone else. Pastors will need to carry the burden of the family while also needing to comfort and give strength to the bereaved family. Such demand may take an intense toll on the well-being of pastors. In terms of church service disruption, pastors are going through a struggle in their ministry, too. Levin (2020) pointed out that some clergymen play a negative role in the spread of COVID-19 by promoting pseudoscientific information about the virus leading to misinformation and disinformation among their parishioners. Further, spreading this misinformation often with a Christian nuance, such as associating the pandemic with demonic power or conspiracy theories (Sturm & Albrecht, 2021).

The Effect of COVID-19 On Stress

Interest in examining the impact of COVID-19 on mental health continues to emerge as complementary to the knowledge generated about the virus and its effects on physical health. Since the area covered in that topic is reasonably broad, works of literature relatable to the research topic are discussed here. In comparing two significant world economies, the United States and China, Wang et al. (2021) showed that cultural and economic factors contribute to COVID-related stress development. Thus, social factors are a significant determinant in increasing COVID-related stress. Complementing the study by Wang, a result from Italy, also reported by Prati (2021), shows that house size, financial loss, and media exposure increase mental health problems related to COVID-19.

Hofmann (2021) identifies that families are particularly affected by COVID due to the increased tension in parenting during the pandemic. While Perkins et al. (2022) show that sibling conflict increased due to the COVID-19 pandemic.

Material and Methods

Data Collection

The pen-ended thematic analysis method is often used to explore the pattern of specific themes in certain phenomena (Braun & Clarke, 2021; Kiger & Varpio, 2020; Maguire & Delahunt, 2017). The focus of the investigation is to examine how participants experienced the COVID-19 pandemic as a pastor in their professional and private lives. The second focus of the study is to explore the experience of how the church's minister adapted to the pandemic from the perspective of their prominent leader.

Ethical Protocol

The study received approval from the Singapore Adventist Conference (SAC) Administrative Committee. Before the research was conducted, all participants received the information sheet on the purpose and methods of the research. The content of the information sheet includes the clause that all participants were free to withdraw from the study at any time should they wish to do so. Finally, all participants consented to participate in the research and the recording of the interviews, which were transcribed with no personal identification markers in the manuscript. Interviews were stored in a secured computer, with the researcher as the only one who could access the information. Since the interview was conducted using teleconference tools, the researcher ensures that during the interview, no eavesdropping may occur, and the interview process is completed privately and confidentially, including running the interview in an empty room and using headphones as the listening devices.

Interview Process

The interview was prearranged at a mutually agreed time via teleconference meeting. The interview was designed as a semi-structured interview, and the question guide was provided as the baseline for further exploration based on the topic of interest. Some questions in the interview are specifically designed to explore the experience of stress that the participants went through during the COVID-19 pandemic. Where appropriate, the researcher will prompt each participant to give additional details to their answer to expand their responses with more relevant insight.

Participants

All participants are SDA pastors currently working for the SAC and holding long-term residency status in Singapore as Singaporean citizens, permanent residents, or long-term work visa holders. All participants joining the research were over the age of 21 and are full-time, paid employees of the SDA church. Six participants were interviewed for the study. These 6 participants represent 85% of all the English-speaking pastors working for SAC. In the last three years, all participants have been serving in one of the SDA Churches in Singapore; thus, they have been fully engaged with the dynamics of the church ever since the emergence of the COVID-19 pandemic in late 2019.

All the pastors participating in the research are married. Therefore, data on the dynamics of their family life was able to be obtained as well. Such information is critical since pastors' family life significantly influences the dynamics of their professional service (Johnson, 2010.; Koenig & Langford, 1998; Lee, 2017).

Data Analysis

The transcribed manuscript of the interview went through coding stages for analysis. The researcher analyzes the transcripts to identify emerging themes from the interview. Special attention is given to identifiable overarching expressions. Finally, once themes were fully confirmed, the write-up commenced.

Results

Since this research aims to identify emerging themes in the source of stress and to cope response of pastors, the result of the study will be divided into two sections. Section one will show themes that emerge in stress sources of the pastor, while the second section will deal with coping among pastors.

General Result: Stress Experience

None of the participants expect COVID-19 will affect their ministry, let alone their entire life. As all of them expressed, most participants perceive the virus as something that will only be a localized problem or not affect their church in Singapore.

Pastor(P) 1: "All I thought about is just something from China. That's all. I don't think it was anything serious. That was honestly. Ok lah, whatever lah. Yeah, it will be something that will phase out. I don't think it was something that is global. I think it's something that is local. It will pass on its own. I think (some) news came strongly on December 2019. I am aware at that time; it was in the news. But I didn't think it will be something that is serious. Because it never crossed my mind."

P5: "I cannot recall definitely but probably January 2020, so initial response was like more like probably it will just be like the other outbreaks won't really affect me. You know."

P3: "I don't (think) it was anything big. I thought it will only stay in China. I don't think it's going to be a big deal. just it going to be a little bit obvious. This new disease in China. I don't think it was a big deal. Not at that time. Because you hear new diseases all the time you will never think it will be a global pandemic."

P6: "I thought it would be another virus like SARS, so not too serious, maybe just need to do some precautions like temperature taking and maybe and, just a pandemic but not that serious just like we have SARS in 2003, I think. Definitely not in the beginning, but once we have the lockdown in Singapore, I think in April then I started to realize that from then on ministry will never be the same."

P4: "This is another wave of virus spreading around and it will also go away."

P2: "My initial thought was it's like SARS it won't be too contagious, it will stay the region, the infection that the optimistic side.... I thought it will be like only certain (region) affected and it will subside. Cos, we have a similar thing with MERS a few years ago. So, I thought it will be similar to that I didn't imagine to be this extent."

As the COVID-19 virus progressed into a pandemic, all participants started to experience some form of stress related to the effect the COVID-19 pandemic brought. Three primary themes emerged from the data analysis conducted on the coding. These themes are conveniently identified as three P's: people, policy, and personal. A more detailed result is shown below:

Theme 1: People

A robust and consistent theme emerges among all participants: they undergo significant stress due to constant exposure to other people. All participants encounter having to deal with people in their professional and private lives at home with their spouses and children. All participants expressed that the stress they experienced was not a burst of an intense stressor but rather a build-up matter that came slowly, not as a significant stressor. However, as the problem constantly happens in their life, the situation becomes a stress for them.

Sub-theme 1: Members of the Church

All participants expressed that their interaction with their church members is one of the primary sources of stress they encountered. In the context of the COVID-19 pandemic, participants described several specific situations where the interaction with members brought stress to pastors. First, there are two schools of thought among members that are in tension with each other, and the pastor needs to be at the center of it. On one side, some congregation members perceived the virus as a serious threat, and there is a need for the church to take reliable measures to mitigate the spread of the virus. These strong measures include shutting down the church's physical operation and switching the service to online services. However, on the other hand, another group of members perceived that the threat of the virus was an exaggerated reaction; therefore, the church should not cease to operate. This tension between the two opposing sides put pastors in a challenging situation, as some of the participants expressed it:

P1: "One member felt we should prepare for live (streaming) right. Because of the unknown. So, I think, I think that is when things start to blow out. Oh! the church should close! So already start to have two camps. Camp A, they might (go) by faith. We, the Lord will protect us, you know. Then camp B, Oh No! You know. We should be wise enough to close the church. So how?"

P2: "A lot (of challenges) but I think the biggest one for was balancing disagreeing parties, you know, it became very divisive, there was to stand on many things, in the beginning, like to shut the church, or to keep it open; Or to later on to the health protocol, how strict we gonna be then finally as we all struggling with the vaccination, for and against to stand in between that and not to take side for the right reason, so that still today, I feel, I am affected to the fact I have lost some relationship because of not that i have done anything but because they think I have chosen a side in this whole situation, and they have cut themselves from us. That has been the biggest challenge for me."

As shown above, the polarized tension where pastors must be stretched in between not only due to the restriction of service but to some other areas of tension, particularly regarding COVID-19 Vaccination. Other participants expressed their reflections on how some of his members turned unkind towards him.

P3: "You might have seen in Singapore there were some messages going on, so some of my church members join the (messaging) group. I saw one of my church members inside. They quite like (my church) but they join this kind of chat to fight COVID restriction. Then there is this other member who didn't have these extreme views but now everything come out then everything pops out. All the anti-vax come out, all the strong things come out, like COVID kind of show people's true colours. It showed the church true colour."

The second area of stress related to pastors' encounters with members happened due to the loss of interaction with them. Since COVID-19 enforced strict social interaction, particularly early in the pandemic, many participants expressed their sense of loss in their interaction with members. These are some excerpts of the expression of loss that the participants said.

P1: "I think as a, you know, person I guess there is a shift you know because i am an outgoing type of person, like to be with people. I think the pandemic has moved me away from doing that."

P4: "I am a person who like to travel and to meet people, visit them and socialize, and these are not possible during this pandemic so that is the one that puts me in challenging situation, a little bit in difficult situation."

Not only that the participants experience an immediate loss as the pandemic started to affect the church, but some participants expressed the loss that they witnessed even as the pandemic entered a milder stage in the late part of 2021, as shown below:

P5: "I think, I am not sure if this is what you are looking for, but members become more distant or become more, they are not so involved so they become not so enthusiastic, or things like that."

In the bigger picture, participants also express the loss they witnessed in terms of members not returning to church since they are used to participating from their homes. One participant said it in this way:

P3: "I think that every church experience a loss in the pandemic, where people stop coming, especially among the younger generation, and this is the lost generation, that is very hard to bring back, when they've gotten used to online and eventually not watching at all, when they have gotten loose to little social interaction, and the bond more than one young adults have told me that I don't feel close to the people in church anymore, so I don't feel like coming, so that loss is the biggest negative part in the church, the negative part is that relationship is lost in the past two years, many of them will never rebuild again"

Sub-theme 2: Family-related Stressor

The pastor has to deal with stress from interaction with people in their professional settings and the challenges that come from family members. Due to the COVID restriction, all participants need to start to do their work from home, and some of the obstacles been expressed in the interview, such as:

P3: "It's hard to work especially from home with two young kids, they were very young. To work in the room where my wife attending to the kids outside it's not easy. Parenting from home with kids it's tough while working. I think that is one of the challenges that we face."

P4: "most of the time it's my wife that has to be my full-time assistant to help me with the technical support that I need for the operation of the system and everything. So also pass my stress to her. The vibration passes down to her"

Theme 2: Policy

The second theme that consistently emerged during the interview is the stress pastors undergo when managing the church during the pandemic. Some of the challenges show some overlapping with encountering people. However, some significant distinctive expressions were observable in the coding sequence; thus, the theme is categorized separately from the earlier theme.

Sub-theme 1: Government Policy

Among all the expressions recorded in the interview, the constant change in government regulation forced pastors to change how the local church should run rapidly. The stress in managing how to run the church is mainly at the beginning of the pandemic. It is much related to navigating through the unknown while having to be responsible for the church, as expressed by many of the participants:

P1: "So the stress happens I guess, the significant challenge was to follow the different phases and implement every phase of those rules. That time it comes so many. You know. It's like boom."

P2: "because of the government regulations I have to vet through a lot of documents that comes sporadically actually consistently about different changes and find ways to apply it to the church. And as I tell people I felt I am a full-time safety management officers and part time pastors during the pandemic. That part of the job was pretty overwhelming because not only I have to understand, I have

to then convinced my board to adopt then find a suitable way to implementing it then communicate it with was quite stressful to have to do it consistently because it has to keep changing."

P5: "I think it's still added on to the stress, especially in the pandemic as the rules keep changing. So, we have to apply and communicate. I think this is a very not just tedious but it the constant change makes it very hard to do."

P6: I don't know if challenges is the right word, I guess challenge can be the right word, but definitely I think all the government rulings that keep changing last time in 2020, I think definitely create a lot of work, thankfully we don't have to keep submitting document anymore, but last time it keeps changing, every week they keep changing we spend a day doing a lot times I can say so I think that would be one"

In addition to the constant change of policy, the tension also emerges from a different view of the government and local church management

P3: Although my church was not that keen to close but, in the end, doesn't matter because government mandate.

Sub-Theme 2: Local–Regional Coordination

Participants also expressed some tension regarding the dynamics between their local church responsibility and the upper leadership direction. Most participants expressed the pressure they encountered due to impractical demands from the upper-level management that created increased pressure on the local church level, as described below:

P1: "They were overcompensating, so they double down on their surveillance on pastor. So, Tuesday we must meet, to see we are actually working, I think there is where the stress coming in. And things are implemented (in the way that) you meet this week, next week you want it to be implemented, how can it be implemented? We are not even meeting members."

The tension is relatively high, especially at the beginning of the pandemic.

P4: "I carefully following the directives of the Conference, try to follow all the measurement."

P1: "You know, even before (the authorities) announce, I think there was a huge stress from us where some churches closed already. Even though it was not announced, you remember those time. Our conference is not willing to close, some churches want to close. We are like oh! We should not be the one! So, the whole debates start to come out in Singapore right now, at that time. So, the strain is, do we close the church or go online? Then the government haven't said anything yet at that time. So that is one of the stresses."

Theme 3: Personal Struggle

Beyond the external factor of stress, some unique emotional issues of pastors caused increased tension in their experienthrough the pandemic. The first struggle is to deal with the sense of not doing enough and putting the value of work as a way to measure self-value. As two participants expressed it:

P6: "I think this one I will be honest, I would say that I didn't cope very well in the beginning, I think it's started in April, so we are doing sermon, then we are doing editing on the video, and meeting, and it was simply overwhelming, working day and night, and learning a lot of new things at the same time. Every time I manage to ease myself a bit I was thinking it's the time for me to add something more, since there are things that I haven't done."

P2: "I think for me, at the very beginning of the pandemic, I faced a challenge because, I was unable to do anything, number one, in fact, it comes to the point that I felt useless... I don't know about you, but it was at that level to the point because i was not able to do anything members felt like the pastor is not doing anything.... I felt like I was not doing anything at all."

Discussion

As far as the knowledge of the researcher, to date, this study is the first research ever being done among SDA Pastors in Singapore. Therefore, plenty of knowledge gaps need to be explored, and the findings here are considered in their earliest stage of development.

As shown in the result section, all pastors did not expect the pandemic to affect their ministry significantly. As a result, their stress response towards the change was considered a natural response to changes. The findings further indicate that conflict, especially in a situation where one party considers themselves in a disadvantaged position, may lead to a sense of job dissatisfaction. Choi (2013) indicates workplace conflict, mainly where dominant management culture is practiced as the norm, contributes significantly to job satisfaction. Pastors, especially in highly structured church organizations like the SDAs, often need to live up to the expectations of their administrators and also their members. Therefore, pastors may perceive their position as being at the receiving end of many demands and expectations during conflict resolution. Being in a place where they are limited to defending themselves may lead to the feeling of dissatisfaction with their work.

Additionally, mediating conflict for pastors may not come as an easy task. Often, pastoral decisions cannot be purely administrative since, in their role as pastors, they are also simultaneously playing the role of a peacemaker and keeper of God's flock. In a study by Faucett et al. (2013), role conflict and ambiguity was a vital factor for stress in pastoral work. This study further expands these findings by explaining how role conflict leads to increased pressure in pastoral ministry.

Findings on how family affects the stress level of pastors broadened the data from earlier results. Maina et al. (2018) indicate that pastors' children are negatively affected by their father's work, mainly administrative and pastoral care. The finding of this study adds new information in regards to the fact that from the perspective of the pastor—a forced situation where pastors need to work from home increases the stress of pastoral work. As the result of the study indicates, the stress is remarkably more substantial when the pastor has young children.

It is worth noting that stressful factors such as financial constraints or any other economic-related did not occur in the result. The absence of economic issues as the stressor is inconsistent with similar studies by Osei-Tutu, Kenin, et al. (2021) is found that financial constraints are one of the stress factors for pastors during COVID-19. The difference between the two findings is likely related to the geographical factor. Singapore is one of the wealthiest nations in the world, and financial security may not be the main stress factor for pastors in Singapore.

As the study shows, internal work of self-value increased the stress level of pastors in the area of personal struggle. When it comes to performance measurement, pastors often need to rely on external feedback to understand their effort's impact. Also, people usually associate pastoral work with the service sector. Therefore, customer satisfaction is often used to measure pastors' performance. The nature of the performance assessment of pastors that relies on external variables can make pastors feel inadequate or not good enough if they don't possess high internal self-esteem. When pastors rely too heavily on what people think and say about their ministry, it may make them feel that they need to continue to perform and satisfy their church members to feel good about themselves. Such unhealthy thinking patterns may lead to increased stress when pastors are limited in providing the best service to their members, such as in the COVID-19 situation.

Lastly, a change in pastoral working culture cannot be effective without organizational change. In contrast, While & Clark (2021) indicate that management's role in mitigating work-related mental health problems in the workplace is critical. The organizational structure of the SDA Church puts local church pastors under the direction of regional leaders such as the mission or conference administration. While these administrators may not be directly involved in the day-to-day activities of the local church, setting up policies to reduce work-related stress among pastors through intentional policy is critical in lowering potential pressure among pastors during a pandemic.

Conclusion

Public health crises such as the COVID-19 pandemic are unlikely to last. Emerging infectious disease problem is likely to be expected in the future. Based on the experience gathered from the present pandemic, work-related stress did affect many, including pastors. The unique role of pastors in the community and the broad coverage of pastoral work may lead pastors to experience mental health issues that can affect their professional and personal lives.

By nature, pastoral work often deals with interpersonal relationships with others. Due to the nature of pastoral ministry, conflict is unavoidable. Enhancing the skills necessary to deal with conflict is necessary to reduce stress among pastors.

The role of pastoral ministry will continue to remain significant in the church's life. The knowledge gained from this research can be a catalyst for the growth of research focused on helping pastors deal with their work challenges to enable them to continue providing optimal service for their parishioners.

References

- [1] Braun, V., & Clarke, V. (2021). Can I use TA? Should I use TA? Should I *not* use TA? Comparing reflexive thematic analysis and other pattern-based qualitative analytic approaches. *Counselling and Psychotherapy Research*, 21(1), 37–47. <https://doi.org/10.1002/capr.12360>
- [2] Budaev, S. (2021). Safety and Reverence: How Roman Catholic Liturgy Can Respond to the COVID-19 Pandemic. *Journal of Religion and Health*, 60(4), 2331–2352. <https://doi.org/10.1007/s10943-021-01282-x>
- [3] Chirico, F., & Nucera, G. (2020). An Italian Experience of Spirituality from the Coronavirus Pandemic. *Journal of Religion and Health*, 59(5), 2193–2195. <https://doi.org/10.1007/s10943-020-01036-1>
- [4] Faucett, J. M., Corwyn, R. F., & Poling, T. H. (2013). Clergy Role Stress: Interactive Effects of Role Ambiguity and Role Conflict on Intrinsic Job Satisfaction. *Pastoral Psychology*, 62(3), 291–304. <https://doi.org/10.1007/s11089-012-0490-8>
- [5] Fernández, Ó., & González-González, M. (2022). The Dead with No Wake, Grieving with No Closure: Illness and Death in the Days of Coronavirus in Spain. *Journal of Religion and Health*, 61(1), 703–721. <https://doi.org/10.1007/s10943-020-01078-5>
- [6] Hofmann, S. G. (2021). The Impact of COVID-19 on mental health. *Cognitive Behaviour Therapy*, 50(3), 185–190. <https://doi.org/10.1080/16506073.2021.1897666>
- [7] Johnson, L. (2010). *Exploring the Relationship Between Work, Family and Religion Among Clergy Families*. 300.
- [8] Kiger, M. E., & Varpio, L. (2020). Thematic analysis of qualitative data: AMEE Guide No. 131. *Medical Teacher*, 42(8), 846–854. <https://doi.org/10.1080/0142159X.2020.1755030>
- [9] Koenig, H., & Langford, D. L. (1998). *The Pastor's Family: The Challenges of Family Life and Pastoral Responsibilities* (1st Edition). Routledge.
- [10] Lee, A. A. (2017). *Ministry, Longevity, Family Contentment, and The Male Clergy Family: A Phenomenological Study of the Experience of Ministry*. 262.

- [11]Levin, J. (2020). The Faith Community and the SARS-CoV-2 Outbreak: Part of the Problem or Part of the Solution? *Journal of Religion and Health*, 59(5), 2215–2228.
<https://doi.org/10.1007/s10943-020-01048-x>
- [12]Maguire, M., & Delahunt, B. (2017). *Doing a Thematic Analysis: A Practical, Step-by-Step Guide for Learning and Teaching Scholars*. 8(3), 14.
- [13]Maina, J. W., Kaaria, Z., & Kivanguli, G. (2018). Effect of Pastor's Church Ministry on their Family Stability in Nairobi County, Kenya. *European Scientific Journal, ESJ*, 14(29), 36.
<https://doi.org/10.19044/esj.2018.v14n29p36>
- [14]Norman, Z., & Reiss, M. J. (2020). Risk And Sacrament: Being Human In A COVID-19 World. *Zygon®*, 55(3), 577–590. <https://doi.org/10.1111/zygo.12618>
- [15]Osei-Tutu, A., Affram, A. A., Mensah-Sarbah, C., Dzokoto, V. A., & Adams, G. (2021). The Impact of COVID-19 and Religious Restrictions on the Well-Being of Ghanaian Christians: The Perspectives of Religious Leaders. *Journal of Religion and Health*, 60(4), 2232–2249.
<https://doi.org/10.1007/s10943-021-01285-8>
- [16]Osei-Tutu, A., Kenin, A., Affram, A. A., Kusi, A. A., Adams, G., & Dzokoto, V. A. (2021). Ban of Religious Gatherings during the COVID-19 Pandemic: Impact on Christian Church Leaders' Well-Being in Ghana. *Pastoral Psychology*, 70(4), 335–347. <https://doi.org/10.1007/s11089-021-00954-5>
- [17]Perkins, N. H., Rai, A., & Grossman, S. F. (2022). Physical and Emotional Sibling Violence in the Time of COVID -19. *Journal of Family Violence*, 37(5), 745–752.
<https://doi.org/10.1007/s10896-021-00249-6>
- [18]Prati, G. (2021). Mental health and its psychosocial predictors during national quarantine in Italy against the coronavirus disease 2019 (COVID-19). *Anxiety, Stress, & Coping*, 34(2), 145–156. <https://doi.org/10.1080/10615806.2020.1861253>
- [19]Sturm, T., & Albrecht, T. (2021). 'Constituent Covid-19 apocalypses: Contagious conspiracism, 5G, and viral vaccinations.' *Anthropology & Medicine*, 28(1), 122–139.
<https://doi.org/10.1080/13648470.2020.1833684>
- [20]Wang, C., Tripp, C., Sears, S. F., Xu, L., Tan, Y., Zhou, D., Ma, W., Xu, Z., Chan, N. A., Ho, C., & Ho, R. (2021). The impact of the COVID-19 pandemic on physical and mental health in the two largest economies in the world: A comparison between the United States and China. *Journal of Behavioral Medicine*, 44(6), 741–759. <https://doi.org/10.1007/s10865-021-00237-7>
- [21]While, A. E., & Clark, L. L. (2021). Management of work stress and burnout among community nurses arising from the COVID-19 pandemic. *British Journal of Community Nursing*, 26(8), 384–389. <https://doi.org/10.12968/bjcn.2021.26.8.384>

Lifestyle Factors of Allied Health Students Before and During the COVID-19 Pandemic

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Abstract: The COVID-19 pandemic restrictions and emergency transition to online classes have an impact on the lifestyle of students. Allied health students, as future healthcare providers, should serve as role models in practicing a healthy lifestyle. This study focused on the lifestyle factors in terms of diet quality, physical activity, sleep, and study habits of allied health students before and during the COVID-19 pandemic. Descriptive design was utilized. The 145 allied health students at a university in the Philippines enrolled in the academic year 2020-2021 were purposively sampled. The test of differences in the lifestyle factors before and during the COVID-19 pandemic showed significant differences in all the lifestyle factors ($p = .000$). The findings revealed that diet quality ($M = 2.14$; $M = 2.79$) and study habits ($M = 1.90$; $M = 2.19$) were significantly higher while physical activity ($M = 2.14$; $M = 1.80$) and sleep ($M = 1.91$; $M = 1.62$) were significantly lower during the COVID-19 pandemic. Therefore, both positive and negative impacts of the pandemic were evident in the lifestyle of the allied health students. Interventions are recommended to further improve the lifestyle factors of the allied health students, especially physical activity and sleep.

Keywords: *COVID-19, diet quality, physical activity, sleep, study habits*

Introduction

The spread of coronavirus disease (COVID-19) forced an emergency transition to online classes across the world with little preparation for faculty and students (Symonds, 2020). These restrictions, while important preventive measures to protect the health of the public, drastically affect individuals' daily lifestyle habits. Staying at home affects diet, choice of food, and reduces physical activity (Górnicka et al., 2020; Pellegrini et al., 2020). Sleep quality worsened during lockdown among university students (Martínez-Lezaun et al., 2020). This shift to online classes decreased the motivation of the students to study (Symonds, 2020). Thus, the pandemic created a sense of panic and caused distraction from studying (Avila & Nicomedes, 2020). This study was conducted to determine the difference in lifestyle factors in terms of diet quality, physical activity, sleep, and study habits of allied health university students before and during the COVID-19 pandemic.

Allied health professionals play a very vital role in providing people with healthcare and services. Healthcare providers work hand in hand to identify, evaluate, and assess individuals for the prevention of diseases and disorders. The future healthcare providers, the allied health students, must also practice a healthy lifestyle, serving as role models to the community even during the pandemic.

Currently, to the best of our knowledge, there are no existing studies written in the Philippines regarding the comparison of the lifestyle factors of the allied health students before and during the pandemic. Thus, this study aimed to determine the difference in lifestyle factors among the allied health students before and during the COVID-19 pandemic. The lifestyle factors are in terms of diet quality, physical activity, sleep, and study habits.

Methodology

Research Design

This study utilized a descriptive design. It is used to obtain information that is focused on the latest status of the phenomenon or event as well as to describe the things that exist with respect to the variables or given conditions in a certain situation (Anastas, 2000). By using this design, the researchers were able to determine the differences in the lifestyle factors of the respondents before and during COVID-19.

Population and Sampling Techniques

The respondents of the study are allied health students at a university in the Philippines in the school year 2020-2021. Purposive sampling technique was utilized, a type of non-probability sampling where the researchers chose the sample that is best suited to the needs of the study and the characteristics of the population (Health Knowledge, 2018).

Instrumentation

The research used an online questionnaire administered via Google Forms. To establish the instrument's content validity, it was reviewed by experts in research, statistics, nutrition, and the English language. After revising the instrument based on experts' suggestions, it was submitted for ethical research review, and after its approval, a pilot study was conducted. The final questionnaire had five sections: (1) Profile of the Respondents which includes age, sex, year level, and program/degree; (2) diet quality; (3) physical activity; (4) sleep; and (5) study habits before and during the COVID-19 pandemic.

Data Analysis

The data gathered was encoded and analyzed using Statistical Package for Social Science (SPSS) software version 23. The specific statistical treatments that were used are descriptive and inferential statistics. Frequency distribution and percentage were utilized to determine the level of study habits of the respondents. Mean and standard deviation was used to determine the lifestyle factors, such as quality of diet, physical activity, and sleep, and the extent of participants' study habits. T-tests were used to examine the significant differences in the lifestyle practices of the students before and during the pandemic.

Ethical Considerations

In this study, the participants' participation was voluntary. To understand the individual's right to privacy, code numbers were used to obtain needed information while keeping the participants' information confidential and anonymous. The informed consent form was presented clearly and comprehensively, and each participant was given the right to not participate in the study by not saying yes to the consent form. The researchers collected the informed consent form along with the survey questionnaire via Google Forms submission.

Results and Discussion

The results presented in this section are the levels of lifestyle factors in terms of diet quality, physical activity, sleep, and study habits. The levels of the lifestyle factors were compared before and during the COVID-19 pandemic.

Level of Lifestyle Factors of the Allied Health Students before the COVID-19 Pandemic

Diet Quality

Table 1 shows that the respondents' overall diet quality mean score is 2.57, with a standard deviation of 0.52, indicating that their lifestyle factors in terms of diet quality were high before the COVID-19 pandemic. It also means that students are following the dietary principles of the food

pyramid by having low amounts of meat and fat while having high amounts of grains, fruits, and vegetables.

Table 1. *Diet Quality Before the COVID-19 Pandemic*

Items	Mean	SD	Scaled Response	Verbal Interpretation
1. 8 glasses of water	3.18	.79	5-7x/wk.	
2. 6 servings of Rice, Rice Products, Corn, Root crops, Bread, and Noodles daily	3.05	.97	5-7x/wk.	
3. 3 servings of vegetables	2.91	.96	5-7x/wk.	
4. 3 servings of fruit	2.51	.81	5-7x/wk.	
5. 3 servings of fish, shellfish, meat, poultry, dried beans, nuts	2.44	.88	2-3x/wk.	
6. 5 servings of sugar/sweets	2.42	.84	2-3x/wk.	
7. 6 servings of fats and oils	2.31	.87	2-3x/wk.	
8. 1 pc egg	2.16	.85	2-3x/wk.	
9. 1 serving of milk and milk products	2.08	.96	2-3x/wk.	
Diet Quality	2.57	.52	4-5x/wk.	High

Legend: 1.00-1.75 = 0-1 time per week (Very Low); 1.76-2.50 = 2-3 times per week (Low); 2.51-3.25 = 4-5 times per week (High); 3.26-4.00 = 6-7 times per week (Very High)

Physical Activity

Table 2 illustrates the level of physical activity of the respondents before the COVID-19 pandemic. The result shows a mean score of 2.14 (SD=.80), interpreted as *moderate* level of physical activity. In line with this, the study's findings show that sedentary lifestyle habits are becoming increasingly popular among young people aged 15 to 24. With the increasing rates of inactivity in this age range, WHO (2013) recommends the importance of physical activity for all ages.

Table 2. *Physical Activity before the COVID-19 Pandemic*

Physical Activity	Mean	SD	MET minutes per week	V. I.
Before COVID-19	2.14	.80	At least 600	Moderate

Legend: 1.00-1.66 = Less than 600 (Low); 1.67-2.33 = At least 600 (Moderate); High-2.34-3.00 = At least 3000 (High)

Sleep

Table 3 shows that the students have a mean score of 1.91 on sleep experience (SD =.39), which is interpreted as moderate sleep deprivation, indicating that they are not getting enough sleep. These findings agree with a study done among post-secondary students across eight Canadian institutions about health-risk behaviors, which states that 75.6% of students are sleep deprived (Kwan et al., 2013).

Table 3. *Sleep Before COVID-19 Pandemic Responses*

BEFORE COVID-19 pandemic, how often have you done or experienced the following?	Mean	SD	Scaled Response	V. I.
1. I was late in class because I overslept.	2.51	.69	Often	
2. Fallen asleep in class	2.23	.84	Rarely	

3. I Stayed up until 3 a.m. or later	2.23	.78	Rarely
4. I woke up too early in the morning and could not get back to sleep.	2.00	.95	Rarely
5. I have difficulty falling asleep	2.00	.92	Rarely
6. I feel refreshed after sleep.	1.96	.85	Rarely
7. I fell into a deep sleep	1.88	.83	Rarely
8. I was satisfied with my sleep	1.77	.87	Rarely
9. I have difficulty getting out of bed	1.75	.89	Never
10. I would like to sleep more after waking up.	1.75	.88	Never
11. Slept for 7-8 hours (Night Sleep)	1.68	.85	Never
12. I feel vigorous after sleep.	1.62	.80	Never
13. Slept on or before 9:00 PM	1.42	.89	Never
Sleep	1.91	.39	Rarely
			Moderate Sleep Deprivation

Legend: 1.00-1.75 = (Never) Severe sleep deprivation; 1.76-2.50 = (Rarely) Moderate sleep deprivation; 2.51-3.25 = (Often) Mild sleep deprivation; 3.26-4.00 = (Always) Optimal sleep

Out of 145 respondents, 61% got an average of seven hours of sleep but had additional naps within the day. Overall, the study concluded that the respondents did not have "beneficial sleeping habits." It shows that the majority of the respondents had at least seven hours of sleep, while the results in Table 3, Question 11 show that the respondents *never* got an average of seven hours of sleep at night, but both studies show the same overall results.

Study Habits

The fourth table shows the study habits results, which show that people had *poor* study habits prior to the COVID-19 pandemic, with an overall mean of 1.90 (SD =.50). According to Ayodele (2013), being organized, taking down notes, reading books, being attentive in class, and doing the task every day characterized good study habits, while bad habits included absenteeism, procrastination, and wasting much time on television, entertainment, and games. The findings agree with their research, as the respondents' attentiveness in class has a *mean* score of 1.61, or they never became attentive in class. In addition, the respondents *never* found a quiet place to study (M = 1.45). This indicates a lack of good study habits.

Table 4. Study Habits Before the COVID-19 Pandemic

Items	Mean	SD	Scaled Response	V. I.
1. Before the class starts, I review previous lessons.	2.46	.85	Rarely	
2. I check my lecture notes to ensure completeness of details after the lecture.	2.13	.82	Rarely	
3. Before I begin an assignment, I estimate the time to be spent on it.	2.08	1.02	Rarely	
4. I recite information that I remember after reading each section in a chapter	2.08	.94	Rarely	

5. I try to record everything the teacher says during the lecture.	2.08	.93	Rarely	
6. I follow a definite study schedule.	1.98	.84	Rarely	
7. I focus entirely on my schoolwork.	1.83	.73	Rarely	
8. I know what time of the day I choose to study.	1.77	.81	Rarely	
9. Before answering an essay question, I organize my thoughts first.	1.67	.69	Never	
10. I listen attentively to the discussion so that I will be able to understand the lesson.	1.61	.67	Never	
11. Before the end of class sessions, I make sure to know the assignments to be accomplished.	1.56	.68	Never	
12. I usually seek a quiet place whenever I study.	1.45	.69	Never	
Study Habits	1.90	.50	Rarely	Poor

Legend: 1.00-1.75 = (Never) Very Poor; 1.76-2.50 = (Rarely) Poor; 2.51-3.25 = (Often) Good; 3.26-4.00 = (Always) Very Good

Level of Lifestyle Factors of the Allied Health University Students During the COVID-19 Pandemic

Diet Quality

Table 5 depicts allied health students' diet quality during the COVID-19 pandemic, with a mean score of 2.79 and a standard deviation of .46 interpreted as *high*, indicating that the respondents' lifestyle factors in terms of diet quality remain *high* during the COVID-19 pandemic. The respondents' *high* diet quality suggests that students, particularly those enrolled in allied health programs, had the knowledge that diet quality affects academic performance and mental health (O'Sullivan et al., 2009). Thus, they have chosen to make healthy choices.

Table 5. *Diet Quality During the COVID-19 Pandemic Responses*

Items	Mean	SD	Scaled Response	V. I.
1. 8 glasses of water	3.40	.74	4-5x/wk	
2. 6 servings of Rice, Rice Products, Corn, Root crops, Bread, and Noodles daily	3.24	.91	4-5x/wk	
3. 3 servings of vegetables	3.04	.91	4-5x/wk	
4. 3 servings of fish, shellfish, meat, poultry, dried beans, nuts	2.74	.89	4-5x/wk	
5. 3 servings of fruit	2.69	.90	4-5x/wk	
6. 6 servings of fats and oils	2.51	.85	4-5x/wk	
7. 5 servings of sugar/sweets	2.63	.90	4-5x/wk	
8. 1 pc egg	2.44	.92	2-3x/wk	
9. 1 serving of milk and milk products	2.33	.96	2-3x/wk	

Diet Quality	2.79	.46	4-5x/wk	High
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Legend: 1.00-1.75 = 0-1 time per week (Very Low); 1.76-2.50 = 2-3 times per week (Low); 2.51-3.25 = 4-5 times per week (High); 3.26-4.00 = 6-7 times per week (Very High)

Physical Activity

Table 6 presents the level of physical activity of the respondents during the COVID-19 pandemic. The overall *mean* score for physical activity is 1.8, with a *standard deviation* of .78, indicating a *moderate* level. Górnicka et al. (2020) state that before the pandemic happened, physical inactivity was among the public's health concerns. Similarly, an international study indicates that the restriction during the pandemic increases the physical inactivity of individuals from five to eight hours per day. Thus, it is said that the COVID-19 pandemic worsened the public health problem.

Table 6. *Physical Activity before the COVID-19 Pandemic*

Physical Activity	Mean	SD	MET minutes per week	V. I.
During COVID-19	1.80	.78	At least 600	Moderate

Legend: 1.00-1.66 = Less than 600 (Low); 1.67-2.33 = At least 600 (Moderate); High-2.34-3.00 = At least 3000 (High)

Sleep

Table 7 shows the sleep experience of the allied health university students during the COVID-19 pandemic. The *mean* score of 1.62 with a *standard deviation* of .44, interpreted as severe *sleep deprivation*, indicates that during the pandemic, most allied health university students did not sleep enough, and the quality of their sleep was not optimal.

Table 7. *Sleep Quality During the COVID-19 Pandemic*

Items	Mean	SD	Scaled Response	V. I.
1. I was late in class because I overslept (I was not late in class because I did not oversleep.)	2.23	.76	Rarely	
2. I like to sleep more after waking up (I don't like to sleep more after waking up.)	2.09	.89	Rarely	
3. I woke up too early in the morning and can't get back to sleep (I don't wake up too early in the morning and can easily get back to sleep)	2.02	.94	Rarely	
4. I fall asleep in class (I did not fall asleep in class)	1.88	.90	Rarely	
5. I stayed up until 3 a.m. or later (I do not stay up until 3 a.m. or later)	1.86	.90	Rarely	
6. I fallen into a deep sleep (I do not fell into a deep sleep)	1.73	.86	Never	
7. I feel refreshed after sleep.	1.67	.88	Never	
8. I have difficulty falling asleep (I don't have difficulty falling asleep)	1.46	1.03	Never	
9. I feel vigorous after sleep.	1.38	.85	Never	
10. I was satisfied with my sleep	1.36	.86	Never	
11. Slept for 7-8 hours (Night Sleep)	1.31	.87	Never	
12. I have difficulty getting out of bed (I don't have difficulty getting out of bed)	1.23	1.00	Never	

13. Slept on or before 9:00 PM	.83	.82	Never	
Sleep	1.62	.44	Never	Severe Sleep Deprivation

Legend: 1.00-1.75 = (Never) Severe sleep deprivation; 1.76-2.50 = (Rarely) Moderate sleep deprivation; 2.51-3.25 = (Often) Mild sleep deprivation; 3.26-4.00 = (Always) Optimal sleep

In a study by Dragun et al. (2020), students during COVID lockdown feel more tired, despite having more sleep. This study supports the result that students are more likely to have *severe sleep deprivation* during the pandemic.

Study Habits

Table 8 presents the study habits of the allied health university students during the pandemic. The mean score is 2.18 with a standard deviation of .60, indicating poor study habits. According to a study carried out in India, students now spend more time studying online, and their study time has improved more than the time spent studying before the pandemic (Bongale et al., 2021). This may explain why there has been an improvement in study habits during the pandemic. But despite the improvement, the study habits of college students during COVID-19 remained poor.

Table 8. Study Habits during COVID-19 Pandemic

Items	Mean	SD	Scaled Response	V.I.
1. Before the class starts, I review previous lessons.	2.82	.77	Often	
2. I follow a definite study schedule.	2.50	.87	Rarely	
3. I check my lecture notes to ensure completeness of details after the lecture.	2.45	.88	Rarely	
4. I focus entirely on my schoolwork.	2.35	.83	Rarely	
5. I recite information that I remember after reading each section in a chapter	2.33	.96	Rarely	
6. Before I begin an assignment, I estimate the time to be spent on it.	2.19	1.08	Rarely	
7. I listen attentively to the discussion so that I will be able to understand the lesson.	2.15	.76	Rarely	
8. I know what time of the day I choose to study.	2.11	.97	Rarely	
9. I try to record everything the teacher says during the lecture.	1.95	.95	Rarely	
10. Before answering an essay question, I organize my thoughts first.	1.88	.82	Rarely	
11. Before the end of class sessions, I make sure to know the assignments to be accomplished.	1.87	.84	Rarely	
12. I usually seek a quiet place whenever I study.	1.60	.79	Never	
Study Habits	2.18	.60	Rarely	Poor

Legend: 1.00-1.75 = (Never) Very Poor; 1.76-2.50 = (Rarely) Poor; 2.51-3.25 = (Often) Good; 3.26-4.00 = (Always) Very Good

Difference of the Diet Quality of the Allied Health Students Before and During the COVID-19 Pandemic

This section illustrates the difference in diet quality among allied health university students before and during the COVID-19 pandemic. The results presented in Table 14 are the paired sample statistics, which measure the diet quality of the respondents before and during the COVID-19 pandemic.

Table 9. *Difference of the Diet Quality Before and During the COVID-19 Pandemic*

Diet Quality	N	Mean	SD	t-value	p-value	V. I.
Before COVID-19	145	2.14	.52	-5.67	.000	Significant
During COVID-19	145	2.79	.46			

$p < 0.05$

The results show a significant difference in the quality of students' diets before and during the COVID-19 pandemic, with a *mean* score of 2.57 before the pandemic and 2.79 during it, with a *p-value* of .000, indicating that the diet quality during the pandemic was significantly higher than the diet quality before the pandemic. These findings agree with a study conducted in Quebec, Canada, by Lamarche et al. (2021), where the researchers noticed a slight increase in the quality of the diet after the pandemic. It was attributed to the fact that the respondents started consuming whole grains, greens, plant proteins, and beans.

Difference of the Physical Activity of the Allied Health Students Before and During the COVID-19 Pandemic

Table 10 presents the difference between physical activity of allied health university students before and during the COVID-19 pandemic.

Table 10. *Difference of the Physical Activity Before and During the COVID-19 Pandemic*

Physical Activity	N	Mean	SD	t-value	p-value	V. I.
Before COVID-19	145	2.14	.80	5.03	.000	Significant
During COVID-19	145	1.80	.78			

$p < 0.05$

Findings showed a significant difference between the physical activity of allied health students before and during the COVID-19 pandemic. The mean of 2.14 before the COVID-19 pandemic and 1.80 during the COVID-19 pandemic with a *p-value* of .000 shows a significant difference. The mean difference of .34 shows that the physical activity level of the respondents during the COVID-19 pandemic was lower than before the pandemic.

The difference between having more physical activity before the pandemic and having it reduced during the pandemic could be attributed to different causes. According to Ammar et al. (2020), home confinement led to a decrease in physical activity of all intensity levels, including moderate, low, vigorous, and overall.

Difference of the Sleep Experience of Allied Health Students before and During the COVID-19 Pandemic

Table 11 illustrates the difference between the sleep quality of allied health university students before and during the COVID-19 pandemic. The results show the comparison of the sleep quality of the respondents before and during the COVID-19 pandemic, where the correlation and the *p-value*

determine if there is a significant difference in the measurement of variables in different situations and present the paired differences, which show how much the variable is affected.

Table 11. *Difference of the Sleep Quality Before and During the COVID-19 Pandemic*

Sleep Quality	N	Mean	SD	t-value	p-value	V. I.
Before COVID-19	145	1.91	.39	7.07	.000	Significant
During COVID-19	145	1.62	.44			

$p < 0.05$

The table illustrates that the difference in sleep quality before the pandemic, though both poor, was better than the sleep quality during the pandemic. The difference is significant. Sleep is one of the most important variables in defining a healthy lifestyle (Farhud, 2015). One study by Diniz et al. (2020) suggested that physical activity impacts sleep. Physical inactivity leads to a disturbed sleep pattern. Since the pandemic led to a decrease in physical activity, this may be one of the reasons why the sleep experience is deprived.

Difference of Study Habits of the Allied Health University Students Before and During the COVID-19 Pandemic

Table 12 presents the results on the difference in study habits of allied health students before and during the COVID-19 pandemic. The *mean* score of study habits before the COVID-19 pandemic was 1.90 compared to the mean score of 2.19 during the pandemic, showing a significant difference with a *p-value* of .000. The paired difference of -.29 indicates that the study habits of allied health university students during the pandemic were significantly higher than their study habits before the COVID-19 pandemic. Study habits contribute to the development of knowledge and perceptual capacities (Kumar, 2015; Rabia et al., 2017).

Table 12. *Difference in the Study Habits Before and During the COVID-19 Pandemic*

Study Habits	N	Mean	SD	t-value	p-value	V. I.
Before COVID-19	145	1.90	.50	-5.79	.000	Significant
During COVID-19	145	2.19	.60			

$p < 0.0$

Summary of Findings

The purpose of the study was to determine the lifestyle factors of the allied health students at one of the universities in the Philippines. The overall diet quality was significantly higher during the COVID-19 pandemic with a *mean* score of 2.79 (SD = 0.46) than the diet quality before the pandemic with a *mean* score of 2.57 (SD = 0.43), a *difference in the mean* of -0.22 (SD = 0.47) and a *p-value* of .000. The respondents' overall diet quality has improved during the COVID-19 pandemic. The interpretation for both values was interpreted as *high* (2.51-3.25). Among the lifestyle factors, diet quality has the biggest positive mean difference of 0.65, whereas the other variables have an average difference of 0.28.

Physical activity before the COVID-19 pandemic had a *mean* of 2.14 (SD = 0.80), and during the COVID-19 pandemic, the mean was 1.80 (SD = 0.778), a *difference in the mean* of 0.338 (SD=0.81) with a *p-value* of .000. The result shows a significant difference between the physical activity of the respondents before and during the COVID-19 pandemic, with more physical activity engagement among college students before the COVID-19 pandemic compared to the result during the COVID-19 pandemic. Among other variables, physical activity, with a *mean difference* of 0.338, was the most affected of all lifestyle factors during the COVID-19 pandemic. Therefore, the physical activity of allied health university students during the COVID-19 pandemic is significantly lower compared to the physical activity before the COVID-19 pandemic.

The respondents' overall sleep experience before the COVID-19 pandemic was a *mean* of 1.91 ($SD = 0.39$), but it decreased during the pandemic to 1.62 ($SD = 0.0366$), with a mean difference of 0.29 ($SD = 0.49$) and a *p-value* of .000. This shows that the sleep experience of the allied health university students was significantly lower during the COVID-19 pandemic than before the COVID-19 pandemic. This means that students tend to have less time to sleep during the COVID-19 pandemic than before the pandemic. As a result, the results were interpreted as *moderate sleep deprivation* (1.76-2.50).

Study habits before the pandemic had a mean of 1.90 ($SD = 0.50$), and during the pandemic, the *mean* was 2.19 ($SD = 0.60$). The *mean difference* was -0.30 ($SD = 0.606$) with a *p-value* of .000. The result shows that there is a significant difference between the study habits of the respondents before and during the COVID-19 pandemic. Therefore, the study habits of the allied health students were significantly higher during the COVID-19 pandemic. However, despite the improvement, study habits remained poor (1.76-2.50).

Conclusion

The study provides evidence on how the allied health students' lifestyle factors (diet quality, physical activity, sleep, and study habits) significantly changed because of the COVID-19 pandemic. Physical activity decreased during the pandemic but still stayed *moderate* compared to before COVID-19. And as for sleep, it shows *severe sleep deprivation* during the COVID-19 pandemic, compared to *moderate sleep deprivation* before the COVID-19 pandemic. However, study habits and diet quality were found to be better during the COVID-19 pandemic than before it. Therefore, the pandemic might not always bring negative effects, but depending on how the students respond to it, it can also bring positive effects.

Overall, the findings of this research have shown how the lifestyle factors of the allied health students have been affected. It was proven that there were changes in these students' lifestyle factors. Even though variables like diet quality and study habits, improved, there is a need for greater improvement. Physical activity and sleep were worsened during the pandemic. Therefore, both positive and negative effects of the pandemic are evident in the lifestyles of the respondents. The results of the study may help the participants with their daily choices of food, daily activities, sleep management, and study habits, which can affect their student life and future health.

Recommendations

Based on the findings of this study, the following recommendations are given to improve the lifestyle factors of allied health students:

1. Despite the improvement in study habits, the results were still rated as *rarely*, which should be taken in consideration, since the improvement did not reach *often*. Teachers may implement different teaching methods or teach the students different learning styles to aid this variable. Allowing students to take the "learning styles" quiz will also help them determine how they are able to learn the lessons. Teachers may use the results as a guide in dealing with students during the pandemic and find strategies on how to convey learning that will improve the students' lifestyle habits.

2. The allied health students, as health advocates, are role models when it comes to maintaining a healthy lifestyle. While they maintain a good diet, they should not neglect physical activity. They should also be motivated to do physical exercises, and if there are restrictions that affect their movement, there are many indoor exercises that they can substitute for outdoor exercises such as *Zumba*, which is very popular, workouts, and other physical exercises that will help them with their physical health. As a result, understanding how they can learn their lessons is critical in determining the styles that can assist them in learning.

3. A recommendation for future researchers would be an analysis between variables to see if one has a positive or negative correlation with the other, which would inform other researchers if one lifestyle variable could be changed to affect another variable. The researchers recommended surveying more respondents to have an equal number of participants among allied health students

for more accurate results. It is also recommended to further research physical activity since it has the highest mean difference, and how it might have negatively affected other lifestyle factors. A comparison of lifestyle changes within other colleges, not only within the allied health students but as a whole university, is also recommended. Within those parameters, each college could be compared to another to see if one lifestyle variable has a greater impact, either positively or negatively, in specific colleges.

4. An intervention to conduct a program and/or seminar that will enhance the study habits of allied health university students, especially in this online learning mode, is also recommended. Conducting weight loss and physical exercises for all students will be a good way of increasing the students' physical activity, especially during this pandemic.

Limitations

The study focused on the four lifestyle factors (diet quality, physical activity, sleep, and study habits) before and during the COVID-19 pandemic. Some of the instruments are questionnaires created by researchers that have undergone validation and reliability tests. The researchers administered an online survey to the respondents to ensure the safety of the researchers as well as the respondents. Therefore, possible biases might be found in self-reported responses, more so when they are done online. The researchers assured the respondents that their responses would be confidential for them to answer the questionnaires in an honest manner.

References

- [1] Ammar, et.al. (2020, June). Effects of COVID-19 Home Confinement on Eating Behaviour and Physical Activity: Results of the ECLB-COVID19 International Online Survey. Retrieved from National Library of Medicine: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7352706/>
- [2] Anastas, J. W. (2000). Research Design for Social Work and the Human Services. <https://doi.org/10.7312/anas1189>.
- [3] Avila, C. J. (2020, November 1). An Analysis on the panic durin COVID-19 Pandemic through an online form. Retrieved from National Library of Medicine: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7362858/>
- [4] Ayodele, C. &. (2013). Study Habits as Influence of Academic Performance of Students Nurses of Banquet State University. International Journal of Nursing Science, 5(2), 60-65.
- [5] Bongale et.al,. (2021, April 22). Effect of the Pandemic on Students' Learning Habits in India. Retrieved from Preprints: <https://www.preprints.org/manuscript/202104.0725/v1>
- [6] Diniz, et.al,. (2020, December 10). Reduction of Physical Activity Levels During the COVID-19 Pandemic Might Negatively Disturb Sleep Pattern. Retrieved from Frontiers in Psychology: <https://www.frontiersin.org/articles/10.3389/fpsyg.2020.586157/full>
- [7] Dragun, R., Veček, N. N., Marendić, M., Pribisalić, A., Đivić, G., Cena, H., Polašek, O., & Kolčić, I. (2020). Have Lifestyle Habits and Psychological Well-Being Changed among Adolescents and Medical Students Due to COVID-19 Lockdown in Croatia? *Nutrients*, 13(1). <https://doi.org/10.3390/nu13010097>
- [8] Farhud, D. D. (2015, November). Impact of Lifestyle on Health. Retrieved from National Library of Medicine: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4703222/>.
- [9] Górnicka, M. D. (2020). Dietary and Lifestyle Changes During COVID-19 and the Subsequent Lockdowns among Polish Adults: A Cross-Sectional Online Survey PLifeCOVID-19 Study. *Nutrients*, 2,4,11.
- [10] Kumar, S. (2015). Study Habits Of Undergraduate Students. *International Journal of Education and Information Studies*, 17-24.
- [11] Kwan, M. Y.-N. (2013). Prevalence of health-risk behaviours among canadian post-secondary students: Descriptive results from the national college health assessment. *BMC Public Health*, 13(1), 1-6. <https://doi.org/10.1186/1471-2458-13-548> .

- [12]Lamarche, et.al. (2021, April 6). Changes in diet quality and food security among adults during the COVID-19-related early lockdown: results from NutriQuébec. Retrieved from National Library of Medicine: <https://pubmed.ncbi.nlm.nih.gov/33398347/>
- [13]Martínez-Lezaun, Iratxe, Montserrat Santamaría-Vázquez, & Mario Del Líbano (2020). Influence of Confinement by COVID-19 on the Quality of Sleep and the Interests of University Students. *Nature and Science of Sleep* 12: 1075–81. <https://doi.org/10.2147/NSS.S280892>.
- [14]N/A. (2018). Methods of Sampling from a population. Retrieved from Health and Knowledge: <https://www.healthknowledge.org.uk/public-health-textbook/research-methods/1a-epidemiology/methods-of-sampling-population>
- [15]O'Sullivan, T., Robinson, M., & Kendall, G. (2009). A good-quality breakfast is associated with better mental health in adolescence. *Public Health Nutr* , 12: 249-258.
- [16]Rabia, M. ., Mubarak, N. ., Tallat, H. ., & Nasir, W. . (2017). A Study on Study Habits and Academic Performance of Students. *International Journal of Asian Social Science*, 7(10), 891–897. <https://doi.org/10.18488/journal.1.2017.710.891.897>
- [17]Symonds, Q. (2020, April 27). The impact of the coronavirus on global higher education. <https://info.qs.com/rs/335-VIN-535/image/The-impact-of-the-Coronavirus-on-GlobalHigher-Education.pdf>
- [18]WHO. (2020, November 26). Physical Activity. Retrieved from World Health Organization: <https://www.who.int/news-room/fact-sheets/detail/physical-activity>

Interpersonal Relationship, Communication skills as Correlates of Nursing Competency among Staff Nurses in a Private Tertiary Hospital

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Abstract: Interpersonal relationships and communication skills are essential to nurses in their workplace, and these skills tend to play an important role in developing the nursing competencies of staff nurses. Hence, the purpose of the study is to determine the relationship between interpersonal relationships and communication skills to nursing competency among staff nurses in a private tertiary hospital. A quantitative study employing descriptive, correlational, and comparative designs was conducted among 100 staff nurses using a self-structured questionnaire distributed via Google Forms. The data were analyzed using descriptive statistics using the mean, Spearman correlation coefficient, Shapiro-Wilk test, Kruskal-Wallis H test, and Dunn's test. The data revealed that interpersonal relationships and communication skills have a significant relationship with nursing competency ($p = <0.01$). In addition, among the moderating variables, significant differences were found between the years of service ($p = <0.01$) and age groups ($p = <0.01$). On the other hand, there is no difference in nursing competency in terms of gender ($p = .667$) or dialect spoken ($p = .058$). The result of the Post hoc-Dunn's Pairwise Comparison Test revealed that the age group has a significant difference from the others as well as in the years of service. Moreover, the test revealed that nursing competency increases as people get older and have more years of experience.

Keywords: *interpersonal relationship, communication skills, nursing competency*

Introduction

For decades, one of the most popular ideas in nursing literature is that interpersonal relationships and communication skills have an impact on nursing competency. Peplau viewed nursing as an interpersonal process between two or more individuals directed toward a therapeutic goal. Therapeutic goal attainment is achieved by the nurses' deliberate actions that occur in a sequence of phases. Skills in observation, assessment, communication, and evaluation serve as the basis for an interpersonal relationship. A study that was conducted by Santos (2019) emphasizes the important relationship between communication and the professional practice of nurses and the need to develop this competency during undergraduate nursing. Communication is a fundamental tool in the teaching and work processes of healthcare professionals, considering their relationships with nursing staff, the multidisciplinary team, patients, and families. One literature review consistently shows positive associations between caregiver communication behaviors and patient outcomes, such as patient recall, patient understanding, and adherence to therapy (King & Hope, 2013). There is a lot of strong evidence to support the argument that good communication skills are essential qualities for delivering patient-centered, value-based care. Multiple studies have linked improved communication to better patient outcomes, safer work environments, decreased adverse events, decreased transfer delays, and shorter stay lengths (Disch, 2012). The purpose of this study is to identify the extent of interpersonal relationships and communication skills, correlate them to nursing competency among staff nurses, and provide new information on how these variables are important in the nursing field. This study will also aid the nurses in improving their relations with patients, families, and co-health

workers. Many nurse practitioners wish to deepen their understanding of interpersonal relationships and communication skills in nursing situations in order that their work will be more effective and socially useful.

The purpose of the study is to determine the relation of interpersonal relationships and communication skills to nursing competency among staff nurses in a private tertiary hospital and to seek answers to the following questions:

What is the extent of interpersonal relationship of the staff nurses?

What is the extent of communication skills of the staff nurses?

What is the level of nursing competency of the respondents?

Is there a significant relationship between interpersonal relationships and nursing competency of the staff nurses?

Is there a significant relationship between communication skills and nursing competency of the staff nurses?

Is there a significant difference in the nursing competency of the staff nurses considering their age, sex, dialect spoken, and years of experience?

Methodology

Research Design

This study will employ quantitative research methods such as descriptive, correlation, and comparative design. The researchers used the descriptive method to determine the interpersonal relationships and communication skills of the nursing staff respondents as correlates of nursing competency and the correlational method to be able to examine the relationship between those variables. According to Ritchie et al. (2013), using the descriptive method enables researchers to perceive a large mass of the target population and make required conclusions about the variables, and by using the descriptive method, the researchers can efficiently design a pre-structured questionnaire with both open-ended and closed-ended questions. As for correlational design, it was stated by Curtis E.A. et al. (2016) that the researchers' findings from correlational research can be used to determine the prevalence and relationships among variables, as well as to forecast events from current data and knowledge. According to Salkind (2010), a comparative design is a research design that aims to find relationships between independent and dependent variables after an action or occurrence has already occurred. The researcher's aim is to determine whether the independent variable influenced the result, or the dependent variable, by comparing two or more groups of people or individuals.

Population and Sampling Technique

The study will be conducted in a private tertiary hospital, wherein the subjects of the study are the staff nurses. The researchers will define the population to conduct a sampling strategy; they will examine all the members of the population and then select members to make the sample. It will include 100 selected regular staff nurses in all areas and exclude nurses in OPD and supervisory from a private tertiary hospital. For this particular purpose, survey questionnaires will be sent via email to the respondents. In this study, the participants will be selected through simple random sampling, which is said to be the most efficient sampling procedure. By using this sampling method, the respondents of this study or each member of the population has an equal opportunity to be part of the sample; they can also be research participants. The researchers will examine the population of the private tertiary hospital and randomly select staff nurses working in the said hospital.

Instrumentation

The instruments are self-structured survey questionnaires. The randomly selected staff nurses working in private tertiary hospitals will be given survey questionnaires through online forms and

will be asked to answer the statements that are indicated. The questionnaire was divided into two parts. Part one consisted of the respondents' demographic profile, which included their age, gender, ethnicity, and years of service. Part two consisted of a total of eighty (48) given indicators: 16 about their interpersonal relationship, 16 on how they communicate, and 16 on how they evaluate their nursing competency.

Ethical considerations

This study will consider the ethical standard set by the university research center. After the approval of the ethical board, the researchers will proceed to conduct the study. WHO (2020) states that the standard of conduct for scientific researchers is regulated by research ethics. In order to protect the privacy, rights, and health of research participants, it is necessary to adhere to ethical principles. Consent will be obtained by the researchers from the informants. The information gathered in this study about the staff nurses is kept confidential and purely for research purposes. The data that is gathered will be used to observe interpersonal relationships and communication skills as correlates of nursing competency in staff nurses. The terms and regulations of the hospital are also stated on the consent form.

Analysis of Data

Analysis of quantitative data requires you to transform arbitrary statistics into useful data using logical and analytical reasoning. It may also involve the calculation of the frequencies of variables and variations between variables. Typically, a quantitative approach is concerned with seeking data that confirms or contradicts the theories you proposed in the earlier stages of your research process. (Saunders, M., Lewis, P., & Thornhill, A., 2012).

The researchers used descriptive statistics. The aim of descriptive research is to describe, justify, or support any sort of theory or conclusion when it comes to a particular group of people (Gutcheck, 2020). The researchers used correlational statistics to assess the relationship between variables which is interpersonal relationship and communication skills as correlates of nursing competencies.

According to Trochim (2020), to describe the basic features of the data in a study, descriptive statistics are used. They present simple summaries of the sample and the steps. They form the basis of every quantitative data analysis, along with simple graphics analysis. A Shapiro-Wilk test is a test of normality that is done to identify if a random sample comes from a population with a normal distribution (the data are sampled from a population that follows a normal distribution). The null hypothesis for this test is that the data are normally distributed. If the p-value is greater than 0.05, the null hypothesis is accepted. If the p-value is less than 0.05, the test rejects the hypothesis, indicating that the data significantly deviate from a normal distribution. Non-parametric tests will be utilized in analyzing the data if the hypothesis of normality is rejected (Prabhaker et al., 2019).

The Spearman correlation coefficient is a nonparametric correlation statistic that determines how strongly two rank-ordered variables are linked. It was created to assess the degree of association between two ordinal variables, but it may also be applied to interval and ratio variables. It is a reliable statistic that works well with ordinal variables with a small or big number of levels, and it's frequently used with interval/ratio variables that don't fit parametric statistics' normal distribution assumption (Frey, 2018).

he Kruskal-Wallis H test (also known as the "one-way ANOVA on ranks") is a rank-based nonparametric test that can be used to see if two or more groups of an independent variable on a continuous or ordinal dependent variable have statistically significant differences. It's a nonparametric alternative to the one-way ANOVA and an extension of the Mann-Whitney U test that allows you to compare more than two independent groups (Laerd Statistics, 2018). Dunn's Test can be used to determine

which means are significantly different from the rest. Dunn's Multiple Comparison Test is a non-parametric post hoc test, a distribution-free test that doesn't presume the data comes from a certain distribution (Glenn, 2017).

Findings/Results

This chapter includes the presentation, analysis, and interpretation of the data to establish the interpersonal relationship and communication skills as correlates of nursing competency among staff nurses in a private tertiary hospital.

Extent of interpersonal relationship of the staff nurses

The interpersonal relationships of the staff nurses maintain a positive ambience in their workplace. An interpersonal relationship is referred to as a strong tie between persons who work in the same organization. To do their best work, the staff nurses who work together should have a strong bond. The staff nurses must learn how to deal with each other to have healthy interpersonal dynamics and, as a result, a positive work environment.

Table 8. *Extent of interpersonal relationship of the staff nurses*

	Mean	SD	Interpretation
I am comfortable working with my fellow staff nurses.	4.24	.553	High
I respect my fellow staff nurses' by being open for suggestions.	4.55	.539	Very High
I feel that my fellow staff nurses are avoiding me.	4.11	.852	High
I prefer working alone than work in teams.	3.67	1.129	High
I feel that my fellow staff nurses trust me.	4.14	.493	High
My fellow staff nurses are friendly.	4.44	.538	High
I value my friendship with my fellow staff nurses.	4.63	.525	Very High
I handle conflicts among fellow staff nurses in an unbiased manner.	4.03	.745	High
My fellow staff nurses like to share their ideas with me.	4.16	.647	High
I feel that my fellow staff nurses find me easily approachable.	4.15	.757	High
I have trouble in maintaining friendly relationship with my fellow staff nurses.	3.89	1.136	High
I have the assurance that my fellow staff nurses will support me if I run into difficulties.	4.08	.748	High
My fellow staff nurses do not hesitate to point out my mistakes concerning work.	3.91	.767	High
I believe in teamwork to achieve quality care to patients.	4.62	.508	Very High
I feel that there is no point in arguing with my fellow staff nurses over work matters.	2.19	.895	Low
I interact with all my fellow staff nurses at the same level irrespective of cultural diversities.	4.29	.715	High
Interpersonal Relationship	4.0688	.29335	High

*Legend: 1.00 – 1.49 = **Very low**; 1.50 – 2.49 = **Low**; 2.50 – 3.49 = **Average**; 3.50 – 4.49 = **High**; 4.50 – 5.00 = **Very high***

Table 8 reveals the extent of the interpersonal relationships among the staff nurses. All responses suggested a high level of perceived interpersonal relationship with a grand mean of 4.0688 (SD = 0.29335). The highest mean is on item number 7, which stated, "I value my friendship with my fellow staff nurses." ($m = 4.63$, $SD = 0.525$) followed by item 14 which stated, "I believe in teamwork to

achieve quality care for patients." ($m = 4.62$, $SD = 0.508$). Results of this study is congruent with the study of Kalisch, Lee & Rochman, which demonstrate that within nursing teams, a higher level of teamwork and perceptions of adequate staffing leads to greater job satisfaction with current position and occupation.

Extent of communication skills of the staff nurses

Communication skills of the staff nurses, both verbal and written, are a vital aspect of the nursing profession. It enables nurses to be more effective in their responsibilities, resulting in improved healthcare efficacy, patient satisfaction, and the nurse's personal well-being. According to Vermeir (2015), effective communication and cooperation are necessary to offer high-quality treatment and patient safety. Poor communication can lead to many negative outcomes, such as discontinuity of treatment, malpractice, and compromising patient safety.

Table 9. *Extent of communication skills of the staff nurses*

	Mean	SD	Interpretation
When talking to my fellow staff nurses, I try to maintain eye contact.	4.39	.584	High
I can clearly convey instructions that I received to my fellow staff nurses.	4.28	.604	High
I can easily express myself in words to my fellow staff nurses.	4.05	.770	High
I listen attentively to what my fellow staff nurses say.	4.58	.572	Very High
I use body language and hand gestures in communicating with my fellow staff nurses.	3.97	.881	High
When I don't understand the instructions, I ask again.	4.46	.610	High
I recognize when my fellow staff nurse is listening to me.	4.28	.604	High
When I am listening to my fellow staff nurse, I try to understand what they are feeling.	4.41	.514	High
I make sure I understand what my fellow staff nurse is saying before I respond.	4.38	.528	High
I rephrase what my fellow staff nurse said, to make sure that I understood them.	4.25	.609	High
When one of my fellow staff nurses gets mad, I change my tone of voice to help calm them down.	4.18	.716	High
When my shift ends, I make sure to organize the information and details in my report to make sure that the report is understood by the next staff nurse.	4.35	.520	High
When I write something in (charts, notes, memos etc.), I make sure that it is clear and understandable.	4.25	.626	High
When talking in a phone, I make sure to repeat what they said for confirmation.	4.33	.587	High
I pose questions about unclear instructions of my fellow staff nurses.	4.14	.752	High
I organize my thoughts in my head before speaking.	4.25	.609	High
Communication Skills	4.2844	.36566	High

Legend: 1.00 – 1.49 = Very low; 1.50 – 2.49 = Low; 2.50 – 3.49 = Average; 3.50 – 4.49 = High; 4.50 – 5.00 = Very high

Table 9 reveals the extent of the communication skills of the staff nurses. All responses suggested a high level of perceived communication skills, with a grand mean of 4.2844 ($SD = 0.36566$). The highest mean is on item number 4, which stated, "I listen attentively to what my fellow staff nurses say," (m

= 4.58, SD = 0.572), followed by item 6, which stated, "When I don't understand the instructions, I ask again" ($m = 4.46$, SD = 0.610) and item 8, which stated, "When I am listening to my fellow staff nurse, I try to understand what they are feeling." ($m = 4.41$, SD = 0.514). Next, items numbers 15, 3, and 5 were placed on the list of items with the third lowest perceived importance, item 15, which stated, "I pose questions about unclear instructions of my fellow staff nurses" ($m = 4.14$, SD = 0.752), followed by item 3, "I can easily express myself in words to my fellow staff nurses" ($m = 4.05$, SD = 0.770), and item 5, "I use body language and hand gestures in communicating with my fellow staff nurses." ($m = 3.97$, SD = 0.881).

Level of nursing competency of the staff nurses

The nursing competency of the staff is acquired through their abilities and personal attributes essential to effectively executing their jobs while integrating many factors like information, procedures, attitude, thinking capacity, and values that are required in certain circumstances. According to Takase and Teraoka (2011), nursing competency is the capacity of a nurse to successfully display a set of attributes, such as personal characteristics, professional attitude, principles, knowledge, and skills, and to exercise his or her professional responsibilities.

Table 10. *Level of nursing competency of the staff nurses*

	Mean	SD	Interpretation
I can gather information through observation.	4.18	.687	High
I am confident in taking the vital signs of patients.	4.77	.468	Very High
I can independently administer prescriptions	4.09	.818	High
I can formulate nursing diagnosis through clinical judgment after reviewing all the gathered information for my patient's problem.	4.01	.643	High
I can confidently establish a priority in a set of diagnoses.	4.15	.657	High
I can identify patient's health problems.	4.02	.666	High
I make sure that information given to the patient is understood.	4.42	.516	High
I am able to delegate tasks to my fellow staff nurses to ensure smooth flow of care.	4.15	.757	High
I utilize information technology as a support in nursing care	4.22	.645	High
I evaluate patient education outcome.	4.28	.587	High
I evaluate patient's condition after applying nursing interventions	4.33	.604	High
I apply nursing interventions to every nursing problem identified	4.35	.609	High
I use objective data in planning for nursing interventions	4.42	.638	High
I use subjective data in planning for nursing interventions	4.39	.665	High
I motivate the patient to adhere to treatments	4.35	.575	High
I inform and educate individual patients and relatives about the treatment.	4.42	.589	High
Nursing Competency	4.2844	.40499	High

Legend: 1.00 – 1.49 = Very low; 1.50 – 2.49 = Low; 2.50 – 3.49 = Average; 3.50 – 4.49 = High; 4.50 – 5.00 = Very high

Table 10 reveals the extent of the nursing competency of the staff nurses. All responses suggested a high level of perceived nursing competency, with a grand mean of 4.2844 (SD = 0.40499). The highest

mean is on item number 2, which stated, "I am confident in taking the vital signs of patients" ($m = 4.77$, $SD = 0.468$), followed by item 7, which stated, "I make sure that information given to the patient is understood" ($m = 4.42$, $SD = 0.516$), item 13, which stated, "I use objective data in planning for nursing interventions" ($m = 4.42$, $SD = 0.638$), and item 16, which stated, "I inform and educate individual patients and relatives about the treatment." ($m = 4.42$, $SD = 0.589$). Next items number 3, 6 and 4 were placed on the third lowest perceived level, with number 3 stating, "I can independently administer prescriptions" ($m = 4.09$, $SD = 0.818$) followed by item 6: "I can identify patient's health problems" ($m = 4.02$, $SD = 0.666$), and item 4: "I can formulate nursing diagnosis through clinical judgment after reviewing all the gathered information for my patient's problem" ($m = 4.01$, $SD = 0.643$).

Relationship of Interpersonal Relationship and Nursing Competency

Improved work-related outcomes have been linked to positive interpersonal interactions with co-workers (Reich & Herscovis, 2011).

Table 11. *Relationship between interpersonal relationship and nursing competency of the staff nurses?*

Variable	Components	Nursing Competency
Interpersonal Relationship	Spearman's rho	.239*
	p-value	0.016
	N	100
	Verbal Interpretation	Significant

*. Correlation is significant at the 0.05 level (2-tailed).

Table 11 reveals that Interpersonal relationship has a significant relationship to nursing competency ($p = 0.016$).

Relationship of Communication Skills and Nursing Competency

The importance of communication in nurses' professional practice is emphasized, as is the need to build this competency during undergraduate nursing. When it comes to their relationships with nursing staff, multidisciplinary teams, patients, and families in health services, communication is a vital instrument in the education and work processes of professionals in this field (Santos et al., 2019). Good communication skills, on the other hand, can help nurses manage a wide range of stressors in their interactions with patients, family, and coworkers, increasing their perceived self-efficacy (Leal-Costa et al., 2020).

Table 12. *Relationship between communication skills and nursing competency of the staff nurses?*

Variable	Components	Nursing Competency
Communication Skills	Pearson's Correlation	.725**
	p-value	<0.01
	N	100
	Verbal Interpretation	Significant

**. Correlation is significant at the 0.01 level (2-tailed).

Table 12 reveals that nurses' Communication skills has a significant relationship to nursing competency ($p = <0.01$).

Nursing competency of the staff nurses related to:

Age

Age and a greater number of years of experience, promote the achievement of basic nursing competencies, such as patient knowledge and the nursing process (Yamamoto et al., 2021).

Table 13. *Difference in nursing competency according to age*

Age	N	Mean Rank	Kruskal-Wallis H	df	p value	Interpretation
23-29	43	36.79	20.137	2	<0.01	Significant
30-39	47	57.66				
40-49	10	75.80				
Total	100					

The significance level is .05

Table 14. *Post hoc - Dunn's Pairwise Comparison Test*

	Age	Test Statistic	p value	Interpretation
23 - 29	30 - 39	-20.869	.002	Significant
	40 - 49	-39.009	<0.01	Significant
30 - 39	40 - 49	-18.140	.216	Not Significant

The significance level is .05.

To determine the specific differences among groups, a post hoc analysis using Dunn's pairwise comparison test was done, as reflected on Table 14. Based on the results, significant differences were found between the age groups 23 to 29 years old and 30 to 39 years old ($p = .002$) and between 23 to 29 years old and 40 to 49 years old ($p = <0.01$). Staff nurses who are 23 to 29 years old (mean rank = 36.79) tend to have a lower level of nursing competency than those who are 30 to 39 years old (mean rank = 57.66), as well as than those who are 40 to 49 years old (mean rank = 75.80).

Sex

Table 15. *Difference in nursing competency according to sex*

Sex	N	Mean Rank	Mann-Whitney U	Z	p value	Interpretation
Male	40	48.98	1139.000	-.430	.667	Not Significant
Female	60	51.52				
Total	100					

The significance level is .050.

Based on the results, there is no significant difference in nursing competency according to the nurses' gender.

Conflicting results were found in the study of Rizany et al. (2018), who stated that male nurses are more competent than female nurses because male nurses provide better quality care while female nurses provide better quantity care to patients.

Dialect Spoken

Table 16. *Difference in nursing competency according to dialect spoken*

Dialect Spoken	N	Mean Rank	Kruskal-Wallis H	df	p value	Interpretation
Tagalog	52	44.35	5.699	2	.058	Not Significant
Bisaya/Ilonggo/Hiligaynon	27	60.48				
Ilocano/Bicolano	21	52.90				
Total	100					

The significance level is .050.

Table 16 reveals that there is no significant difference in nursing competency according to the nurses' dialect.

Years of experience

Table 17. *Difference in nursing competency according to years of service*

Years of Experience	N	Mean Rank	Kruskal-Wallis H	df	p value	Interpretation
6 months - 1 year	7	13.43	32.159	3	<0.01	Significant
2 - 3 years	24	35.21				
3 - 4 years	22	45.89				
5 years or greater	47	65.99				
Total	100					

The significance level is .050.

Table 18. *Post hoc - Dunn's Pairwise Comparison test of years of experience*

	Years of Service	Test Statistic	p value	Interpretation
6 months – 1 year	2 – 3 years	-21.780	0.480	Not Significant
	3 – 4 years	-32.458	0.059	Not Significant
	5 years or greater	-52.561	<0.01	Significant
2 – 3 years	3 – 4 years	-10.678	1.000	Not Significant
	5 years or greater	-30.781	<0.01	Significant
3 – 4 years	5 years or greater	-20.103	.043	Significant

The significance level is .05.

To determine the specific differences among groups, a post hoc analysis using Dunn's pairwise comparison test was done, as reflected on Table 18. Based on the results, significant differences were found between the years of service: 6 months to 1 year and 5 years or greater ($p = <0.01$), 2 to 3 years and 5 years or greater ($p = <0.01$) and 3 to 4 years and 5 years or greater ($p = 0.043$). Staff nurses who have 6 months to 1 year of service (mean rank = 13.43), 2 years to 3 years (mean rank = 35.21), and 3 to 4 years of service tend to have a lower level of nursing competency than those who have 5 or more years of service (mean rank = 65.99).

Discussion

Extent of interpersonal relationship of staff nurses

An employee's interpersonal interaction with his or her coworkers is crucial to career and job success. Valuing friendship with coworkers and building a particular link with them creates job achievement, happiness, and success because of the good interpersonal relationship that develops (Satyendra, 2014). Although nurses desire autonomy, they also require the support of solid interpersonal interactions. Interpersonal relationships build the foundation that nurses need to engage therapeutically with other people (Travelbee, 1964). Interpersonal relationships develop over time because of excellent team engagement. On the other side, when a member quits the group and ceases communicating, these ties may suffer (Obakpolo, 2015). The consolidation of interpersonal relationships among nursing professionals can lead to improvements with medical professionals, with positive impacts on patient safety and efficiency (Migowski et al., 2018).

Extent of communication skills of staff nurses

Active and attentive listening is vital to communication. The level of communication is raised by paying close attention to what is being said. Listening is a vital skill for developing interpersonal skills, and failure to listen gives the impression that other people are unimportant. The ability to listen is crucial to professional success, and listening to coworkers can help meet expectations, prevent disagreements and misunderstandings, and easily complete any assignment (Unnati, 2022). Nurses who pay attention to the person who is talking can build trusting connections. They can put their patients' and families' best interests first, as well as the interests of their team members. They do this by doing more than simply remaining silent or giving someone their whole attention. Body language, facial expressions, attitude, and conduct are all things they pay attention to (Gelinas, 2018). Communication benefits not only the patients but also the nurses. Nurses who interact well with their coworkers increase morale and job satisfaction (Vertino, 2014).

Level of nursing competency of the staff nurses

Vital sign measurement and recording are key skills for nurses working in all clinical settings. The vital signs are used to establish a baseline for a patient's current health state, and vital signs have a great impact on the health of a patient (Cox, 2009). The capacity to explain and make sure it is understood, listen, and empathize with patients and colleagues can have a significant impact on individual and organizational performance in terms of clinical quality, patient experience, and financial outcomes (Merlino, 2017). In nursing, objective data is a component of the health assessment process, which entails gathering information through observation. The senses of sight, hearing, smelling, and touching are employed in the health care setting to obtain information about the patient. Gathering objective data is important in nursing planning and in the assessment of patients (Alida, 2021). Patient education is essential because it helps patients better comprehend the treatments available to them. It also enables doctors and other medical professionals to assist people in making educated healthcare decisions, which promotes quality care for the patient (Wilson, 2021).

Relationship of Interpersonal Relationship and Nursing Competency

When organizations create positive interpersonal interactions, others tend to follow the example, further developing a sense of community (Baker & Dutton, 2007). In addition to formal professional interactions, informal relationships (i.e., those that develop outside of the business) are linked to better work and personal results. Coworker attraction, for example, improves teamwork, communication, and cooperation (Mainiero, 1989). Workplace friendships have been linked to various favorable outcomes, including higher job satisfaction, job involvement, job performance, team cohesion, organizational commitment, and lower turnover intentions (Berman, West, & Richter, 2002; Feeley, Hwang, & Barnett, 2008; Riordan & Griffeth, 1995; Winstead, Derlega, Montgomery, & Pilkington, 1995)

Relationship of Communication Skills and Nursing Competency

According to previous research, health professionals' communication skills are associated with more positive health outcomes, such as patient satisfaction, treatment adherence, and improvements in quality-of-care indicators (Beach et al., 2005; Stiefel et al., 2010; Uitterhoeve et al., 2010; Barth and Lannen, 2011; Lenzi et al., 2011; Bernard et al., 2012; Rezaei and Askari, 2014; Scholl et al., 2014; Capone, 2016). If nurses have good communication skills, they will feel safer and more competent, which will help them improve their interpersonal relationships. As a result, nurses are able to effectively manage a wider range of stressors, enhancing their self-efficacy (Leal-Costa et al., 2020).

Nursing competency of the staff nurses related to age

According to Rizany et al. (2018), nurses' age affects nursing competency. As nurses grow older, they attain more experience and learning which results in higher nursing competency. Nurses who were older and had more work experience were thought to be more qualified.

Nursing competency of the staff nurses related to dialect spoken

In contrast to the previous study by Shamsi et al. (2020), in healthcare, linguistic problems cause miscommunication between medical professionals, lowering both parties' satisfaction and compromising the quality of service and patient safety.

Nursing competency of the staff nurses related to years of experience

According to Fukada (2018), nurses with 5 years of clinical experience had significantly higher proficiency in direct, everyday care compared with nurses with only 1 year of experience. They had learned to make proper clinical judgments, conduct planned nursing care, and evaluate outcomes to deliver care that addressed individual health needs.

Limitations and implications

This study set out to investigate the relationship between interpersonal relationships and communication skills to nursing competency among staff nurses and determine which among the independent variables significantly affect nursing competency. The limitation of the study is that the data will be collected in one tertiary hospital in Manila, and the survey time frame is between January and February only. The nursing competency questionnaire will be self-reported by the staff nurses and not evaluated by the supervisor due to the excessive number of nurses and time constraints.

Based on the results, it implies that the staff nurses perceive that they have a good interpersonal relationship with each other, as they also believe in their skills and ability to communicate with their fellow staff nurses. It shows that when staff nurses value, respect, and work together, they form a good relationship with each other and perceive that their communication skills with their fellow staff nurses are high, which positively affects their nursing competency as well as their work performance.

Conclusion

This study set out to investigate the relationship between interpersonal relationships and communication skills to nursing competency among staff nurses and determine which among the independent variables significantly affect nursing competency. It was found out that the respondents' interpersonal relationship and communication skills were as high as they perceived them to be. Further, the results revealed that staff nurses' perceptions of interpersonal relationships and communication skills are positively correlated to nursing competency. On the other hand, although there is no difference in nursing competency between male and female respondents or their dialect spoken, the age and years of experience of the respondents significantly predict their nursing competency.

References:

- [1] Alida D. (2021). Objective Data in Nursing: Definition & Examples - Video & Lesson Transcript. Study.Com. Retrieved March 18, 2022, from <https://study.com/academy/lesson/objective-data-in-nursing-definition-examples.html>
- [2] Al Shamsi, H., Almutairi, A. G., Al Mashrafi, S., & Al Kalbani, T. (2020). Implications of Language Barriers for Healthcare: A Systematic Review. *Oman medical journal*, 35(2), e122. <https://doi.org/10.5001/omj.2020.40>
- [3] Berman, E. M., West, J. P., & Richter, M. N. (2002). Workplace relations: Friendship patterns and consequences (according to managers). *Public Administration Review*, 62, 217-230
- [4] Butts, J. B., & Rich, K. L. (Eds.) (2015). *Philosophies and theories for advanced nursing practice* (2nd ed.). Jones & Bartlett Learning, LLC.
- [5] Cox, C. (2009). *Physical Assessment for Nurses* (2nd edn.). West Sussex, UK: Blackwell Publishing, Ltd.

- [6] Disch, J. (2012). Teamwork and collaboration. In G. Sherwood & K. Barnsteiner (Eds.), *Quality and safety in nursing: A competency approach to improving outcomes* (1st ed.) Ames, Iowa: John Wiley & Sons, Inc.
- [7] Frey, B. (2018). The SAGE encyclopedia of educational research, measurement, and evaluation (Vols. 1-4). Thousand Oaks,, CA: SAGE Publications, Inc. doi: 10.4135/9781506326139
- [8] Fukada, M. (2018). "Nursing Competency: Definition, Structure and Development." Yonago Acta
- [9] Medica 61, no. 1: 1–7. "Gender Issues: Communication Differences in Interpersonal Relationships." Accessed July 2, 2020. <https://ohioline.osu.edu/factsheet/FLM-FS-4-02-R10>.
- [10] Gelinas, L. (2018, October 9). Listening as a caring competency. American Nurse. <https://www.myamericannurse.com/listening-caring-competency/>
- [11] King, A., & Hoppe, R. B. (2013). "Best practice" for patient-centered communication: A narrative review. *Journal of Graduate Medical Education*, 5(3), 385–393.
- [12] Leal-Costa, C., Gonzales, S.T., Ramos-Morcillo, A. J., Ruzafa-Martínez, M., Agea, J. L. D., & Roman, C. J. (2020). Communication Skills and Professional Practice: Does It Increase Self-Efficacy in Nurses. *Frontiers in Psychology*. Volume 11. <https://www.frontiersin.org/article/10.3389/fpsyg.2020.01169>
- [13] Mainiero, L. A. (1989). Office romance: Love, power, and sex in the workplace. New York: Rawson Associates.
- [14] Merlino, J. (2017). Communication: A Critical Healthcare Competency. Patient Safety & Quality Healthcare. Retrieved March 18, 2022, from <https://www.psqh.com/analysis/communication-critical-healthcare-competency/>
- [15] Prabhaker, M., Pandey, C. M., Singh, U., Sahu, C., & Keshri, A. (2019). Descriptive Statistics and Normality Tests for Statistical Data. *Annals of Cardiac Anaesthesia*. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6350423/>.
- [16] Rizany, I., Hariyati, R. T. S., & Handayani, H. (2018). Factors that affect the development of nurses' competencies: A systematic review. *Enfermería Clínica*, 28, 154–157. [https://doi.org/10.1016/S1130-8621\(18\)30057-3](https://doi.org/10.1016/S1130-8621(18)30057-3)
- [17] Saunders, M., Lewis, P. & Thornhill, A. (2012) "Research Methods for Business Students" 6th edition, Pearson Education Limited. "Interpersonal Communication Competence Scale: Brazilian Translation, Validation and Cultural Adaptation." Accessed August 10, 2020.
- [18] Santos, J., Copelli, F., Balsanelli, A. P., Sarat, C., Menegaz, J., Trotte, L., Stipp, M., & Soder, R. M. (2019). Interpersonal communication competence among nursing students. *Revista latino-americana de enfermagem*, 27, e3207. <https://doi.org/10.1590/1518-8345.3226.3207>
- [19] SkillsYouNeed (2012). Clarification—Communication Skills. Retrieved March 18, 2022, from <https://www.skillsyouneed.com/ips/clarification.html>
- [20] Travelbee, J. (1964). What's wrong with sympathy? *The American journal of nursing*. 64:68–71.
- [21] Uitterhoeve, R. J., Bensing, J. M., Grol, R. P., Demulder, P. H. M., and van Achterberg, T. (2010). The effect of communication skills training on patient outcomes in cancer care: a systematic review of the literature. *Eur. J. Cancer Care* 19, 442–457. doi: 10.1111/j.1365-2354.2009.01082.x
- [22] Unnati, C. (2022, January 24). Listening skills. <http://codeunnati.org/>
- [23] Wilson, B. (2021, October 19). Why Patient Education is Important. The Nerdy Nurse. <https://thenerdynurse.com/why-patient-education-is-important/>
- [24] Winstead, B. A., Derlega, V. J., Montgomery, M. J., & Pilkington, C. (1995). The quality of friendships at work and job satisfaction. *Journal of Social and Personal Relationships*, 12, 199–215.

Knowledge, Attitude and Practices on Handwashing in a Selected Barangay

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Abstract: Handwashing is one of the most preventive measures used to fight certain diseases. However, many people undervalue the importance of handwashing on an everyday basis. Hence, this study was conducted to describe the knowledge, attitude, and practice of selected barangays in Ilagan, Isabela towards handwashing. This quantitative study used a survey questionnaire in acquiring the necessary data from 120 respondents. The study revealed that the respondents have a very high level of knowledge, a very positive attitude towards handwashing, and an excellent handwashing practice of the respondents. The study concluded that there was no significant relationship between knowledge and practices on handwashing. This implies that the level of knowledge of the respondents does not affect the extent of practices of the respondents on handwashing, a significant relationship between attitude and practices on handwashing was however found ($r = .410$, $p = .001$). On the other hand, the study revealed that there was no significant difference in the handwashing practices of the respondents when their age is considered. The researchers recommended that future studies should get a wider scope of the population in the community with different geographical locations and include other factors.

Keywords: *knowledge, attitude, practices, handwashing*

Introduction

In developing countries, despite the accessibility and availability of clean water, well-established sanitation infrastructures, and daily hygiene promotion, the incidence of diarrhea has increased steadily over the past few years (Pang et al., 2015). Cross-contamination is a well-known consequence of inadequate handwashing habits. Germs were spread from unwashed hands to food-processing containers as much as half of the time and to refrigerator handles 11% of the time, according to the study, which was conducted employing kitchen employees (*Studies Show Poor Handwashing Is A Common Problem*, 2018). In relation to that statement, hand hygiene is the act of cleaning one's hands with the use of soap and water to kill and remove bacteria or microorganisms. According to the Centers for Disease Control and Prevention (CDC), hand washing is the simplest and yet one of the most important activities in cutting the spread of viruses, germs, and other harmful microorganisms (Toney-Butler et al., 2020). Hand washing is considered one of the most effective hygiene promotion activities for public health in developing countries (Rabbi & Dey, 2013). However, many people undervalue the importance of handwashing on an everyday basis. Nurses and other practitioners in line with the medical field had been grounded with the term "handwashing" and had become acquainted. But many people who are not in line with these jobs are part of the population who are not frequently acquainted with repeated handwashing. It is a common practice that most people are unable to implement on a daily basis. So many people are suffering from illnesses because they are not washing their hands properly or even at all (Gorvett, 2020).

Methodology

This chapter contains information about the research design that was used. Population and sampling techniques will also be discussed, as well as the instrumentation, data-gathering procedure, and analysis of the data.

Research Design

The researcher for this study used a quantitative research method to analyze the numerical data that was collected. The process of collecting and interpreting numerical data is known as quantitative research. It can be used to discover patterns and averages, make predictions, verify causal linkages, and generalize results to larger groups (*An Introduction to Quantitative Research*, 2020). Because the researcher believes that the quantitative method is the best fit to saturate the data needed for the study. And under the quantitative method, the researchers utilized a descriptive correlational research design to describe the knowledge and attitude concerning practices of hand washing in a selected barangay. Descriptive research is designed for frequencies, averages, and other statistical calculations; thus, this design best accomplished the objectives of this study. Descriptive research aims to describe a population, situation, or phenomenon accurately and systematically ([McCombes](#), 2019). A correlational study seeks to

uncover correlations between variables and to forecast future events based on current information (Stangor & Walinga, 2019). Mertler (2014) explained that the purpose of descriptive studies is to describe and interpret the current status of individuals, settings, conditions, or events. Therefore, a descriptive research design is appropriate in this study because it allows the researcher to observe practical or natural practices and knowledge of the respondents without affecting them in any way.

Population and Sampling technique

The population of this study consists of residents of a selected barangay in Ilagan, Isabela ranging from the ages 20 – 65 years old whose work is not in line with the nursing or medical field thus the sampling technique that will be used is the non-probability sampling, specifically purposive sampling will be utilized to produce a sample that can be logically assumed to be representative of the population (Lavrakas, 2008), so healthcare workers and students that are in medical line was not included in the population. The sample size consisted of 120 residents in the chosen barangay. The sample was predominantly female with the number of 72 (60%), and male with the number of 48 (40%). While the age distribution was diverse, the predominant age was 20– 34 years of age (50%). Please refer to Table 1 for additional demographic data.

Table 1. *Description of Participants Demographics (N = 120)*

Age

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	20-34	60	50.0%	50.0	50.0
	35-49	33	27.5%	27.5	77.5
	50-65	27	22.5%	22.5	100.0

Gender

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	48	40.0%	40.0	40.0
	Female	72	60.0%	60.0	100.0
	Total	120	100.0%	100.0	

Instrumentation

Pilot Study. First, the researchers conducted a pilot study that consist of 50 participants from the neighboring barangay to test the reliability of the instrumentation of the study in preparation for the actual gathering of the data. The result of the pilot study showed the value of Alpha Cronbach: .626 on the Scale of Handwashing Knowledge, .937 on the Scale of Handwashing Attitude, and .854 on the Scale of Handwashing Practices. A generally accepted rule is that α of 0.6-0.7 indicates an acceptable level of reliability, and 0.8 or greater is a very good level.

Informed Consent. Attached to the questionnaire is the informed consent information form which contains the purpose, confidentiality, and anonymity of the respondents. The rights of the respondents are also mentioned. Information sheets also help to ensure that participants are prepared and not surprised by the research activities they will be involved in.

Questionnaire

The researchers formulated a survey questionnaire to identify the correlation between handwashing knowledge and attitudes concerning practices. The questionnaire was composed of four parts. The first part consists of the profile of the respondents (name, age, sex, occupation, etc.). The format of the second part consists of eight questions about knowledge of handwashing, which can be answered with a dichotomous response option of yes or no. The third part consists of 13 questions about attitudes toward handwashing that utilize the 5-point Likert scale. The Likert scale is a five- or seven-point scale that is used to allow the individual to express how much they agree or disagree with a particular statement about their attitude toward handwashing. And it can be answered by strongly agreeing, agreeing, moderately agreeing, disagreeing, or strongly disagreeing. A Likert scale is a survey tool that is used to measure attitudes and opinions by asking people to rate how much they agree or disagree with a series of statements about a subject (Joseph, 2019). The fourth part consists of 15 questions about practices in handwashing that can be answered using a 5-point Likert scale of always, usually, sometimes, often, and never. In addition to measuring statements of agreement, Likert scales can measure other variations such as frequency, quality, importance, likelihood, etc. The researcher will also translate the questionnaire into the Tagalog dialect in case the respondents do not understand the English language.

Ethical Consideration

The researchers asked permission from the Barangay captain of the selected barangay to conduct data collection for the residents of the barangay. Attached with the letter is a copy of the questionnaire and written consent form for the participants. Once permitted, data collection was conducted. Before handing out the questionnaire, the researchers explained that participation would be voluntary and that the residents were not obligated to participate if they chose not to. They had the right to refuse to participate in answering the questionnaire. The residents who chose to partake in the study were required to agree upon written consent, which included the purpose of the study, voluntary participation, confidentiality of data, and time spent answering the questionnaire. It was explained to the respondents that all the data that was gathered would be kept confidential and would only be used for research purposes. The researchers were responsible for handing out and receiving the questionnaires. The gathered information was exclusively used for research purposes.

Data Gathering Procedure

After the approval of the proposal, the researchers constructed a questionnaire, which was submitted for expert validation by seven experts. After it was validated, the researchers consulted the adviser and asked permission for the ERB application. After that, the researcher applied to the Ethics Review Board to ensure that the research upheld the principles of ethics and that participants and researchers were protected from undue risks. Once permitted, the researchers conducted a pilot study with 50 participants to test the reliability of the self-constructed questionnaire. A letter of request with an attached questionnaire and written consent from the participants was given to the Barangay captain

to ask permission to conduct a survey study. Once permitted, the researchers were able to proceed with handing out questionnaires to the residents.

Informed consent was attached to the questionnaire to inform the respondents of the purpose of the study, the confidentiality of their given information, and their voluntary participation. The researcher did the same thing as the data collector. The researchers were able to hand out a minimum of 2 questionnaires and a maximum of 4 questionnaires per household. After the data collection, the researchers encoded the answered questionnaires and submitted them to a professional statistician who interpreted the data and analyzed it using a different statistical test.

Analysis of the Data

After the data gathering, the researcher encoded the data. Then it was processed, evaluated, and analyzed using statistical analysis software such as the Statistical Package for Social Sciences (SPSS). The analysis of the data was done with the help of a qualified statistician. The statistical techniques and tools that were used in the study were the following: The frequency distribution and percentage were used to determine the demographic profile of the respondents. A weighted mean and standard deviation were used to interpret and analyze the assessment of the respondent's level of knowledge, attitude, and extent of practices on handwashing.

Table 2. *Likert Scale Interpretation to assess the Level of knowledge on handwashing of the respondents*

Likert Scale		
	Weighted Mean Interval	Qualitative Interpretation
5	0.91-1.00	Very High
4	0.81-0.90	High
3	0.71-0.80	Fair
2	0.61-0.70	Low
1	0.0-0.60	Very low

Table 3. *Likert Scale Interpretation to assess the Attitude on Handwashing of the Respondents*

Likert Scale		
Response Scale	Weighted Mean Interval	Qualitative Interpretation
5	4.5-5.00	Very positive
4	3.5-4.49	Positive
3	2.5-3.49	Neutral
2	1.5-2.49	Negative
1	1.0-1.49	Very negative

Table 4. *Likert Scale Interpretation to assess the Practices on Handwashing of the Respondents*

Likert Scale		
Response Scale	Weighted Mean Interval	Qualitative Interpretation
5	4.5-5.00	Excellent
4	3.5-4.49	Good
3	2.5-3.49	Average
2	1.5-2.49	Fair
1	1.0-1.49	Poor

Pearson's Product-moment correlational coefficient was used to determine the relationship between knowledge and practices on handwashing as well as the relationship between attitude and practices

on handwashing. The Pearson correlation coefficient (also known as the Pearson product-moment correlation coefficient) r is a metric that determines the degree to which two quantitative variables (intervals or ratios) are related to one another (instead of being different) (Allen, 2017).

The Kruskal-Wallis H test was used to determine the significant difference that exists in handwashing practices when grouped according to age. The Kruskal-Wallis test was used instead of ANOVA because there is no equal distribution of the age group, and thus a non-parametric Kruskal-Wallis test was used. The Kruskal-Wallis test is a rank-based nonparametric test that is used in statistical research or calculations to find them. Unlike the ANOVA test, which assumes a normal distribution of the dependent variable as well as equal variance among group results, the Kruskal-Wallis test does not require any assumptions (Gordon, 2021).

Mann-Whitney U test was used to determine whether there is a significant difference in handwashing practices based on gender.

Results and Discussion

This chapter presents the data gathered from the respondents to this research. It also provides the analysis and interpretation of the data that has been organized according to the statement of the problem written in the first chapter of this paper.

This chapter is divided into six (6) parts. The first part will be about the level of knowledge about handwashing among the respondents. The second part will present the attitudes toward handwashing of the respondents. The third part will discuss the extent of handwashing practices by the respondents. The fourth part shows if there is a significant relationship between knowledge and practices on handwashing. The fifth part will answer if there is a significant relationship between the attitude and practices of handwashing. The last part will reveal if there is a significant difference in the hand washing practices of the respondents when the following moderating variables such as age and sex.

Level of Knowledge on Handwashing of the Respondents

Table 5. *Level of knowledge on handwashing of the respondents*

	Mean	SD	Qualitative Interpretation
Keeping hands clean is not really an important step to avoid getting sick and spreading germs to others.	.96	.201	Very High
Many diseases can be spread by washing of hands with soap and clean, running water.	.92	.264	Very High
Coughing and sneezing using your own hands can spread germs if not washed right away	.99	.091	Very High
Germs from unwashed hands can get into foods and drinks of people who prepare or consume them.	.98	.129	Very High
In doing the handwashing, the use of basin with water is better than using running water from the faucet.	.77	.425	Fair
Using water alone to remove germs from your hands is just as effective as using soap.	.85	.359	High
Rubbing of hands and fingers while doing	.98	.129	

hand washing is necessary to remove germs.			Very High
Drying of hands after handwashing using clean towel is more acceptable than rubbing it in your own clothes.	.98	.129	Very High
Total	.93	.128	Very High

Legend: 0.0 – 0.60 = Very low; 0.61 – 0.70 = Low; 0.71 – 0.80 = Fair; 0.81 – 0.90 = High; 0.91 – 1.00 = Very high

Table 2 shows the level of knowledge of the respondents about handwashing. Based on the results, with a mean score of 0.99, the respondents have a very high level of knowledge about the risks of coughing and sneezing with their hands if they are not washed right away. Also, the respondents showed a very high level of knowledge about the risks of preparing foods and drinks without washing their hands, the importance of rubbing their hands and fingers together while washing their hands, and the use of a clean towel when drying their hands. The preceding statements got a mean score of 0.98. Additionally, they have a very high level of knowledge about the importance of keeping their hands clean, and the benefits of washing hands with soap and clean running water. These two statements got a mean score of 0.96 and 0.92, respectively. On the other hand, with a mean score of 0.85, the respondents have a high level of knowledge about the proper way of washing their hands with the use of clean water and soap. Furthermore, with a mean of 0.77, the respondents have a fair level of knowledge about the importance of using running water while doing handwashing. Overall, with an average score of 0.93, it can be said that the respondents have a very high level of knowledge about handwashing.

UNICEF Philippines (2020) affirmed the abovementioned findings. According to a report they published, they discovered that during this pandemic, the degree of knowledge about proper handwashing is substantially higher. Additionally, REACH (2015) revealed a high overall level of hygiene awareness and understanding across many provinces in the Philippines, including Eastern Samar, Samar, Leyte, Cebu, Capiz, and Iloilo.

Attitude on handwashing of the Respondents

Table 6. *Attitude on handwashing of the respondents*

	Mean	SD	Qualitative Interpretation
1. I believe that handwashing is important for my safety in combating germs.	4.85	.359	Very Positive
2. I am willing to spend money in buying antibacterial soap to be used in my handwashing.	4.52	.565	Very Positive
3. I am willing to spend more time just to make sure that I can do handwashing properly.	4.67	.540	Very Positive
4. I believe Handwashing is a convenient thing to do.	4.71	.474	Very Positive
5. Proper handwashing is beneficial to my health.	4.72	.488	Very Positive
6. Handwashing is necessary in my everyday living.	4.76	.485	Very Positive

7. I am willing to help my family and friends to understand the importance of handwashing.	4.69	.547	Very Positive
8. I believe that proper handwashing practice is related to good health.	4.77	.444	Very Positive
9. I am willing to make handwashing practice as a part of my lifestyle.	4.73	.480	Very Positive
10. Performing handwashing does not interfere with my daily activity.	4.33	.980	Positive
11. I wash my hands even though other people don't do it.	4.75	.506	Very Positive
12. I wash my hands even though other people don't see it.	4.78	.471	Very Positive
13. I am willing to be an advocate in my community to promote handwashing practice.	4.63	.549	Very Positive
<i>Total</i>	4.6846	.41423	Very Positive

Qualitative interpretation: 4.5-5.00=Very Positive; 3.5-4.49=Positive; 2.5-3.49=Neutral; 1.5- 2.49=Negative; 1.0-1.49=Very Negative.

The table above is about the attitudes of the respondents towards handwashing. Based on the findings, the respondents have a very positive attitude about the importance of handwashing in combating germs, washing hands even if no one will see it, proper handwashing practice is related to good health, the necessity of handwashing in their everyday lives, washing hands even if no one is doing it, handwashing as being part of their lifestyle, proper handwashing is beneficial to their health, the convenience of handwashing, sharing the importance of handwashing to other people, spending time in doing handwashing, in advocating the handwashing practice, and in buying antibacterial soap for handwashing. These statements received a mean score of 4.85, 4.78, 4.77, 4.76, 4.75, 4.73, 4.72, 4.71, 4.69, 4.67, 4.63, and 4.52, respectively. Meanwhile, with a mean of 4.33, they have a positive attitude that performing handwashing does not interfere with their daily activities. Overall, the respondents have a *very positive attitude* toward handwashing.

In contrast, the Philippine Star (2020) revealed in a news item that 50% of Filipinos have a negative attitude toward handwashing. Despite repeated cautions from the World Health Organization and the Department of Health, these unfavorable sentiments persist.

Table 7. *The extent of practices on handwashing of the respondents*

Statements	Mean	SD	Qualitative Interpretation
1. I wash my hands regularly.	4.86	.395	Excellent
2. I wash my hands before eating.	4.95	.219	Excellent
3. I wash my hands after eating.	4.85	.403	Excellent
4. I wash my hands when I arrive home.	4.55	.646	Excellent
5. I wash my hands right after touching different objects.	4.47	.744	Good
6. I remove my jewelries before washing my hands.	4.50	.898	Excellent
7. I use soap when washing my hands.	4.83	.436	Excellent

8. I rigorously rub my palm and fingers when performing handwashing.	4.79	.483	Excellent
9. I use clean towel to dry my hands after handwashing.	4.76	.502	Excellent
10. When I sneezed or cough and cover my mouth using my hands, I immediately wash them.	4.59	.728	Excellent
11. I wash my hands after using the toilet.	4.94	.298	Excellent
12. I wash my hands for at least 15-30 seconds.	4.70	.574	Excellent
13. I wash my hands after handling money.	4.46	.787	Good
14. I wash my hands after using a public restroom.	4.87	.387	Excellent
15. I wash my hands after doing household chores.	4.80	.478	Excellent
<i>Practices</i>	4.7278	.32310	Excellent

Legend : 1.0 – 1.49 = Never ; 1.5 – 2.49 = Rarely ; 2.5 – 3.49 = Sometimes ; 3.5 – 4.49 = Often ; 4.5 – 5.00 = Always

The table above depicts the extent to which respondents practice handwashing. The respondents have excellent practices for handwashing in terms of washing their hands before and after they eat, after using the toilet, after doing household chores, after sneezing and coughing, when they arrive home, after using public restrooms, and when they remove their jewelry before handwashing. These statements received a mean score of 4.95, 4.85, 4.94, 4.80, 4.59, 4.55, 4.87, and 4.50, respectively. They also have excellent practices in terms of regular handwashing, the use of soap while washing hands, proper handwashing, drying their hands with a clean towel, and frequent handwashing. These preceding statements got a mean score of 4.89, 4.83, 4.79, 4.76, and 4.70. Moreover, they have good practice in terms of washing their hands after touching different objects and after handling money. These 2 got a mean of 4.47 and 4.46 respectively.

Overall, the respondents have excellent practices for handwashing.

The findings of this study are different from those in the report of Aguja (2020). According to the report, ninety-nine percent of Filipinos have increased their hand washing frequency, but only half do so properly. That is according to a recent 2020 Philippines Handwashing Habits Survey, which indicated that just 50% of Filipinos follow proper and safe handwashing procedures.

Relationship Between Knowledge and Practices on Handwashing

Table 8. *Relationship Between Knowledge and Practices on Handwashing*

Handwashing	<i>r</i>	<i>p-value</i>	<i>QI</i>
Knowledge	.078	.395	NS
Practices	.078	.395	NS

Correlation is significant at $P < 0.05$; Legend: S= Significant, NS=Not Significant

Table 5 depicts the relationship between handwashing knowledge and practices. Based on the results, the variables got a p-value of 0.395, which is greater than the alpha value of 0.05, resulting in failing to reject the null hypothesis. As a result, there was no significant relationship between handwashing knowledge and practices. The result of this study implies that the level of knowledge of the respondents does not affect the extent of their practices regarding handwashing.

However, Al-Wutayd et al. (2021) reported that handwashing knowledge was correlated with practice during the COVID-19 pandemic.

Relationship Between Attitude and Practices on Handwashing

Table 9. *Relationship between attitude and practices on handwashing*

Handwashing	<i>r</i>	<i>p-value</i>	<i>QI</i>
Attitude	.410	.001	S
Practices	.410	.001	S

The table above is about knowing if there is a significant relationship between attitude and practices regarding handwashing. The table shows that these variables got a p-value less than the alpha level, hence, the null hypothesis was rejected. Therefore, there was a significant relationship between attitude and practices on handwashing. Positive attitude to handwashing will most likely lead to better handwashing practices.

Lee et al. (2021) concurred with this conclusion. They concluded that people's attitudes toward handwashing are a key practice factor, particularly during the COVID-19 epidemic, when hand hygiene is critical differences in the handwashing practices of the respondent when age and sex are considered.

Table 10. *Difference in the handwashing practices of the respondents when age and sex are considered*

Profile	<i>p value</i>	<i>QI</i>
Age	.161	Not Significant
Sex	.232	Not Significant

Difference is Significant at $P < 0.05$

The table above shows the differences in the handwashing practices of the respondents when they are grouped according to their age and sex. The study failed to reject the null hypothesis because the p-values of 0.161 and .232 were greater than the alpha value of 0.05. Therefore, there was no significant difference in the handwashing practices of the respondents when their age and sex were considered.

In a handwashing test conducted by Wong and Lee (2019), they discovered that the youngest age group did much better than the older age group in hand washing. The older group missed the front of the fingers, the back of the fingers, and the lateral side of the hand during the handwashing test. Nibal et al. (2019) contradicted this conclusion. When handwashing frequency was evaluated, they discovered a significant gender difference. When compared to males, a considerably greater proportion of females washed their hands six times daily. Additionally, Mariwah, Hampshire, and Kasim (2012) discovered that female students were more likely to wash their hands at all and both hands than male students.

Conclusion

Handwashing is an essential part of the health of a community. This study assessed the relationship between knowledge and attitude toward practices of handwashing in a selected barangay. The overall study shows that the level of knowledge, attitude, and practices on handwashing of the respondents were high. Statistics show that even with a high level of knowledge about handwashing, it doesn't always correlate with good practices because knowledge doesn't always affect a person's behavior

when it comes to handwashing. On the other hand, a good attitude correlates with good practices in handwashing, according to this study, which means that if a person has a positive outlook about handwashing, it is more likely that he or she will practice it properly.

Statistics also show that gender and sex differences doesn't directly affect the handwashing practice of the respondent.

Recommendations

Based on the findings and analyses of the study, the following recommendations are proposed to the following:

Nursing Practice and Nursing Education

Nurses and educators are hereby encouraged to continue to educate and provide more awareness and promotion of handwashing to their patients and their communities. Even though the COVID-19 pandemic has helped many people see the importance of proper handwashing, the role of nurses as educators should always continue.

Community

This research will help the community come up with more effective health promotions, specifically handwashing. Future programs and campaigns related to handwashing should focus on improving handwashing practices and not just the handwashing knowledge part alone.

Nursing Research

A suggestion for future researchers to improve the study is to get a wider scope of the population in the community from different geographical locations. A single barangay alone cannot conclude the handwashing knowledge, attitude, and practices in the whole community. Further research employing research methodologies that allow for generalization is required due to the inability to apply the findings or comparable studies to diverse groups.

References:

- [1] Aguja, Argie C. (2020, September 30). 50% of Pinoys don't know safe handwashing – 2020 Handwashing Habits Survey. *Philippine Star*.
<https://www.philstar.com/lifestyle/health-and-family/2020/09/30/2046204/50-pinoys-dont-know-safe-handwashing-2020-handwashing-habits-survey>
- [2] Al-Wutayd, O., Mansour, A. E., Aldosary, A. H., Hamdan, H. Z., & Al-Batanony, M. A. (2021). Handwashing knowledge, attitudes, and practices during the COVID-19 pandemic in Saudi Arabia: A non-representative cross-sectional study. *Scientific Reports*, 11(1), 16769. <https://doi.org/10.1038/s41598-021-96393-6>
- [3] Gordon, J. (2021, July 20). Kruskal Wallis Test—Explained. The Business Professor, LLC. <https://thebusinessprofessor.com/research-analysis-decision-science/kruskal-wallis-test-definition> and Health Council. <https://waterandhealth.org/disinfect/resist-flu-washing-drying-hands-appropriately/>
- [4] Lee, M., Kang, B.-A., & You, M. (2021). Knowledge, attitudes, and practices (KAP) toward COVID-19: A cross-sectional study in South Korea. *BMC Public Health*, 21(1), 295. <https://doi.org/10.1186/s12889-021-10285-y>
- [5] Pang, J., Chua, S. W. J. L., & Hsu, L. (2015). Current knowledge, attitude and behaviour of hand and food hygiene in a developed residential community of Singapore: A cross-sectional survey. *BMC Public Health*, 15(1), 577. <https://doi.org/10.1186/s12889-015-1910-3>
- [6] Rabbi, S. E., & Dey, N. C. (2013). Exploring the gap between hand washing knowledge and practices in Bangladesh: A cross-sectional comparative study. *BMC Public Health*, 13(1), 89. <https://doi.org/10.1186/1471-2458-13-89>

- [7] Shona McCombes. (2019). Descriptive Research | Definition, Types, Methods & Examples. Scribbr, July 21, 2022.
<https://www.scribbr.com/methodology/descriptive-research/>
- [8] Stangor, C., & Walinga, J. (2019). 3.5 Psychologists Use Descriptive, Correlational, and Experimental Research Designs to Understand Behaviour.
<https://openpress.usask.ca/introductiontopsychology/chapter/psychologists-use-descriptive-correlational-and-experimental-research-designs-to-understand-behavior/>
- [9] WHO. (2017, May 9). *Forgetting to wash your hands can cost lives*.
<https://www.who.int/news-room/feature-stories/detail/forgetting-to-wash-your-hands-can-cost-lives>
- [10] Writer. (2020). What Is Slovin's Formula? <https://www.reference.com/world-view/slovin-s-formula-fb8e208a01cd104c>

The Relationship of Satisfaction towards Post-Natal Care and Quality of Recovery among Post Caesarean Section Patients in Selected Hospitals in the Philippines

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Abstract: Post-natal care for post-caesarean women is an important aspect of achieving quality recovery. The aim of the study is to explore the relationship between satisfaction with post-natal care and the quality of recovery among post-caesarean patients in selected hospitals in the Philippines. Data were extracted from adapted questionnaires that comprised questions that measured the extent of satisfaction with post-natal care and the quality of recovery among post-caesarean women in selected hospitals in the Philippines. The respondents of the study were chosen using purposive sampling. Data gathered were analyzed using the mean, standard deviation, and Pearson-r correlation. The findings reveal that the respondents were *moderately satisfied* with the post-natal care provided. The mean Obstetric Quality of Recovery (ObsQoR-11) of the post-caesarean women was 69.33 out of the score of 110. A significant correlation ($p=0.007$) was found between the post-natal care provided and the obstetric quality of recovery. This means that the better the post-natal care provided, the better the obstetric quality of recovery. It is therefore recommended that nurses and physicians work closely to provide post-natal care to post-caesarean women in order for them to have a high obstetric quality of recovery.

Keywords: *post-natal care, quality of recovery, post-caesarean women, obs-qor-11*

Introduction

The steady increase in the number of caesarean deliveries has been observed throughout the years in the Philippines. The WHO Global Survey on Maternal and Perinatal Health in 2007-2008 reported a 27.3% caesarean delivery rate in Asia, and data from the Philippine Obstetrical and Gynecological Society (POGS) showed a caesarean section rate of 27.8% in 2012. Women who had caesarean delivery, if not well taken care of, properly supported and managed in this period, can be at risk to a variety of serious health problems. According to the article from the World Health Organization (WHO), maternal deaths following caesarean sections in low and middle-income countries are 100 times higher than in high-income countries. In theory, all of the major causes of maternal death can be treated with effective and timely clinical interventions. In practice, however, even if a woman manages to access prenatal care and delivers in a health facility with a skilled birth attendant, poor quality of care can be life-threatening. The health of mothers after caesarean sections has been described as a particular area of neglect (Battawi et al., 2017), and dissatisfaction associated with the birth experience could cause cases such as postpartum depression, negative emotions toward the baby, breastfeeding problems, and unwanted pregnancies in the future (Ozkan et al., 2019). Moreover, quality of care is of particular concern in low- and middle-income countries as mentioned in the article of the World Health Organization.

Patient satisfaction has been viewed as an outcome indicator that measures the quality of care and efficiency of healthcare systems. It is a complex, multidimensional concept involving physical, emotional, mental, social, and cultural factors. Patient satisfaction and experience of the quality of

care are found to be difficult to measure because of their subjectivity based on patient expectations (Harazi et al., 2021). Patients compare their expectations and how they perceived the services. If the services were equal to or more than the patients' expectations, they will be satisfied (Kurniati et al., 2017). Thus, patient satisfaction is considered an effective indicator of measurement with regard to the success and quality of care given by healthcare providers.

The quality of recovery, meanwhile, is also considered an important measure of the quality of care. It is also assessed from the patient's point of view, and thus it can be a measurement of patient health status and represent the patient's perception of the outcome of their care (Berning et al., 2017). It is a patient-reported outcome measure that evaluates their recovery after surgery, such as their ability to resume normal activities after surgery, and is composed of many dimensions, such as physical, psychological, and social health. However, the quality of recovery after surgery can be problematic to evaluate as there is no existing "gold standard." Nonetheless, valid and reliable instruments to measure the quality of recovery have proven that physical and mental well-being are both important factors in the quality of recovery (Berning et al., 2017). 2

Both patient satisfaction and the quality of recovery are important concepts that can be used to measure the quality of care. However, how they influence each other and to what extent is not yet clearly defined. There may be a potential relationship between each as both are considered measures of quality of care. The aim of this study, therefore, is to determine the correlation between patient satisfaction and the quality of recovery among post-caesarean section patients.

The study will explore the correlation between patient satisfaction and the quality of recovery among post-caesarean section patients. Specifically, the study will answer the following questions:
What is the extent of satisfaction towards postnatal care among post-Caesarean patients?
What is the extent of the quality of recovery among post-caesarean sections in terms of?
If there is a significant relationship between satisfaction towards postnatal care and the quality of recovery among post-caesarean section patients?

Methodology

Research Design

Descriptive, correlational, and comparative research designs were used in this study. This research design was selected because it could describe the relationship between the variables of patient satisfaction and the quality of recovery among post-caesarean patients. For this study, the variables involved are the information of procedures, communication, comfort and care, specific to postnatal care, and value and preference for postnatal mothers on the patient's satisfaction and physical comfort, pain, physical independence and emotion on the quality of recovery. The aim of this research design is to explore, count or classify, and create statistical figures and models to elucidate the observation. The main goal of the study was to understand the relationship between patient satisfaction with healthcare professionals' services and the quality of recovery. Therefore, a correlational and comparative methodology using a survey design was selected as the most appropriate research design for the study.

Population and Sampling Technique

The researchers used convenience sampling technique in choosing the online mothers' support groups to be included in this study. The population in this study consisted of Filipino post-caesarean section patients who are members of various online mothers' support groups. The following criteria were used for the selection of the respondents to be included in the study: (1) women who are eighteen (18) to forty-nine (49) years old, (2) admitted and stayed in the hospital for 3-5 days from 2021 to present, (3) primary caesarean section, (4) completed 37th - 41st week of gestation (term), (5) no

postpartum complications, (6) had elective or non-elective caesarean section, (7) agreed to participate in the study. A total of 250 respondents were able to answer the online questionnaire; however, only 200 respondents were used for the study since 50 respondents did not fit the inclusion criteria and some did not consent to answering the questionnaires.

Instrumentation

The researchers made use of the Patient Satisfaction with Healthcare Professionals Questionnaire, a self-structured questionnaire developed by the researchers that had excellent internal reliability using 50 samples (Chronbach's $\alpha = 0.9$). For measuring the quality of recovery, the researchers used the Obstetric-Specific Quality of Recovery (ObsQoR-11) Questionnaire, with permission to use granted from the authors themselves, Ciechanogicz et al., 2018. These two questionnaires, along with an additional personal information questionnaire, were integrated into a Google Form format for online dissemination.

Analysis

Following the completion of data collection, the researchers validated and encoded the data using an appropriate standard tool such as SPSS. The scores of the respondents from the questionnaires given were tallied and subjected to statistical treatment. The data computation was done by an authorized statistician. The following statistical treatment was used to answer the given research objectives.

Basic descriptive analysis was conducted to show the respondents' demographics in terms of age, educational attainment, type of hospital admitted, and location of the hospital admitted to. A basic descriptive analysis was also conducted to show the data on patient satisfaction with healthcare services in terms of information on procedures, communication, comfort, and care, specific to postnatal care, and the value and preference for postnatal mothers among post-caesarean patients. Basic descriptive analysis was also used to show the frequency and percentage of total patient satisfaction among the respondents. Basic descriptive analysis was also conducted to show the results of the quality of recovery in terms of physical comfort, pain, physical independence, and emotion among post-caesarean patients.

Pearson's Correlation was used to measure significant relationships between patient satisfaction and quality of recovery

Ethical Consideration

The researchers highly regard the Universal Declaration on Bioethics and Human Rights (2005), particularly the sections on (4) benefit and harm, (5) autonomy and individual responsibility, (6) consent, and (7) privacy and confidentiality. The benefits to the research participants were maximized to the greatest extent possible, and any potential harm was minimized. In terms of informed consent, the respondents were asked to fill out the provided written consent themselves prior to the collection of data. Participants will be given the choice not to participate by answering "no" to the consent form. The participants' right to confidentiality and privacy was protected in such a way that their identities will remain unknown. They have the option of not putting their names in the given questionnaire. Researchers came up with a code that will individually represent each questionnaire. Only the researchers had access to the first-hand information given. The statistician was only given values to work with. After encoding, questionnaires will be deleted. The study prior to its implementation was evaluated by the Adventist University of the Philippines (AUP) Ethics Review Board (ERB).

Results and Discussion

Table 1 presents the respondents' mean satisfaction score for items under Specific to Postnatal Care. The item "Nurses met my needs adequately during the two to three days after birth" got the highest rating with a mean score of 4.135, a standard deviation of 1.1149, and a degree of intensity verbally

interpreted as "partially agree." This means that the respondents partially agree that the nurses have met their needs adequately during the first two to three days after birth. The health of the mothers after caesarean section birth is very important to address, and a good quality of care given would lead to satisfaction associated with the birth experience, which could also lead to a better health outcome for both the mother and baby when the needs of the mothers are adequately met in this time of vulnerability. However, the item "Nurses spent enough time to help latch on breastfeeding" got the lowest mean score of 3.350 and a standard deviation of 1.4588, and the degree of intensity was verbally interpreted as "undecided." This means that the respondents were undecided when it came to how the nurses spent enough time to help the infant latch on to breastfeeding. Educating mothers on how to properly breastfeed their babies is very important to the overall health and relationship of the mother and the baby. According to the article from the World Health Organization (WHO), breastfeeding is one of the most effective ways to ensure child health and survival. Breastfed children perform better on the intelligence test and are less prone to diabetes, being overweight, or obesity. Women who also choose to breastfeed their children have a reduced risk of breast and ovarian cancer.

Table 1. Mean Satisfaction Score Specific to postnatal Care per individual item

Item	Mean	Std. Dev.	Verbal Interpretation
Nurses met my needs adequately during the two to three days after birth	4.13	1.11	Highly Satisfied
Nurses spent enough time to help latch on breastfeeding	3.35	1.45	Moderately Satisfied
Nurses spent enough time to inform me about wound care	3.62	1.32	Moderately Satisfied
Nurses spent enough time to give information about my own care after birth	3.57	1.36	Moderately Satisfied
Nurses spent enough time to give information about the care of my baby	3.71	1.35	Moderately Satisfied
The information received from doctors and nurses about self-care and baby care was consistent	3.87	1.21	Moderately Satisfied
Over-all Satisfaction to Post-Natal Care	3.71	1.35	Moderately Satisfied

Note: (5 = Strongly Agree; 4=Partially Agree; 3=Undecided; 2= Partially Disagree; 1 = Strongly Disagree)
On examining the total patient satisfaction of post-caesarean patients following hospital care, Table 2.6 presents the overall patient satisfaction of the post-caesarean patients.

Table 2. Total Patient Satisfaction of Post-Caesarean Patients following hospital care:

	Not Satisfied		Minimally Satisfied		Satisfied		Moderately Satisfied		Fully Satisfied	
	N	%	N	%	N	%	N	%	N	%
TOTAL	16	8	7	3.5	19	9.5	72	36	86	43

Table 2 shows that 43% were "fully satisfied," 36% were "moderately satisfied," 9.5% were "satisfied," 3.5% were "minimally satisfied," and 8% were "not satisfied" with overall hospital care. These findings suggest that the highest percentage of respondents were fully satisfied with the care they received following hospitalization, and only 8% were not satisfied. The current finding supports the findings of Ozkan et al. (2019), who conducted a study in a Turkish hospital and concluded that women who had caesarean sections (81.3%) were more satisfied than those who had normal births (70.4%). Factors such as the high education level of spouses, women's work, and not using enemas during childbirth

were found to increase the maternal satisfaction of women who have caesarean births. Maternal satisfaction was also found to be higher in the study of Jha et al. (2017), which measured the satisfaction of 1004 newly delivered women in India.

Table 3.1 shows the mean satisfaction scores on the quality of pain recovery; the overall mean is 5.50 out of 10 (10 being the highest and 0 being the lowest), with a median score of 5.5 and a standard deviation of 2.51. For the individual item on the quality of recovery from pain, "moderate pain" got the highest mean score of 5.69 and median score of 5, with a standard deviation of 2.30, while "severe pain" got the lowest mean score of 5.31 and median score of 6, with a standard deviation of 3.24.

When asked about pain, most of the respondents reported moderate for both moderate and severe pain. According to the article by Lavand'homme (2018), postoperative pain after caesarean section is more severe than reported in the majority of randomized control trials. Marcus et al. (2014) demonstrated that at least 14% of women would have wanted more analgesics. Other studies also pointed out that postpartum women have the tendency to underreport pain and are reluctant to take analgesics for the fear of exposing their babies to any pain medication. Furthermore, according to the study conducted by Kumar et al. (2022) at a university hospital in India, they mentioned that it is most likely that the pain varies significantly across cultures and can be influenced by ethnic or cultural differences.

Pain significantly affects different dimensions of recovery. For example, pain interferes with mother-child bonding by limiting breastfeeding (Wen et al., 2015). This risk for delayed breastfeeding and a feeling of guilt if the woman is unable to care for her newborn increased risk for developing postpartum depression by threefold (Woods et al., 2012). Pain also results in limited mobilization, disrupted activities of daily living, and reduced baby nutrition (Marfua et al., 2019). Thus, effective pain control is an important component of post-operative care. Calming the mother by reducing the unpleasantness of pain increases her ability to take care of herself, reduce nosocomial infections, and reduce hospitalization costs (Imani et al., 2018). Taking analgesics could help reduce the pain. Specifically, paracetamol and non-steroidal anti-inflammatory drugs (e.g., ketorolac) are usually considered for mild to moderate post-caesarean pain. According to Kintu et al. (2019), however, single analgesics have been shown to be ineffective in the treatment of moderate and severe pain in studies. Thus, the use of multimodal analgesia is now suggested. The addition of dexmedetomidine to ketorolac, compared with its addition to paracetamol, has been proven to cause further reduction in the post-caesarean pain score and provide more satisfaction to mothers (Imani et al., 2018).

Table 5 presents the mean satisfaction scores on the quality of emotional recovery; the overall mean is 6.27, with a standard deviation of 2.28. This means that respondents sometimes needed help after an operation in managing their overall comfort. In terms of control, most patients felt in control only half the time post operation. The item "I feel in control" got the highest mean of 6.45 and a mean of 7 with a standard deviation of 2.28.

Table 6. Mean ObsQoR-11 scores on overall quality of recovery (Lowest score is 0, highest score is 110; N=200)

	Mean	Median	Std. dev
Overall Quality of Recovery Score	69.33	70	19.07

Table 3.5 presents the mean Obstetric Quality of Recovery score among the respondents. For the overall obstetric quality of recovery, the mean score is 69.33 out of 110 (110 being the highest and 0 being the lowest), with a standard deviation of 19.07. In the study of Ciechanowicz et al. (2018),

conducted at a UK university hospital, the median score for good recovery was 100, while 87 was the score for poor recovery for their respondents. This is in contrast with the study conducted by Kumar et al. (2022) at a university hospital in India, wherein the median score for good recovery was 84.6 and 75.1 for poor recovery. The authors have mentioned that the discrimination between good and poor recovery varies depending on the population used in the study. Furthermore, they anticipated some possible confusion amongst their respondents with regards to answering the questionnaire, thus they were at the bedside if patients wanted to clarify some information. The present study was conducted online, and this might have an effect on the median score that has been obtained from our respondents since the researchers were not able to conduct the questionnaire at bedside due to the limitations of the COVID-19 pandemic. Moreover, protocols, or standard operating procedures, vary among the hospitals in the Philippines, and these differences in the clinical environment may account for the lower obstetric quality of recovery scores observed in our study compared to previous studies. Patient satisfaction and the quality of recovery are two essential variables that can be used to assess the quality of care. Table 4.1 shows the results of the correlation between patient satisfaction in the areas of information, communication, comfort, and care, specific postnatal care and values and preferences, and quality of recovery in the areas of physical comfort, pain, physical independence, emotion, and overall quality of recovery.

Table 7. *Correlation between Patient Satisfaction and Quality of Recovery among Post Caesarean Section Patients*

		Information	Communication	Comfort and Care	Specific to Postnatal Care	Value and Preference
Physical Comfort	Pearson Cor. Sig(2-tailed)	0.60 (.396)	.086 (.225)	.139 (.050)	.155 (.029)	.077 (.276)
Pain	Pearson Cor. Sig(2-tailed)	-.031 (.664)	-.016 (.819)	.048 (.496)	.088 (.215)	-.012 (.869)
Physical Independence	Pearson Cor. Sig(2-tailed)	.090 (.204)	.041 (.566)	.050 (.480)	.150 (.034)	.030 (.668)
Emotion	Pearson Cor. Sig(2-tailed)	.114 (.108)	.042 (.558)	.048 (.497)	.163 (.021)	.012 (.867)
Overall Quality of Recovery	Pearson Cor. Sig(2-tailed)	.083 (.244)	.058 (.413)	.102 (.151)	.192 (.007)	.046 (.519)

Among the different areas of patient satisfaction, the area specific to postnatal care showed a statistically significant correlation between patient satisfaction and quality of recovery among post-caesarean section patients ($p < 0.05$) (Table 4.3). Patient satisfaction in postnatal care is significantly related to the quality of recovery on physical comfort, physical independence, emotion, and the overall quality of recovery obstetric score, with P-values of .029, .034, .021 and .007, respectively. This means that if patients are satisfied with how healthcare professionals educate them about breastfeeding, wound care, and baby care, they will be able to have a good recovery in terms of physical comfort, physical independence, emotion, and recovery quality.

The present finding also supports the qualitative study of Baghirzda et al. (2018), which says that there is some evidence that high-risk populations may benefit from postpartum support to improve parenting, maternal mental or physical health, or quality of life. Furthermore, the present study also supports the study of Marwa et al. (2020), which was conducted in a teaching hospital in Egypt, wherein they concluded that the women who received obstetric fine nursing care during labor and the postpartum period had a higher satisfaction level, better obstetric outcomes, and an earlier

postpartum recovery than women who received only routine hospital care. Women who had standard postpartum care were more likely to start early oral fluids, initiate a regular diet, be less exposed to complications, and mobilize in less than 6 hours (El-Aty, A & Mostafa E, 2022).

However, there is no statistically significant correlation between patient satisfaction on information, communication, comfort and care, value and preference, and the quality of recovery on physical comfort, pain, physical independence, emotion, and the overall quality of recovery obstetric score.

Table 9. *Pearson correlation strength between Patient Satisfaction specific to postnatal care and Quality of Recovery on physical comfort, physical independence, emotion and overall quality of recovery among Post Caesarean Section Patients*

Specific to Postnatal Care		
	Correlation Coefficient (positive)	Strength of Relationship
Physical Comfort	.155	Very low
Physical Independence	.150	
Emotion	.163	
Overall Quality of Recovery	.192	

Note: 0.00-0.199: Very low correlation; 0.20-0.399: low correlation; 0.40-0.599: Middle correlation; 0.60-0.799: High correlation; 0.80-1.000: Very high correlation

Table 4.3 shows a very low correlation between the patient satisfaction specific to postnatal care and the quality of recovery in terms of physical comfort, physical independence, emotion, and the overall quality of recovery. This is consistent with the findings by Berning et al. (2017), which showed only weak to moderate correlations with overall patient satisfaction with anesthesia and surgery and the quality of recovery at different points (pre-operative and post-operative). The quality of recovery has only a marginally supplementary effect on patient satisfaction, since recovery after surgery is a complex process that involves different patient characteristics and perspectives, aspects of the surgery performed, and other adverse events. Another study found that satisfaction is a poor predictor of the quality of recovery because it is considered a subjective assessment rather than an objective measurement (Royse et al., 2013).

Recommendation

The researchers recommend that a study with a larger number of participants be done and conducted in public hospitals for more generalized results. The researchers also recommend that healthcare owners, administrations, managers, and professionals strengthen the mode of educating our mothers when it comes to breastfeeding, wound care, self-care, and caring for the baby after the procedure, as this helps the patients have a better quality of recovery in terms of physical comfort, physical independence, and emotion. The researchers also recommend that the healthcare professionals attending the patient must anticipate and address the negative symptoms, such as pain and physical comfort, early for better management and health outcomes. When patients are satisfied with the postnatal care they have received, this will also influence the recovery of the mother and the health of the child. Hospital owners, administrators, and managers should also strengthen standard procedures for post-caesarean mothers' comfort and care, as there is a significant difference in satisfaction with post-caesarean patients' comfort and care from a private hospital to a public hospital.

References

- [1] Abdelati, I.H., Saadoon, O.H.M., Mosafa, ARA., (2019). Quality of cesarean section nursing care and its reflection up-on women's satisfaction with labor experience. *International*

- Journal of Advanced Nursing Studies*, 8(1), 11. doi: 10.14419/ijans.v8i1.27149
- [2] Adeyinka O, Jukie AM, McGarvey ST, Muasau-Howard BT, Faiai M, Hawley NL. (2017). Predictors of prenatal care satisfaction among pregnant women in American Samoa. *BMC Pregnancy and Childbirth* 17(1),381.
 - [3] Anikwe, C. C., Egbuji, C. C., Ejikeme, B. N., Ikeoha, C. C., Egede, J. O., Ekem, N. N., & Adeoye, S. I. (2019). The experience of women following caesarean section in a tertiary hospital in SouthEast Nigeria. *African Health Sciences*, 19(3), 2660–2669.
<https://doi.org/10.4314/ahs.v19i3.42>
 - [4] Azari, S., Sehaty, F., & Ebrahimi, H. (2013). Satisfaction of women from cesarean section care services in public and private hospitals of Tabriz. *Iranian journal of nursing and midwifery research*, 18(6), 435–438.
 - [5] Battawi J, Hafiz, S. (2017). "Evaluation of Postnatal mother's satisfaction with nursing care in El-Shatby Maternity University Hospital." Retrieved from DOI: 10.9790/1959-0606026980
 - [6] Baghirzada, L., Ibrahimov, F., & Macarthur, A. (2018). Recovery after childbirth: A qualitative study of postpartum women. *Clinical Obstetrics, Gynecology and Reproductive Medicine*, 4, 1-5.
 - [7] Berning, V., Laupheimer, M., Nübling, M. & Heidegger, T. (2017). "Influence of quality of recovery on patient satisfaction with anaesthesia and surgery: prospective observational cohort study". Retrieved from doi:10.1111/anae.13906
 - [8] Burgener, A. M. (2017). Enhancing Communication to Improve Patient Safety and to Increase Patient Satisfaction. *The Health Care Manager*, 36(3), 238-243.
<https://doi.org/10.1097/hcm.000000000000165>
 - [9] Ciechanowicz, S., Setty, T., Robson, E., Sathasivam, C., Chazapis, M., Dick, J., Carvalho, B. & Sultan, P. (2018). "Development and Evaluation of an Obstetric Quality-of-recovery score (ObsQoR-11) after elective caesarean delivery. *British Journal of Anaesthesia*". 1-10
 - [10] El-Aty, A., & Mostafa, E. (2022). Effect of Postpartum Standardized Care Guidelines to Caesarean Section Women on Pain Relief and Satisfaction: Comparative Study. *Port Said Scientific Journal of Nursing*, 9(1), 23-51.
 - [11] Griffiths, J., Lever Taylor, B., Morant, N. et al. (2019) A qualitative comparison of experiences of specialist mother and baby units versus general psychiatric wards. *BMC Psychiatry* 19, 401. <https://doi.org/10.1186/s12888-019-2389-8>
 - [12] Jha P, Larsson M, Christensson K, Svanberg AS. (2017). Satisfaction with childbirth services provided in public health facilities: results from a cross- sectional survey among postnatal women in Chhattisgarh, India. *Global Health Action* 10(1),1386932.
 - [13] Kang, Ryung A, Seungwon Lee, Eunkyung Lee, Yoon J. Cho, Ji S. Jeong, Soo J. Choi, Mi S. Gwak, Woo S. Sim, Duk K. Kim, and Justin S. Ko. (2022). "Validation and Clinical Utility of the Korean Version of the Obstetric Quality-of-Recovery Score (ObsQoR-11) Following Elective Cesarean Section: A Prospective Observational Cohort Study" *Diagnostics* 12, no. 2: 291.
<https://doi.org/10.3390/diagnostics12020291>
 - [14] Kumar, S, V. Ashok, D. Jain, A. Arora, A. Singh, P. Sikka, Validation of an obstetric quality of recovery scoring tool (ObsQoR-11) after elective caesarean delivery in a developing country: a prospective observational study, *International Journal of Obstetric Anesthesia*, Volume 49, 2022,103235, ISSN 0959-289X, <https://doi.org/10.1016/j.ijoa.2021.103235>.
 - [15] Kurniati, F.D., Lusmilasari, Lusmilasari, L., & Mulatsih, S. (2017): Patient satisfaction and its relationship with the quality of comprehensive emergency obstetric and neonatal care (cemonc) in the general hospital of panembahan senopati bantulBelitung. *Nursing Journal*, Volume 3, Issue 4, July-August 2017.Pp; 3(4):443-449
 - [16] Lau et al. (2020). Choice of public versus private hospital for maternity care: a cross-sectional questionnaire study. *Hong Kong J Gynaecol Obstet Midwifery* 2020;20(2):62-8 |
<https://doi.org/10.12809/hkjgom.20.2.01>

- [17]Lotfi, M., Zamanzadeh, V., Valizadeh, L., & Khajehgoodari, M. (2019). Assessment of nurse–patient communication and patient satisfaction from nursing care. *Nursing Open*, 6(3), 1189–1196. <https://doi.org/10.1002/nop2.316>
- [18]Marwa, A. S., Eman, S. A., Wafaa, A., & Mai, M. Y. (2020). Effect of implementing obstetric fine nursing care on women's childbirth satisfaction, selected obstetric outcomes and postpartum recovery. *Academic Journal of Nursing and Health Education*, 9(1), 1-16.
- [19]Na, S. H., Jeong, K. H., Eum, D., Park, J. H., & Kim, M.-S. (2018, October). Patient quality of recovery on the day of surgery : Medicine. LWW. Retrieved February 9, 2022, from https://journals.lww.com/mdjournal/fulltext/2018/10050/patient_quality_of_recovery_on_the_day_of_surgery.81.aspx
- [20]Okumu, C., Oyugi B. (2018). Clients' satisfaction with quality of childbirth services: A comparative study between public and private facilities in Limuru Sub-Country, Kiambu, Kenya. <https://doi.org/10.1371/journal.pone.0193593>
- [21]Ozkan, S., Bal, M., (2019). "Maternal Satisfaction in normal and caesarean birth: A cross-sectional study". Retrieved from *International Journal of Caring Sciences*
- [22]Panagopoulou, V., Kalokairinou, A., & Tzavella, F., Kolovos, P. & Tziaferi, S. (2018). Women's views of postnatal care and evaluation of an intervention of postnatal home visits in Greece. 4. 20-36.
- [23]Panth, A., & Kafle, P. (2018, June 24). Maternal satisfaction on delivery service among postnatal mothers in a government hospital, Mid-Western Nepal. *Obstetrics and Gynecology International*. Retrieved April 27, 2022, from <https://www.hindawi.com/journals/ogi/2018/4530161/>
- [24]Philippine Statistics Authority (PSA) and ICF. (2018). *Philippines National Demographic and Health Survey 2017*. Quezon City, Philippines, and Rockville, Maryland, USA: PSA and ICF.
- [25]Pinto, S., Fumincelli, L., Mazzo, A., Caldeira, S., & Martins, J. C. (2017). Comfort, well-being and quality of life: Discussion of the differences and similarities among the concepts. *Porto Biomedical Journal*, 6-12.
- [26]Prokopowicz A, Korzeniewska A, Byrka K. (2021) "Patient anxiety of verticalization on day 0 after a Cesarean section." *Arch Gynecol Obstet*. 2021;303(2):391-399. doi:10.1007/s00404-020-05748-3
- [27]PSA.gov.ph. 2022. Births in the Philippines, 2017 | Philippine Statistics Authority. [online] Available at: <<https://psa.gov.ph/content/births-philippines-2017>>.
- [28]Rafiei, M., Saei Ghare, M., Akbari, M., Kiani, F., Sayehmiri, F., Sayehmiri, K., & Vafaei, R. (2018, April). Prevalence, causes, and complications of cesarean delivery in Iran: A systematic review and meta-analysis. *International journal of reproductive biomedicine*. Retrieved April 27, 2022, from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6004597/>
- [29]Regmi, S., Kaphle, H. P., & Gupta, N. (2017). Maternal satisfaction regarding perinatal care and influencing factors in tertiary hospitals of western, Nepal. *Medicine*, 6(3), 471-475.
- [30]Royse CF, Chung F, Newman S, Stygall J, Wilkinson DJ. Predictors of patient satisfaction with anaesthesia and surgery care: a cohort study using the Postoperative Quality of Recovery Scale. *European Journal of Anaesthesiology* 2013; 30: 106-10.
- [31]Shoorab, J.N., Mirteimouri, M., Taghipour, A., & Latifnejad Roudsari, R. (2019). "Women's Experiences of Emotional Recovery from Childbirth-Related Perineal Trauma: A Qualitative Content Analysis." *International journal of community-based nursing and midwifery*, 7(3), 181–191. <https://doi.org/10.30476/IJCBNM.2019.44993>
- [32]Stützer, P.P., Berlit, S., Lis, S. et al. Elective Caesarean section on maternal request in Germany: factors affecting decision making concerning mode of delivery. *Arch Gynecol Obstet* 295, 1151–1156 (2017). <https://doi.org/10.1007/s00404-017-4349-1>
- [33]Sveinsdottir, H., Borgthorsdottir, T., Asgeirsdottir, M.T., Albertsdottir, K. & Asmundsdottir, L.B. (2016) "Recovery after same-day surgery in patients receiving general anesthesia: A cohort study using the quality of recovery-40 questionnaire." *J Perianesthesia Nurs*.

- 2016;31(6):475-84. <https://doi.org/10.1016/j.jopan.2015.07.003>
- [34]Tamer, L. K., & Dag, G. S. (2020). The Assessment of Pain and the Quality of Postoperative Pain Management in Surgical Patients. *Sage Journals*. doi.org/10.1177/2158244020924377
- [35]World Health Organization. (2019). "Death from Caesarean Sections 100 times higher in developing countries: global study." Retrieved from:<https://www.who.int/reproductivehealth/death-from-caesarean-sections/en/>
- [36]World Health Organization. (2007-2008). WHO Global Survey on Maternal and Perinatal Health.
- [37]Younas A., & Sundus A. (2018,): Patients' Experiences And Satisfaction About Care Provided By male Nurses In Medical Surgical Units In Is-lamabad, Pakistan: A Pilot Study. In *Nursing Forum*. 53 (1): 12-19. <https://doi.org/10.1111/nuf.12212>.
- [38]Zhang, L. M., Hornor, M. A., & Robinson, T. (2020, October 1). Evaluation of postoperative functional decline among older adults. *JAMA Surgery*. Retrieved February 9, 2022, from <https://jamanetwork.com/journals/jamasurgery/fulla>

Hybridity of Culture in Five Selected Filipino Postcolonial Novels

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Abstract: Postcolonial literature interrogates the hybridity of culture, since postcolonial texts are deeply rooted in the culture of its subject and writer/s. Utilizing thematic analysis grounded upon Ashcroft et al.'s *The Empire Writes Back* and Dick Hebdige's *From Culture to Hegemony*, the paper explored how five Filipino postcolonial novelists depicted, recreated, interrogated, or problematized the issue of hybridity of culture in their works. Moreover, the paper explicated how the novels aptly mirror the emergence of one's culture from pure/monoculturalism to hybrid/multiculturalism through the analysis of the novels' characterizations, narrative techniques and conveying of meaning. The study recommends future study on this topic, employing other diasporic novels and utilizing other literary theories related to hybridity and/or postcolonialism.

Keywords: *culture, hybridity, postcolonial, monoculturalism, multiculturalism*

Introduction

Postcolonialism focuses on several issues; the most relevant of which is the question on how culture, with its components like sex, class, and ethnicity, functions in colonial and postcolonial discourses. Colonized forces formed to articulate their experiences of the politics of oppression. Postcolonial theorists believe that one's own colonial position will inevitably affect the text production. Third world country writers could have written back to their empires by representing their experiences.

Postcolonialism, if defined as after colonialism, and is a restrictive and limiting term for it connotes only political independence. It is, therefore, a sustained process in colonial and neo-colonial societies. As such, it concerns itself with the strategies to subvert the actual material and discursive effects of the imperial process. Postcolonial writing thus focuses on the "significance of language and writing in the construction of experience; and the use of subversive strategies, mimicry, parody and irony" (Ashcroft et al., 2002).

Postcolonialism, either with or without hyphen, means only one thing - the revisiting and the reconsideration of previous, recent, and current historical materials in the countries that have been colonized and/or are still experiencing the "aftermaths" of colonization in all modes of existence (culture, society, politics, and economics). Postcolonial writings then, emerge in their present form out of the experience of colonization and asserted themselves by "foregrounding the tension with the imperial power and by emphasizing their differences from assumptions of the imperial center" (Ashcroft et al., 2002, p. 5). Consequently, postcolonial literature does not simply consist of writings produced after colonization because it also covers works resulting from the interaction between the colonizing (imperial) culture and the broadness of indigenous practices.

In societies which were once under colonial rule, it is not surprising to admit that their contemporary art, philosophy, and literature are in no sense continuations or simple adaptations of the colonizer's models. This is because the process of literary decolonization involves destruction of the colonizer's codes and subversion of the dominant colonialist discourse.

The dismantling process has always been accompanied by the demand for an entirely new or wholly recovered pre-colonial 'reality', given the nature of the relationship between the colonizer and the colonized, its social brutality and cultural denigration, is perfectly comprehensible, yet cannot be achieved. Post-colonial culture is inevitably a hybridized phenomenon involving a dialectical relationship between the 'grafted' colonialist's cultural systems and an indigenous ontology, with its impulse to create or recreate an independent local identity. Such construction or reconstruction only occurs as a dynamic interaction between the colonizer's hegemonic systems and 'peripheral'

subversions of them (Hebdige, 1993). It is not possible to return to or to rediscover an absolute pre-colonial cultural purity, much less create national or regional formations entirely independent of their historical implication in the colonial enterprise (Ashcroft et al., 2002).

Hence, it has been the project of post-colonial writing to interrogate colonial discourses and discursive strategies from its position within and between two worlds: "to investigate the means by which the colonizer imposed and maintained its codes in its colonial dominations of so much of the rest of the world" (Ashcroft et al., 2002, p.38). Thus, the rereading and rewriting of the colonizer's historical and fictional record is a vital and inescapable task at the heart of the post-colonial enterprise. These subversive maneuvers, rather than the construction of essentially national or regional alternatives, are the characteristic features of the post-colonial texts. Post-colonial literature/culture is constituted in counter-discursive rather than homologous practices.

Postcolonial literature and its study are essentially political in that its development and the theories which accompany this development radically question the apparent axioms upon which the whole discipline of English has been raised. Not only the canon of 'classical texts', the disruption of which by new, 'texts' can be easily countered by a strategy of incorporation from the center, but its own specific national, cultural, and political grounding and offers itself as a new system for the development of 'universal' human values, is exploded by the existence of post-colonial literatures.

Post-colonial reading strategies acknowledge that readings and the formations which bring them into being are corrigible. They are not immutable 'truths' but changeable social and political constructions. The concept of literary studies in general will be revitalized by the perception that all texts are traversed by the kinds of complexities which the study of post-colonial literatures reveals.

In postcolonial literature, culture is presented as a construct readily affected by postcolonialism. The colonizing nation, by and large, becomes advantageous or disadvantageous to the culture of the colonized nation, hence hybridity becomes prevalent. In postcolonial literature, hybridity commonly refers to the creation of new transcultural forms within the contact zone produced by colonization. Like syncretism, the term has been recently associated with Bhabha (2012) whose analyses of colonizer/colonized relations stressed the interdependence and mutual construction of their subjectivities. Spivak (1996) added that being too western in orientation, postcolonial intellectuals support the notion of hybridism (multiculturalism) yet cannot move away from the eastern perspective of pure East, pure universal, pure institution, the marginal or specific, or as the para-institutional (monoculturalism). Fanon (2017) likewise instigated that hybridity, as a colonial expression, came out as a catalyst for the accelerated mutation of colonized societies. As a result, new attitudes, new modes of action, and new schemes made their ways into the "pure" or "monoculture". Hybridity then becomes an agent of "in-betweenness" or "multiculturalness", which questions the stability of meaning and identity.

Hybridity, however, is only possible when looked at vis-à-vis the lenses of purity. The former cannot exist without the latter and vice-versa; they are mutually exclusive, therefore, a binary opposition. More than that, it can be said then that purity can be equated to monoculturalism or the cultivation of a single culture, to the exclusion of other possible cultures that might have been present while hybridity parallels with multiculturalism or the cultivation of cultures present without disregarding the mono or native culture, with the aim of refining or embellishing it.

Moreover, multiculturalism (Gandhi, 1998), is a procedure whereby the convenient othering and exoticization of ethnicity merely confirms and stabilizes hegemony. Monoculturalism, in contrast, is once again longing for the pure "Other" of the West (Spivak, 1996); the neo-orientalist anxiety in the anthropological desire to retrieve and preserve the pure authentic native. This construct is also traced in the studies of Cesari (2007) and Landolt (2007).

Given the mentioned backgrounds, there is then a need to look into how contemporary literature (or writers for that matter) address issues of hybridity of culture in their works. This paper then explored how five Filipino postcolonial novelists depicted, recreated, interrogated, or problematized the issue of hybridity of culture in their works using cultural studies and post-colonial frameworks.

Methodology

The researcher used the descriptive-analytical approach defined by McMillan and Schumacher (1993) as “primarily an inductive process of organizing data into categories and identifying patterns (relationships) among categories” in interpreting the novels under study. The instruments used in this study found their basis in Hirsch’s theory that “makes it possible to speak of the validity of interpretation” (Hoy, 1978, p. 12). The interpreter’s primary task is to reproduce the author’s logic, attitudes, cultural givens—in short, the author’s world (Hirsch, 1967). The study then sought to unravel how the five authors recreated and/or interrogated the theme of monoculturalism and multiculturalism through analysis and close reading of the novels’ characterizations, narrative technique, and conveying of meaning with the tenets of Ashcroft et al.’s book, *The Empire Writes Back to the Center*, and Dick Hebdige’s *From Culture to Hegemony* as its theoretical bases. The study aimed to present how novelist coming from a colonized country depicted, recreated, and/or interrogated the issue of hybridity, purity, monoculturalism and multiculturalism of culture, among others.

Results and Discussion

Hybridity of Culture

Hybridity is one of the central themes in the discourse on postcolonial culture/s and identity/ies. It is an operative verbalization of ambivalence and mutability demonstrating a dynamic stride of resistance or opposition to a domineering ideological and cultural colonial hegemony. As a prime mace against oppressive imperial power and —grand narratives, hybridity locates and echoes the in-betweenness of the self and the other offering a rupture at the binarial and oppositional dissertation fashioned by the dominant authority (Fanon, 1991). Often consequential of indecisive passages and incursions of identities, hybridity is at once plural, complex, subversive, intricate and sometimes contradictory cultural interaction. Emerging from this potential creative space is the discourse of postcolonial literature as hybrid that voices and reflects the nuances of hybridity beyond creative and critical realms as understanding to elaborate upon the interconnections between identities, experiences and cultures that are inert and monolithic bestowed by the colonial and hierarchical (El, 2014)

Since *Fish-Hair Woman* talks about “residing” between two opposing, yet equally important locations, or “in-betweenness” as Fanon (2017) suggests, notwithstanding the novel’s being endangered by the encounter between two confusing systems of belief, it follows that the novel tackles the issue of hybridity. This can be traced on the following incidents in the novel study:

Having left the Philippines for Hawaii, Estrella, in *Fish-Hair Woman*, becomes Stella who has shed off her rural ways to fit into the urban setting of Hawaii. The hybridization of the “pure” if not mythic) Filipino identity is further represented by Estrella’s journey from Iraya to the city to Hawaii and then back to the Philippines. This journey she (un)willingly subjected herself to has “changed” her; thus, it symbolizes the hybridization of Filipino identity. She has to cut her hair short, has to dress like an American (...Amber, burnished amber hugged by chartreuse tank top with matching slacks and nails. She’s a fashion plate with a slight American accent and a manner marked by agitation... [Bobis, 2015, p. 103]) and has been addicted to opium—changes that bespeak how a once naïve shy Iraya lass turns into a “cosmopolitan” woman. On a larger scale, this metamorphosis reflects how a once “pure” or monocultural character turns into a hybridized or multicultural one.

Luke McIntyre, who was born and raised in Australia, has slowly accepted Filipino ways. His father Tony too, Don Kiko’s friend, has become a “Pinoy” when he falls in love with Pilar. He has solidarity with Iraya and its people, taking part in its food and engages in its problems, which eventually causes his doom in the end.

This is also mirrored in the actuations of Don Kiko, a devout Roman Catholic, who becomes a Born-Again Christian to alter his past and to hide the machinations, most of them political in nature he has done in his favor. His “hybridized character” can also be supported by his use of both the Spanish and English languages, which consequently, are the languages of Philippine colonizers. Moreover, his

business partnership with a Japanese national for a “private island with excellent games” (Bobis, 2015, p. 131) makes complete the representation of all the colonizers the Philippines has had.

But for Pilar and her guerilla lover, Tony McIntyre, such hybridity is taken into a different scale. By becoming involved with the underground movement, Pilar and her lover mirror the change both their political orientations and their identities—by joining guerillas, they have unknowingly embraced the hybridization of their culture/identity. Moreover, they have shed away their naïveté, and has become involved in the drive towards peace, progress, equality, and justice.

For Pay Inyo, the gravedigger, hybridity, much more multiculturalism can be drawn from his penchant for Western products. His *sari-sari* store is always filled with western goodies-- corned beef, crackers, sandwich spread, even liquor (J and B Whiskey). Although he also sells native Filipino sweets and goodies, the novel tells readers that the Filipino goodies are meant for everyday trade, while the western products reserved for important, if not powerful visitors. More than this, his distortion of the English language by using “truly, truly” as his form of expression echoes how he “hybridizes” not only the English language but also his native tongue.

In *State of War*, the issue of hybridity (multiculturalism) is seen in Adrian’s distorted version of reality. Adrian’s minor problem of mind was brought about by an explosion which “hurled him into a time warp, fixing him forever in a maze of words, a verbal account of four hundred years, tortured and tormenting” (Rosca, 1998, p 376). This mirrors the destruction of the purity of Filipino identity, far from being pristine—the mythic past is an impossibility in a nation of many possibilities, hence the dawn of a hybrid culture. Such impossibility amidst many possibilities is further seen in the genealogy of the novel’s characters which in turn, essays the hybridization of Filipino identity (*i.e.*, paternity issues). Flipping through the pages of the novel, one readily sees that Filipino ancestry, as represented by the characters of the narrative, has been infused with Spanish, American, Japanese blood among others. Needlessly, in their effort to project an “ideal” ancestry, some characters have to lie (Maya has been repeatedly impregnated by a Capuchin monk, she bore him seven sons, but has never told people this, although they know; Mayang, the wife of Luis Carlos, has had an illicit affair with Hans, her husband’s assistant and bore him a child, yet Luis Carlos claims the child is his even if the child’s European features are too much to disregard). Such source of conflict between and amongst characters signifies hybridity.

By taking part in the festival, the characters, like Adrian, Anna and Eliza become hybridized characters because the festival that serves as the frame of the novel is used by Rosca as a symbolic and literal site of questioning dominant belief systems and practicers. Variously referred to as a “festival of memories” and “a singular evocation of victory in a country of too many defeats” (Rosca, 1998, p. 15), it serves as the novel’s link to Filipino “tradition and identity” (Mendible, 2011). A celebration as a product of rebellion and relinquished through language and memory, the festival becomes the locus where anything is possible—where peasant farmers turn into ancient warriors in tribal costumes, guerilla fighters ululate and gyrate with enemy soldiers, while transvestites swagger through the street with sawed-off shotguns under their shirts.

Rosca also uses the festival in the Island of K in *State of War* as the basis for discussion of hybridity. In the novel, the festival seems to straddle between cultural amnesia and cultural renewal, which in turn spell the boundaries multiculturalism (hybridity) has over culturally-bound (monocultural, pure) traditions. By acquiring a significant section of the waterfront property and building a haven for tourists, the dominant elite aims to achieve the “benefits” of a tourism-sponsored “endless fiesta”—seen in modernization, progress, contact with the world, employment—all precursors of a hybrid, multiculturalist society. In their view, half the town would “go on with the festival for the tourists” (p. 38), while the other half could be trained “to work in hotels” (Rosca, 1998, p.38). By fashioning the novel this way, a seemingly joyful affair becomes an exclusive show of domination—where folk “participation” means meeting the demands, if not needs, an elite coterie.

The commercialization of the festival presents its paradoxical status as cultural model or episteme. While the revelry positions popular rebellion and explicate the complexities and tensions common within a community, it also depends for “survival on economic support and the wink of an authorial

eye" (Mendible, 2011). Rosca further hints at this relationship through the "unauthorized" festival occurring during the official event. The Procession or "poor folks' festival" as it is called, takes place in the margins of the central event—and is attended by the island's peasants. This event, ignored by most festival participants, assumes a somber and less vocal form of communication. It involves a modest candlelight display that pays homage to the spirits of Philippine ancestors hence, in a sense, monocultural because it only involves the peasants. The solemnity of the event and the absence of too much pomp and pageantry reify too, the monocultural side of this modest celebration.

Linked to a cultural ethos of self-determination (cf: Bakhtin's "feast of becoming"), the novel represents the "oppositional culture of the oppressed, a countermodel of cultural production and desire" (Stam, 2004). Ultimately then, the novel bespeaks the very hybridity of the once "pure" Filipino identity by using characters and symbolisms the novel is rich of.

Such hybridity also reflects in Clara's evolution from a mere reporter/spectator to an "actress" of the stories she covers in *Eating Fire, Drinking Water*. Having grown inside the Convent of Sta Clara, she has to act based on the decorum set by the nuns (hence, she is pure then), but once outside its portals, and when she starts immersing herself with the "real" world, she gets hybridized. At first, she does not know how to pick up the missing pieces of her life's puzzle, but she is able to do so after going out and embracing the world.

Most characters in the novel, too, (like Laslo who participates in the demonstrations to rebel against the inhumanity of his father but in the end, gets truly involved in the cause they are fighting for); Luis Bayani, the founder of the YRM Movement, Sophia; Rogelio Campos and Dario, soldiers whose lives have been played with by fate) and a number of other characters who have to shed off their being "pure" to become "hybridized" elements. By becoming "hybridized", these characters have undergone multiculturalism stemming from their culturally-bound orientations then (their being pure).

If there is someone who breathes the extent of hybridity the Philippines and the Filipinos have been through in the novel, it is Luis Bayani. Wanting to awaken his comrades, the Filipino government, he, together with other members of the YRM, organized demonstrations aimed at denouncing the government. For Luis Bayani, to denounce the government and all its "inhumanity" is like "putting out fire" (Chai, 1996, p.111) yet he admits that this fire burns "inside us, in the belly of the country" (Chai, 1996, p. 112). Such words can be equated with him saying, Filipinos can no longer regain what was once a good, if not ideal government (representative of purity, monoculturalism) since they have ingested the ways of a bad, abusive government (representative of hybridity, multiculturalism). And although they can fight "water with water", which means they can have a new, pure culture and identity by once again allowing time and space to solidify them--, he also makes Filipinos realize that the result is "splattered in the pages of history: bloodbaths, uprisings, revolutions, you name it. And on it goes." We can have a new, pure identity, but we will forever be at war in our journey towards achieving it, since "after many centuries, we're still a people who eat fire and drink water" (Chai, 1996, p. 243).

This eating fire and drinking water are also reflected in the remnants of hybridity, as opposed to being pure in *When the Rainbow Goddess Wept*. The Macaraigs and the other characters have undergone a lot of trials. At first, they are still "pure", without any trace of hybridity, yet as the war goes on, the experiences that come with it has made them hybridized characters. They have learned to put away the things and ways they have become accustomed to in Ubec and embraced (with reservations of course) the new life they are having in Taytayan. As discussed above, Engr Nando Macaraig, Doc Mendez, Max and Gil Alavarez, have in one way or the other, become hybridized, shedding off their purity (their Filipinoness) when they go to America.

Hybridity can also be in the character of Nando who claims to be both "American and Filipino" (Manguerra-Brainard, 1995, p.87), that although a Filipino, he has much regard for the Americans, he pins his hope on them to win the war they are forced to be a part of. Nida and Max's "child" also hint at this, he, being the product of rape suffered by Nida under the hands of a Japanese soldier. Although, the child does not in any way resemble Max, he claims the child his "own" and even fought with Doc

Mendez when the latter blurted out that he is a fool for keeping a child not his. Such situations suggest how a pure, monoculture becomes hybridized, multicultural. More so, the incorporation of native epics (recounted by Laydan) within the novel's plot breathes the hybridity not only of the text itself but also of the hybridization of the pure, native Filipino culture.

On one hand, breathes out characters who are already hybridized even at the start of the story. The whole of Rio's clan, they, being associated both with the Philippines and the United States, and other nations outside the Philippines like Spain, qualifies them to be practicing hybridity, much more, multiculturalism. Rio even claims that they are a "family of opportunists" (Hagedorn, 1990, p. 6). At the start of the novel, Rio and Pucha, and some of their cousins are seen "swooning" over American movies, actors, actresses and products: we have Pucha collapsing over an American actress and actor, even imitating their ways; we have Mickey who wants to see Elizabeth Taylor naked; we have Isabel Alacran who is a jetsetter among others.

To illustrate further, Rio leaves Manila for Chicago but she does not associate herself as a citizen of the Philippines or of America. She feels home only in airports, she finds enjoyment in globe-trotting, almost preferring to be a citizen of the world. She realizes through her dream that that she has to embrace her destiny, "...to fly away around in circles, to swoop and dive in effortless arcs against a barren sky, to flap and beat her wings in her futile attempts to reach what surely must be heaven."... (Hagedorn, 1990, p. 247) (which is home).

Rio's listening with Lola Narcisa and the servants to radio soap operas magnify her hybridity. Lola Narcisa and the servants seem to be remnants of pure, monocultural tendencies since they drunk themselves with melodramas the radio offers. Rio on one hand, is both a listener and a "slave" of American movies, hence hybridism and multiculturalism. With Rio listening with them, hybridity surfaces best in the novel, as she tries to bridge the gap between the pure, monocultural tendencies and the hybridized, multicultural ones, which results of course, into hybridism and multiculturalism still.

The presence of transvestites (Eugenia/Eugenio) and bisexuals (Joey Sands) in the novel also speak of the text's hybridity. Eugenia/Eugenio, Uncle Mad's love, is a hermaphrodite; she was once a famed singer and dancer. Her presence in the novel voices not only the novel's, but the Filipinos' hybridism, if not multiculturalism. The fact that she is genderless; she therefore embodies how Filipinos have become "genderless" as well in terms of their pure, native culture. By being androgynous, she becomes a representation of Filipinos' hybridism.

Joey Sands' presence in the novel also yields to the novel's hybridism, multicultural leanings. Considering Filipino machismo, one sees gays are not so much welcomed in the Philippines, they are considered a disgrace, or worst, a "plague" (*salot*). With Joey Sands playing a major role in the novel, it tells us that the once "male" only status quo for the Pinoy male (which is pure, monocultural), has now turned out of date—we now have gays, lesbians, transgenders and bisexuals. With his "bisexuality", he turns out to be a representative of Filipino's hybridism, multiculturalism.

Hybridism or multiculturalism can also be perceived from the language Pucha Gonzaga and Cora Camacho use in the novel. Both characters utilize "broken English", most of the time, incorporated with Tagalog words. Their command of the English language turns them to laughing stocks since they violate rules of diction, spelling and worst, grammar. For this fledging critic, the incorporation of such use of language in the novel does not only to keep up with the novel's fragmented structure but also to justify the very hybridism both of the text and of the Filipinos. The fact that neither Pucha nor Cora speak straight, if not bad English or Tagalog makes them hybridized characters, representative of the Filipinos no longer pure, monocultural leanings.

Lastly, the incorporation of Spanish, Tagalog, Ilocano, and even Bisaya within the predominantly English text demonstrates a dash of hybridism as well. The novel's difficulty too, also breathes out its hybrid leanings. A revolt against the linear plot, the novel involves multiple narrators, and cyclical plot. Such style then equates to hybridism or multiculturalism, since it opposes the usual linear plot, which in turn represents purity or monoculturalism.

Conclusion

The issue of hybridity appears for this critic, without uncertainties, is prevalent in postcolonial literature. Reverberations of such issue are seen in the above analysis of the novels under study. Characters primarily breathe this, with the symbolisms and text comes as secondary. Notably, the presence of pure, monocultural leanings is already impossible since the elements reflecting them in the novel are all geared towards hybridism or multiculturalism. Although the women novelists do not directly state it, one can assume that, s/he can no longer get back that purity or monoculturalism s/he may dream of, it is already beyond his/her grasp, thanks to the forces and factors around him which "tainted" and at the same time "refined" that purity to make it hybrid and multicultural.

References

- [1] Ashcroft, B., Griffiths, G., & Tiffin, H. (2002). *The empire writes back: Theory and practice in post-colonial literatures*. Routledge.
- [2] Bhabha, H. (2012). *The location of culture*. Routledge.
- [3] Bobis, M. (2013). *Fish-hair woman*. Anvil Publishing Inc.
- [4] Cesari, J. (2007). *Islam and multicultural societies: A transatlantic comparison*. Palgrave Macmillan.
- [5] Chai, A. J. (1996). *Eating fire, drinking water*. Ballantine Books, Random House Publishing Group.
- [6] Fanon, F. (2017). *The wretched of the earth*. Preface by Jean Paul-Sartre.
- [7] Gandhi, L. (1998). *Postcolonial theory: A critical introduction*. Columbia University Press.
- [8] Hagedorn, J. (1990). *Dog eaters*. Penguin Books.
- [9] Hebdige, D. (1993). *Subculture: The meaning of style*. Routledge.
- [10] Hirsch, E. Jr. (1967). *Validity in interpretation*. Yale University Press.
- [11] Hoy, D. (1978). *The critical circle: Literature, history, and philosophical hermeneutics*. University of California Press.
- [12] El, J. (2014). Postcolonial literature, hybridity and culture. *International Journal of Humanities and Social Science Studies*, 1(2), 125-128.
- [13] Landolt, P. (2007). *Nation-state building projects and the politics of transnational migration: Locating Salvadorans in Canada, the United States and El Salvador*. Palgrave Macmillan.
- [14] Manguerra-Brainard, C. (1994). *When the rainbow goddess wept*. Plume Books.
- [15] McMillan J. & Schumacher, S. (1993). *Research in education: A conceptual introduction* (3rd ed.). Harper Collins College Publisher.
- [16] Mendible, Myra (2011) *The politics and poetics of Philippine festival in Ninotchka Rosca's state of war*. Florida Gulf Coast University.
- [17] Rosca, N. (1998). *State of war*. W.W. Norton and Company.
- [18] Spivak, G.C. (1996). *The post-colonial critic*. Routledge
- [19] Stam, Robert (2004). *Subversive pleasures: Bakhtin, cultural criticism and film*. John Hopkins University

Analysis of the Obscure Biblical Allusions in Robert Frost's "Mending Wall"

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Abstract: Allusions are implied or indirect references to give aesthetic value to any writing. Robert Frost used allusions in his poems, including Biblical allusions. But Frost's use of Biblical allusions in the poem, "Mending Wall", has not yet been studied in detailed. The reason could be that the Biblical allusions are not overtly present in the poem. But a careful poetic analysis reveals that enough Biblical allusions are present in an obscure form. Therefore, the purpose of the study was to analyze the obscure Biblical allusions in the poem. The study was done through poetic analysis which is a part of the social-scientific research method. The poetic analysis method discovered obscure Biblical allusions including the title of the poem, "Mending Wall" alluding to God's salvation as a mending process; "He is all pine" as an allusion to one of the woods used to make the cross for the Crucifixion of Christ; "apple orchard" as a reference to the Garden of Eden; "good neighbor" to Jesus' command to love the neighbor through the parable of the "Good Samaritan;" "loaves" to the miracle of loaves and fishes; and "Bringing a stone.../In each hand" denotes the tablets of the Ten Commandments carried by Moses. Therefore, all these references used in the poem by Robert Frost have a Biblical affiliation and therefore it can be concluded that these are the obscure Biblical allusions found in the poem.

Keywords: *obscure allusion, biblical, poetic analysis, mending wall, good neighbor*

Introduction

Robert Lee Frost or simply Robert Frost, began his poetry career as a teenager and began to teach at a school when he was seventeen. Frost had only a visual memory of his first small school up in the hills near Salem, New Hampshire, for what was essentially his first teaching experience, early in the 1900s. While the kids did their work in their seats, he liked to sit at the window and draft his poems while gazing out into the pine trees (Newdick, 1936).

The opening poem of the American poet, Robert Frost's second collection of poetry, *North of Boston*, which was released in 1914, is named "Mending Wall." The "Mending Wall," like the majority of the poems in this book, is a tale set in a rural New England community. It talks about building a barrier between the properties of two New England farmers each spring. Every year, they ponder how the wall is breached (Sethi, 2018).

This poem is built around the life of two neighbors who met mainly in the spring of every year to mend their wall. For the speaker of the poem, Frost himself, this exercise of mending is more of a playful thing than a serious one. Nevertheless, they took this activity to not only mend their wall, but also to stitch their relationship.

The poem uses only one explicit allusion and that is the "elves." But this research paper attempts to identify obscure Biblical allusions that are present in the poem, and is also an attempt to investigate Robert Frost's effort to include Biblical allusions creatively in his classic work.

Literature Review

Grace (Grace, 1939) considers each poem from the standpoint of the quantity and caliber of the syntheses it contains in order to analyze and assess it. The synthesis is a phrase that is both potent and distinctive, in which the individual words are obscured by the whole of which they are a part. No word can be changed or removed without causing the synthesis to fail. In other words, the synthesis—the irrevocable union of one word, image, and sound with one or more other words, images, and sounds—is the place in any particular line where the poetry is most concentrated.

In literature, allusion is a very important device, and that makes poetry very difficult to survive without it. M. H. Abrams, as cited by William Irwin, defines allusion as "a brief reference, explicit or indirect, to a person, place, or event, or to another literary work or passage (Irwin, 2001)." Irwin further pointed out that, mainly allusions are overt, but sometimes allusions are covert; they may even be concealed. For instance, it is commonly known that Pope attempted to hide many of his allusions; otherwise, his intended audience would have been somewhat smaller. The idea is that allusions do not have to be subtle (Irwin, 2001). Irwin also asserts Michael Leddy's belief that allusion can sometimes be so subtle that only the author is aware of it, even if in theory others should be able to spot it. It can be isolated, directed, and isolated on a micro level (Irwin, 2001).

Frost is a master artist of words who created classics that penetrated human souls regardless of distance, culture, and norms. "Frost's poems are so marvelously intricate that they reward attention to details of imagery, allusion, and tone (Pack, 2003)."

As a matter of fact, the poetry of Robert Frost is rife with irony and complex undertones. When a poem—or all of Frost's poetry—seems to have been understood by the reader, the poet/magician pulls the rug out from under him, and the reader starts to realize that he has been duped. Despite having very straightforward language, Frost's poem "After Apple-Picking," which was first published in his book *North of Boston* in 1914, is archetypal in meaning. Frost conceals the more obvious meanings of his poems using literary tactics like symbolism, imagery, dramatic setting, and—as Frost himself put it—"sound of sense." The vague meanings and allusions to various subjects in other Frost poems like "Mending Wall" and "Come In" are frequent (Tebbe, 1997).

His highly acclaimed dramatic narrative poem, "Mending Wall," is proof of his exceptional creativity. Frost wrote this poem in early 1913 (published in 1914), when he had been in England for about a year. According to John Evangelist Walsh and Douglas Wilson, as paraphrased by Sanders (Sanders, 2007), Frost's excursion to Kingsbarns, Scotland, in August of that year was inspired by the stone walls he saw while out for a day walking with the British academic J. C. Smith. Frost was drawn to Smith at once and opened up to him about the Derry farm, from which he had been gone for four years, as well as his upcoming second book, as their ensuing contact makes evident. After arriving back in Beaconsfield, Frost wrote to Sidney Cox about the stone walls, using the local term for them—"dry stane dykes"—and saying just, "I liked those," a terse statement given their apparent significance. The readers appreciate Robert Frost's "Mending Wall." Regardless of being a modern poet, Robert Frost used blank verse in the poem and that is to win readers' admiration. The speaker of this poem is opposite the wall. The speaker's older neighbor is separated from him by a wall. While the neighbor sees this wall as a symbol of progress, he views it as unnecessary. So, the separation of those who live in the same society is the key issue. It also represents a challenge in transition (Latif et al., 2022).

Robert Frost juxtaposes two individuals who appear to be very different in this poem on either side of a crumbling stone wall. Then he assigns them the responsibility of fixing the damage. One of the guys, who is the speaker of the poem, isn't sure if he really wants to fix the wall each year or if he just does it to spend time and talk with his neighbor while also having a philosophical conversation with those of us who are listening to the poem. He seems to have a tremendous desire to remove the obstacles standing in the way of the complete union of space and thoughts (Luce, 2000).

The 'wall' in the poem stands for the duality of life, the subject of destruction and creation, which are interdependent. Here, we can see that destroying something doesn't always mean it's a negative thing if it inhibits decent neighbors from getting along, just as creating something that alienates people from one another is not always a good thing. The Frost's wall, which simultaneously divides and brings two individuals together, is a representation of ambiguity (Srinivasarao, 2013).

They get together annually, and they rebuild the wall. Hard and impenetrable boulders make up the wall. The speaker in Frost's poem imagines them as loaves and balls—bread to be shared—and toys—another type of outdoor game—to be played together. Frost contends that the wall, with all of its symbolic implications, serves as the framework for healing the relationship between these estranged men (Perlow & Furman, 2017).

It is quite clear that the entire poem is about walls in the metaphorical sense of dividing people. However, the wall that divides the speaker from his neighbor is also a wall that mends, indicating that it serves both a positive and a negative purpose. The speaker says: "Before I built a wall I'd ask to know / What I was walling in or walling out" (Lathem, 1969).

The typical focus of criticism of "Mending Wall" is on what is walled off in an absurd ritual, yet what is walled in is just as significant to the poem (Arms & Henry, 1979).

The poem is also rich with symbolisms. Especially, the symbolism of the apple tree and the pine tree. The apple is a representation of both guilt and atonement in Christian tradition. In an 18th-century hymn, the tree that Eve was barred from eating from in the Garden is now referred to as "Jesus Christ, the Apple Tree." The cedar, a member of the pine family, is connected to God's worship in the Bible; Solomon's temple was constructed from Lebanon cedars (NRSV, 1 Kings 5) (Phillips, 2020).

Like many other great poets, Frost's poems also exhibit simple layers but at the same time are multilayered and complex. Even this poem, "Mending Wall" is quite heavy and complex. "The first surface meaning, the anecdote, the parable, the surface meaning has got to be good and to be sufficient in itself. If you don't want any more, you can leave it at that" (Cook, 1976).

Frost used simple words with a multipurpose effect. "Frost's name for the phenomenon was *synecdoche*—the name for the part signifying the whole, as in "hands" for "sailors" or "wave" for "sea" (Quinn, 1999).

In intellectual and political debate, lines from Robert Frost's well-known poem "Mending Wall" are frequently used to frame discussions of boundaries. Some have used passages from the poem to defend the building of physical barriers, while others have challenged the seeming truism the poem presents (Madsen & Ruderman, 2016).

Many of Frost's poems ask a question and offer two opposing viewpoints. In some, Frost uses an allusion to skew the argument in favor of one point of view. However, the allusion is so subtle that the reader doesn't notice it, giving him the impression that the poem is conflicted because the poet hasn't made up his mind about the issue (Selvi & Malar, 2021).

Findings

A detailed analytical study of Robert Frost's "Mending Wall" by the researchers clearly brought out the significant, though obscure, Biblical allusions. All the suggested allusions are positioned creatively in different lines of the poem by the poet.

Many great writers of the English literature including Spenser, Shakespeare, Milton, Tennyson, and Browning used Biblical allusions. If they didn't use allusions, much of the charm and the worth of their poetry would have gone. Even the American authors used Biblical allusions including Robert Frost in his poems.

1. "Mending Wall"

The poem's title, "Mending Wall" has "Wall," which is a common motif found in the Bible. The Bible has some important stories related to walls that are fascinating. Joshua's effort to destroy the walls of Jericho and Nehemiah's efforts to rebuild the walls of Jerusalem are accurate examples. They are metaphoric and symbolic. With reference to the stories related to walls in the Bible, walls are a symbol of protection, safety, salvation, and strength. For example, Samuel about David's messengers said, "They were a wall to us both by night and day, all the time we were with them keeping the sheep" (1 Samuel 25:16, 2010).

As quoted by Daniel L. Dreisbach from the Dictionary of Biblical Imagery, "walls become a symbol of salvation itself (Dreisbach, 2007)." Besides its metaphoric and symbolic significance, Robert Frost uses wall as an obscure allusion to God's salvation. This can be further established when the reader delves into "Something there is that doesn't love a wall, / That wants it down. "I could say "Elves" to him" (Lathem, 1969).

"Elves" are considered as spirits that can bring diseases and destruction. In the poem, they are the ones who don't like the wall and thus the "mending" goes on. Thus, the researchers establish that "Mending wall" alludes to the salvation of God as a work in progress to save and protect God's people despite "Elves" working against it.

Even though this is one perspective to establish "mending wall" as an obscure Biblical allusion as God's protection, there are other interpretations that treat the "wall" as a metaphor or as a symbol of things that are entirely different.

2. "Pine" and "apple orchard"

Trees have prominent symbolic significance in the Christian theology. Buckley (2017) by quoting Mircea Eliade, stated that, 'Christians view Jesus Christ, a historical figure who is frequently represented by the wooden cross on which he died, as their sacred center rather than a specific location. However, in Christian theology, the tree also represents both Adam's fall in the Garden of Eden and salvation via Christ's crucifixion. The tree is considered a profane emblem of spring and renewal. The tree has come to represent human redemption and an extension of the cross in Christian literature.'

The New England farmer Robert Frost's daily life included both apples and pines. However, Frost, a scholar of classical and biblical literature, also owned them and considered his poems as dialogues with the entire canon of religious and secular literature. He emphasizes the qualities of the two farmers in the "Mending Wall" by using the symbolism of the apple and the pine. He also employs it to mimic and refute a key passage, the conversation between Eve and the serpent in the Garden of Eden (Phillips, 2020).

"Not satisfied with apple tales, legends and symbols, many people in the Middle Ages began searching for the Garden of Eden and its infamous apple tree.... The apple began appearing in devotional pictures, often mythical depictions of the Garden of Eden (Janik, 2011).

In lines 24-26 (Lathem, 1969) of the "Mending Wall" Robert Frost writes, "He is all pine and I am apple orchard / My apple trees will never get across / And eat the cones under his pines, I tell him." If the apple tree is a temptation to life, the pine forest is a temptation to death," according to Philips (2020). This establishes the researchers' assumption of the "pine" tree used in the making of the cross. Similarly, the presentation of the two trees alludes to the two trees in the Garden of Eden. One tree was the Tree of Life and the other was the Tree of the Knowledge of Good and Evil (Genesis 2:8-9, 2010).

3. "Good neighbors"

Love is the foundational principle that keeps neighbors as "good neighbors." That's why in the Gospel of Matthew 22:37-39 (Matthew 22:37-39, 2010) Jesus says, "³⁷ 'You shall love the LORD your God with all your heart, with all your soul, and with all your mind.' ³⁸ This is *the* first and great commandment. ³⁹ And *the* second is like it: 'You shall love your neighbor as yourself.'

A "good neighbor" is always and should be interested in the affairs of his neighbor. By taking care of the neighbor, the caretaker would become a "good neighbor." That's what Jesus Christ explained through the parable of the "Good Samaritan," and this term is well known in all humanitarian and secular circles beyond the Christian religion.

Robert Frost's poem is also a reflection of the universal need for limits, a reflection on how to sustain societal harmony, and a philosophical investigation into who our neighbors might be, ethically and psychologically. The narrative of two neighbors is presented. They get together every spring to fix a deteriorating stone wall between them and the poem distinguishes between two methods based on their characteristics. One that focuses on the ceremonial act of mending to this shared work using a falling wall as an opportunity for creativity and play, and one who feels compelled to keep using a father's tired cliché (Hinrichsen & Dempsey, 2011).

The opportunity to mend the wall can be considered as an opportunity to mend the neighborly relations. Frost's next-door neighbor had an intriguing viewpoint on this yearly tradition of wall-mending. "Good fences make good neighbors." He might have noticed something in that yearly tradition that we missed. Frost believed that his apple trees would never wander into his neighbor's pine forest without permission and consume its pinecones. He made fun of his neighbor by using this absurd image. His neighbor, though, had not argued. "Good fences make good neighbors," he merely retorted. Frost continued to walk alongside his neighbor along the wall. To ensure that two herds of cattle are kept apart, you might require sturdy fences. On this land, however, there were no cows. He only says, "Good fences make good neighbors" (Robeck, Jr., 1999).

According to Copland and Peat (2016), neighbors can be both wonderful and unpleasant, as Frost's speaker attests to. Comparing the concept of the neighbor to two other categories of human relationships—family and friendship—helps us to better comprehend its distinctive features. The concept of family conjures up permanent and legally binding blood ties or social contracts. Contrarily, friendship is a non-contractual relationship. Additionally, it is founded on the acceptance of diversity while imagining connections across that diversity. The neighbor paradigm allows for even more diversity than friendship because neighbors don't always look for kinship but rather coexist in an uneasy, occasionally hostile, occasionally helpful nearness. Neighbors form a temporary, open, and non-binding community.

Thus, the use of "good neighbor" by Robert Frost is a clear indication of its use as an obscure Biblical allusion.

4. "Loaves"

The use of the first literary device in the poem is in line 17 in the form of a metaphor. Stones are compared to the "loaves", and it evokes the reader to the miracle of loaves and also the breaking of bread by Jesus in the Bible.

Van Iersel, as quoted by van Aarde (1994), "regards the variation in the wording 'He gave thanks and broke the loaves' (Mk 6:41) and 'When he had...given thanks, he broke them' as of fundamental importance. If we accept, as most scholars do, that this 'central formula' is an allusion to the celebration of communion in the early church."

Aarde (1994) further noted that the preceding result is undeniably true when Mark 6:41 and Mark 8:6 (the language of the twofold narrative, respectively), and Mark 14:22 and 1 Corinthians 11:23–24 (the words of the Markan and Pauline narratives of the establishment of communion), are compared: The stories about the multiplicity of loaves were not connected to the custom of communion by Mark. Before Mark, it was present in the transmitted history. John's association of the miracle of the multiplicity of loaves (Jn 6:1–15), the link to the Old Testament story of the manna from heaven (Jn 6:22–40), and the custom of communion further supports the inference that has been made (Jn 6:41–59).

Therefore, "loaves" is another obscure Biblical allusion used by Robert Frost. Furthermore, in line 18, Frost mentions that "we have to use a spell to make them balance." The use of "spell" as an allusion to the prayer of Jesus that multiplied the loaves to feed the listeners and balance their hunger. Thus "loaves" gets firmly established as an obscure allusion in the poem.

5. "In each hand, like an old-stone savage armed"

There are several thoughts this line from the poem can evoke in the readers. Readers subconsciously suppress the unpleasant and out-of-place imagery of the "stone-armed savage" and the "yelping dogs" because they seem out of place in the pastoral setting of the poem. These pictures don't go with the typical notion of a first reading of the poem or the typical perception of the poet. Maybe erecting walls is both a savage invention and a pitiful first step away from savagery (Dubinsky, 1995).

Ahmed and Al-Gobaei (2013) reflected on Robert Frost's lines from "Mending Wall" that talk about 'The neighbor resembling a Stone Age savage when he is carrying stones and is walking along the wall. In this dramatic monologue, the narrator poses inquiries and then he responds to them.'

This dramatic monologue, as part of visualization, can also be alluded to Moses, the Bible hero, carrying the two stone tablets with Ten Commandments and reaching the people of Israel. Especially, Moses got a savage look after seeing the Israelites worshipping the golden calf. Exodus 32:19 (Ex. 32:19, 2010) says, "So it was, as soon as he came near the camp, that he saw the calf *and* the dancing. So Moses' anger became hot, and he cast the tablets out of his hands and broke them at the foot of the mountain."

Discussion

For English poetry analysts, Robert Frost's poems are an interesting mix of challenge and adventure. This research is proof to that and moreover there is a treasure trove that awaits for anyone who is willing to take up the challenge. Thus, the present study researched and analyzed the obscure Biblical allusions in Robert Frost's "Mending Wall."

Works of poetry are not just a simple literary emancipation, but it's a storehouse of literary creativity that opens new chapters every day. In that context, Frost's "Mending Wall" still holds valuable treasures.

The use of Biblically connected words, phrases, or events like "Mending Wall," "loaves," "pine," "apple orchard," "good neighbors," and "in each hand, like an old-stone savage armed" are all proved as Biblical allusions used by Robert Frost. This was possible due to the previous studies done by several researchers on the meaning of allusion and the Biblical allusions found in Frost's poems that are similar in other literary works of other writers. To elaborate it further, as Irwin (Irwin, 2001) pointed out, allusions "can be isolated, directed, and isolated on a micro level. Because Frost's poems are 'marvelously intricate and they reward attention to details of allusion' (Pack, 2003), "Mending Wall" also has 'allusions to various subjects' (Tebbe, 1997).

Therefore, this poetic analysis could establish that the title "Mending Wall" as an obscure reference to Joshua's effort to destroy the walls of Jericho and Nehemiah's efforts to rebuild the walls of Jerusalem, and also "wall" as an allusion to God's protection as Dreisbach establishes (2007). Also, "loaves" used as a metaphor in the poem is a clear allusion to the feeding of five thousand, and also an allusion to the 'celebration of communion in the church' (Aarde, 1994). This "communion" was Frost's undesirable desire that he establishes through his neighbor. The next obscure Biblical allusions are "pine" and "apple orchard." These are the two allusions that are connected to the Bible, and they are alluded to the two trees in the Garden of Eden. The Tree of Life and the other was the Tree of the Knowledge of Good and Evil found in the book of Genesis in the Bible. Another major Biblical allusion is the "good neighbors." Even though "Good fences make good neighbors" was part of an early writing, it was popularized through Frost's poem. As an allusion, "good neighbor" is clearly alluded to the parable of the "Good Samaritan" told by Lord Jesus Christ. The final allusion, as established by the researchers is in line forty of "Mending Wall" that says, "In each hand, like an old-stone savage armed (Lathem, 1969)." This dramatic monologue clearly helps the readers to visualize the Biblical character Moses, carrying the two stone tablets with Ten Commandments and reaching the people of Israel. Especially, Moses had a savage look after seeing the Israelites worshipping the golden calf (Ex. 32:19, 2010).

These findings may help in the previous studies done regarding the various covert and overt Biblical allusions in a variety of English literature. Nevertheless, the researchers also think that the way this analysis treated some words, phrases, and ideas as obscure Biblical allusions from the poem "Mending Wall" may need further study to fully establish them as Biblical allusions.

Conclusion

"Mending Wall"—true to its name, is still "mending" relations in politics, between countries, and even between ordinary people. Also, it encouraged the researchers to study this great work of poetry to understand how Robert Frost artistically placed obscure Biblical allusions. Thus, the identification "Mending Wall," "Pine" and "apple orchard," "good neighbors," "Loaves," and "In each hand, like an old-stone savage armed" as obscure Biblical allusions in the poem, will enrich the English literature. Moreover, the findings of the study help us to understand the metaphysical elements of Frost's poetry, and the beauty of Bible as a masterpiece that has been inspiring writers of all generations to freely allude to Biblical characters, events, and ideas.

References

- [1] 1 Samuel 25:16. (2010). New King James Version. Andrews University Press.
- [2] Aarde, A. G. V. (1994). Chapter 2: The miraculous multiplication of loaves (Mt 14:13-21 and par): Historical criticism in perspective. HTS Teologiese Studies / Theological Studies. <https://doi.org/10.4102/hts.v0i0.4437>
- [3] Ahmed, K. M., & Al-Gobaei, F. A. (2013). Treatment of Nature in the Selected Poems of Robert Frost: Quest for Humanism and Symbolic Representation. *Journal of Al-Frahedis Arts*, 651–663.
- [4] Arms, G., & Henry, N. (1979). Frost's Mending Wall. *The Explicator*, 30–32. <https://doi.org/10.1080/00144940.1979.9938577>
- [5] Buckley, L. (2017). The Tree as Sacred Symbol in St. Augustine's Confessions and Dante's Divine Comedy. *Classics in the Catholic Tradition*, 1–10.
- [6] Cook, R. L. (1976). Robert Frost: A Living Voice. In *The Georgia Review* (pp. 447–460). <https://www.jstor.org/stable/41399672#metada>.
- [7] Copland, S., & Peat, S. (2016). Mending Walls and Making Neighbors: Spatial Metaphors in the New Modernist Studies. 1–29.
- [8] Dreisbach, D. L. (2007). The "Wall of Separation" Motif in Biblical Literature and Western Political and Legal Thought. 2, 29.
- [9] Dubinsky, J. M. (1995). War and Rumors of War in Frost. *The Robert Frost Review*, 1–22.
- [10] Ex. 32:19. (2010). New King James Version. Andrews University Press.
- [11] Genesis 2:8-9. (2010). New King James Version. Andrews University Press.
- [12] Grace, W. J. (1939). Teaching Poetic Appreciation through Quantitative Analysis. *College English*, 1(3), 222. <https://doi.org/10.2307/371270>
- [13] Hinrichsen, L., & Dempsey, S. (2011). The Good Neighbor: Robert Frost and the Ethics of Community. *The Robert Frost Review*, 8–23.
- [14] Irwin, W. (2001). What Is an Allusion? *Journal of Aesthetics and Art Criticism*, 59(3), 287–297. <https://doi.org/10.1111/1540-6245.00026>
- [15] Janik, E. (2011). *Apple: A Global History*. Reaktion Books Ltd.
- [16] Lathem, E. C. (1969). Mending Wall. In *The Poetry of Robert Frost* (pp. 33–34). Holt, Rinehart and Winston.
- [17] Latif, A., Muhammad, A., & Saira, M. (2022). A Stylistic Analysis of Robert Frost's Selected Poems. *Journal of Development and Social Sciences*, 3(II). [https://doi.org/10.47205/jdss.2022\(3-II\)08](https://doi.org/10.47205/jdss.2022(3-II)08)
- [18] Luce, R. (2000). Mending Walls: Using a Reader-Response Approach to Teach Poetry. In *Reader Response in Secondary and College Classrooms* (pp. 93–94). Routledge Taylor and Francis Group. https://books.google.co.th/books?hl=en&lr=&id=ZUIC_6RO0BoC&oi=fnd&pg=PA93&dq=related:j3UhYrM1HnEJ:scholar.google.com/&ots=EToCHTEeOS&sig=K8AwU5gOEh7CGIOQERmmMGV9dzs&redir_esc=y#v=onepage&q&f=false

- [19]Madsen, K. D., & Ruderman, D. B. (2016). Robert Frost's ambivalence: Borders and boundaries in poetic and political discourse. *Political Geography*, 55, 82–91. <https://doi.org/10.1016/j.polgeo.2016.06.003>
- [20]Matthew 22:37-39. (2010). New King James Version. Andrews University Press.
- [21]Newdick, R. S. (1936). Robert Frost as Teacher of Literature and Composition. *The English Journal*, 25(8), 632. <https://doi.org/10.2307/804974>
- [22]Pack, R. (2003). *Belief and Uncertainty in the Poetry of Robert Frost*. University Press of New England. https://books.google.co.th/books?hl=en&lr=&id=amUdiZLtBJcC&oi=fnd&pg=PR9&dq=Robert+Frost+and+allusion&ots=T6aHs8fb4F&sig=5lLTa_vbahACi168c40JmSuKXVU&redir_esc=y#v=onepage&q=Robert%20Frost%20and%20allusion&f=false
- [23]Perlow, G. L., & Furman, A. C. (2017). On Medicine and Boundaries: Frost's Mending Wall. *Journal of General Internal Medicine*, 32(7), 850–851. <https://doi.org/10.1007/s11606-017-4058-2>
- [24]Phillips, T. (2020). Standing Up for Evil: The Price of Knowledge in Frost's "Mending Wall." *The Explicator*, 78(3–4), 132–135. <https://doi.org/10.1080/00144940.2020.1816880>
- [25]Quinn, G. (1999). Frost's Synecdochic Allusions. *RESOURCES FOR AMERICAN LITERARY STUDY*, 11.
- [26]Robeck, Jr., C. M. (1999). Do "Good Fences Make Good Neighbors"? Evangelization, Proselytism, and Common Witness. 87–103.
- [27]Sanders, D. (2007). Earth, Time, and England: New Light on Frost's "Old-Stone Savage" and "Mending Wall." 18.
- [28]Selvi, M. D. T., & Malar, A. A. (2021). A Critical Analysis of Robert Frost Poems. *Journal of Language and Linguistics in Society*, 1–6. <https://doi.org/10.55529/jlls.12.1.5>
- [29]Sethi, D. D. (2018). Using Robert Frost's Mending Wall to Teach Overcoming Barriers to Communication. 5.
- [30]Srinivasarao, S. (2013). Nature Poetry and Modernity: A Critical Review on Robert Frost Poetry. *Research Journal of English Language and Literature*, 161–164.
- [31]Tebbe, F. (1997). Awakening to Frost. *Harper Anthology*, 125–129.

Financial Statement Quality and Internal Control: Issues, Reasons, and Solutions in Selected Seventh-day Adventist Schools in Sabah, Malaysia

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Abstract: This study analyzed financial statement quality and internal control in five Seventh-day Adventist schools in Sabah, Malaysia. Its goals were to understand their financial reporting challenges and reasons for these problems, as well as to find practical ways to address and resolve them. A qualitative research method was used; schools' financial statements from 2015–2020 were examined, along with audit communication letters dealing with internal control deficiencies. Interviews were conducted with 15 respondents, including principals, headmasters/headmistresses, treasurers, financial staff, and auditors to better understand reasons and look for solutions to these problems. The findings revealed that the schools had financial statement problems such as understated severance allowances, inadequate allowances for doubtful debts, incomplete records of property, plant, and equipment, and inaccurate working capital and liquidity calculations. Internal control deficiencies were discovered that included incomplete reconciliations with banks and higher organizations, minimal segregation of duties, and poor inventory records. The single-entry accounting system practiced by some schools complicated management efforts to raise financial management standards and comply with Generally Accepted Accounting Principles. Overall, the findings revealed that school boards and administrators were struggling to address these issues.

Keywords: *financial statements, internal control, Adventist schools, Sabah, Malaysia, General Conference Auditing Services, generally accepted accounting principles*

Introduction and Literature Review

In every organization, financial statements play an important role in communicating the company's financial position and performance, particularly in guiding the main users such as owners and management, investors, creditors, banks, and government agencies in making decisions. Financial statements should be prepared in accordance with Generally Accepted Accounting Principles so that users are not misled by the financial information revealed, and the reporting entity is protected from fraud. The auditors must act professionally by giving a fair opinion about the statements, and disclosing any financial irregularities found during the audit process. The financial statements should include information for both the current and prior fiscal years so that the entity's performance can be compared with its previous results at the same time in the yearly operating cycle (Szydelko & Biadacz, 2016). High-quality informative financial statements supported with documentary evidence should be prepared with relevant qualitative characteristics such as relevance, faithful representation, comparability, understandability, timeliness, and verifiability (Herath & Albarqi, 2017).

Some not-for-profit organizations have only a few employees and lack strong internal controls. However, administrators and other relevant staff can still establish a good code of conduct, implement policies and procedures to safeguard assets, produce reliable and proper financial statements, and improve administrative effectiveness. Good internal controls are geared toward the prevention of error and fraud, thus helping firms to achieve their objectives while protecting their reputations (Dzomira, 2014). Preparing financial statements that are consistent with generally accepted accounting principles and establishing a high standard of internal control are important issues for SDA schools in Sabah.

According to General Conference Auditing Service (GCAS) reports, the most common financial report infractions were misstatement of Property, Plant and Equipment (PPE), lack of evidence for PPE, lack of evidence for accounts receivable, and lack of evidence for revenue. The most frequently mentioned

internal control weaknesses were minimal segregation of duties and failure to reconcile accounts. These reports also mentioned incomplete monthly financial statements submitted to governing committees and administration (GCAS Annual Report, 2019). In other words, schools are failing to prepare timely and complete financial statements that should be submitted every month. Furthermore, the Sabah Mission Auditing Service (SMAS) found that some primary schools only employed a single-entry accounting system to generate their financial statements and did not use accounting software.

General Conference Auditing Service (GCAS). GCAS serves as an independent internal financial auditor to Seventh-day Adventist church organizations and educational institutions at the secondary level or higher (*GCAS Working Policy 2019-2020*, n.d.). GCAS performs worldwide annual auditing services for Adventist organizations and produces three important reports: 1) An opinion on the financial statements; 2) a policy compliance report; and 3) an audit communication letter (an assessment of internal control systems) (Hamra & Namkote, 2020).

Seventh-day Adventist (SDA) Schools in Sabah. The primary and secondary schools operated by the SDA denomination in Sabah play an important role in providing basic education to their communities, especially church members' children. There are two secondary schools operated by the Sabah SDA Mission and twelve primary church schools, which are mostly located in rural areas. These schools are registered under the Sabah Education Department and overseen by the Malaysian Ministry of Education as private schools and non-profit organizations. The SDA schools in Sabah are supervised by the Education Superintendent of the Sabah Adventist Mission. All schools use the same syllabi and textbooks as the government schools, with Malay as the medium of instruction. Each primary school also operates a kindergarten, so educational programs are offered for kindergarten children aged five to six, primary (grade 1 to grade 6), and secondary (grade 7 to grade 12).

Elementary schools provide knowledge and a basic core of skills that are beneficial to students' lives. The school program was designed purposely to enhance spiritual, physical, mental, and emotional health. One of the main purposes of Adventist primary schools is to prepare students for whole-person development based on biblical values, including stimulating a loving relationship with God. "The secondary school implementing the church philosophy seeks for objectives of spiritual dedication, self-realization, social adjustment, civic responsibility, and economic efficiency" (*SSD Working Policy Book II - Education*, 2015, p. 11). Table 1 shows Adventist and non-Adventist student enrolments in 12 primary schools and 2 secondary schools from 2015 to 2021.

Table 1. 2015-2021 Student Enrollment in SDA Schools, Sabah, Malaysia

Year	Primary Schools			Secondary Schools			Grand Total
	Adventist	Non Adventist	Total	Adventist	Non Adventist	Total	
2015	1014	473	1487	311	134	445	1932
2016	1070	571	1641	345	126	471	2112
2017	1159	560	1719	354	96	450	2169
2018	1162	563	1725	351	122	473	2198
2019	1161	553	1714	361	114	475	2189
2020	1108	578	1686	382	119	501	2187
2021	1120	581	1701	382	119	501	2202

Source: *Schools' Closing Reports, Education Department, Sabah Mission (12 Primary, 2 Secondary)*

Financial Statements. A financial statement is a financial report that discloses key information about an organization's financial position in regard to its assets, liabilities, and equity. It also shows financial performance derived from income and expenses, which is useful in analyzing management's

responsibilities for managing the entity's economic resources, and evaluating the organization's past and future potential to generate cash flows (IFRS, 2018). The primary goal of financial reporting is to reveal the organization's financial information about its financial position, which includes economic resources (assets) and claims (liabilities and equity), as well as information about how income is earned and spent, which affects the value of economic resources and claims (IFRS, 2018).

Financial Reporting Quality and Qualitative Characteristics. Accounting quality is defined as the capability of accounting measures to reflect a firm's economic position and performance (Barth et al., 2008). High-quality financial reports may be achieved when sources contain highly usable information and vice versa (Osasere & Ilaboya, 2018). High-quality financial reporting must be precise and predictable, transparent, not misleading, and correspond to specified objectives and qualitative characteristics (Herath & Albarqi, 2017). The information in financial reports is useful when it fulfills fundamental and enhancing qualitative characteristics of financial information. These fundamental qualitative characteristics are relevance and faithful representation, whereas enhancing qualitative characteristics consist of comparability, verifiability, timeliness, and understandability (IFRS, 2018).

Small and Medium Enterprises (SMEs). Since the SDA schools in Sabah registered under the Malaysian Ministry of Education are small not-for-profit organizations, some characteristics of Small and Medium Enterprises (SMEs) are explored. The definition of SMEs under the qualifying criteria looks at size of operations and is categorized into micro, small, and medium sizes based on sales turnover or the number of full-time employees, whichever is lower. Table 2 shows details explaining the SME definitions for services and other sectors, including private education.

Table 2. *Malaysian Categories and Criteria for Small and Medium Enterprises*

Category	Sales Turnover	Number of Full-Time Employees
Micro	less than RM300,000	less than 5
Small	from RM300,000 to less than RM3 million	from 5 to less than 30
Medium	from RM3 million to RM20 million	from 30 to 75

Source: (SME Corp. Malaysia, 2013)

Malaysia adopted International Financial Reporting Standards (IFRS) for financial statements and reporting beginning January 1, 2012, as stated by the chairman of the Malaysian Accounting Standards Board (MASB), Dato Mohammad Faiz Azmi (MASB, 2013). The IFRS version for SMEs was also introduced and is called the Malaysian Private Entities Reporting Standards (MPERS). The implementation of this standard set took effect on January 1, 2016, with some amendments to suit local organization needs (Salin, 2017). The fundamental goal of establishing the IFRS for SMEs, according to the International Accounting Standards Board (IASB), was to improve the effectiveness of decisions and to minimize information gaps for SMEs around the globe (Jamil et al., 2021).

The biggest problem of IFRS implementation, however, is a scarcity of competent people and a lack of readiness (Gelaye, 2019). Since full IFRS adoption can be troublesome, human resources must be educated to meet these challenges (Mustafa et al., 2012). Thus, the implementation of IFRS in Malaysia has prompted concerns, particularly about the costs as well as the knowledge and skills required. The expense of harmonizing these standards with Malaysian Financial Reporting Standards outweighs the benefits to financial statement users, and complete adoption would compel governments to give up their rights. Lack of accounting software packages and requisite knowledge of how to use them among business owners, managers and staff has led to inappropriate financial statement reporting (Raihana et al., 2017). Accurate and timely financial reports improve decision-making and enable efficient resource allocation and contracting (Bushman & Smith, 2003).

Internal Control. The Treadway Commission's Committee of Sponsoring Organizations (COSO) defined internal control as a strategy designed by boards, administrators, and staff to accomplish organizational goals in respect to (a) operational effectiveness and efficiency, as well as financial performance and asset protection; (b) reliability, transparency, and timeliness of financial and non-financial reporting; and (c) laws and regulations, including organizational policy compliance (COSO, 2013). The COSO internal

control strategy consists of five components, namely, control environment, risk assessment, control activities, information and communication, and monitoring activities (Lynford, 2015). These components are important for achieving the reliability of financial reporting, preventing/detecting fraud, and correcting material misstatements (Rubino & Vitolla, 2014).

A strong internal control system helps in the production of high-quality financial reports that reduce procedural errors (e.g. transactions posted with correct amounts but entered into the wrong account) and estimation errors, as well as earnings management (e.g. manipulating financial records to make revenue and profit appear consistent and reliable). Financial information becomes more reliable because of excellent internal control (Doyle et al., 2007).

However, weak internal control may lead to low quality accounting data and inaccurate financial reporting (for example, accrual-based accounting). Lower accrual quality may happen if the entity has a poor control environment that leads to intentionally biased accruals through earnings management caused by a lack of separation of roles, and unintentional errors in accrual estimations because of inexperience in calculating bad debt expense provision (Doyle et al., 2007). Nevertheless, due to a lack of data on internal control, it is nearly impossible to establish a direct link between the quality of internal control and the quality of accounting information (Doyle et al., 2007).

In terms of fund management, a robust internal control system ensures that transactions are legally authorized, records are complete and accurate, and errors/frauds are prevented and detected in time, which helps organizations to grow and expand (Sambo & Benneth, 2018). However, leaders such as secondary school principals may neglect their duty to set up effective financial policies, segregate financial duties, and monitor expenses and income, including transaction authorization and verification that eventually weakens fund management (Aase, 2009; Oche & Oche, 2009).

A successful internal control system should result in more trustworthy recorded amounts for everyday operations, such as payments from customers, sales, and inventory management, as well as reducing intentional and unintentional mistakes in financial statements. On the other hand, adverse internal control may lead to inaccurate financial statements due to bias into accruals, lowering the quality of both internally and externally reported accounting numbers. (Skaife et al., 2008).

Methodology

A qualitative descriptive research design was used to examine and analyze the contents of the unaudited financial statements (2015 to 2020 fiscal years) for 5 SDA schools in Sabah: 2 secondary and 3 primary schools. GCAS audit reports and management letters for the 2 secondary schools from 2015 to 2017 were also reviewed, along with SMAS audit reports for 3 primary schools for the same period. The unaudited statements consisted of the statements of financial position, statements of financial activity, statements of changes in net assets, statements of cash flows, and notes to the financial statements for 6 consecutive years (2015-2020) for 2 secondary schools (Schools 1 and 2) and 1 primary school (School 3) operated under the Sabah Adventist Mission. The unaudited financial statements for the other 2 primary schools (Schools 4 and 5) were also analyzed, but little information was obtained as these reports consisted only of statements of financial activity based on a single-entry accounting system. The audit reports for the 2015 to 2017 fiscal years were analyzed to explore the auditor's opinions about financial reporting and internal control issues, reasons, and recommendations.

The researcher managed to collect the unaudited and audited financial statements from all five schools; each school provided good cooperation. The COVID-19 pandemic caused delays in some audits; this was the main reason why some statements had not yet been audited. Here is a brief description of how the data was collected:

The researcher asked for permission from the Sabah SDA Mission and each school board to review and analyze their financial statements and audit reports for the study period. The researcher traveled to the respective schools to obtain a hard copy of the financial statements, which were handed over by the treasurer.

Soft copies of financial statements were also distributed via WhatsApp application and email.

Three schools provided full financial statements (except for cash flow statements), for the fiscal

years of 2015 to 2020, as well as audit reports for 2015 to 2017. Soft copies of these documents were sent via WhatsApp and email. One school provided paper copies of its financial reports based on a single-entry accounting system from 2015 to 2020, as well as its audit reports from 2015 to 2017, which were collected by hand. One school provided hard copies of two fiscal years based on a single-entry accounting system, including audit reports for 2015 and 2016. This school did not share its financial statements from 2017 to 2020 because they had not yet been audited. Interview sessions were conducted with 15 respondents consisting of principals, headmasters, treasurers, finance office staff, and auditors through Google Meet, Microsoft Teams, and WhatsApp, as well as face-to-face interviews. These interviews were useful to discover some issues, reasons, and solutions implemented by school management and the school board. The research instrument utilized in this study was an interview guide that asked a comprehensive list of questions about various financial management issues. Two tables consisting of financial statement issues and internal control issues were used to record information obtained from the respective schools.

Findings

Financial Statements

Table 3 (following page) shows the unaudited statements of financial activity for Schools 1, 2, 3, and 4 for the 2018–2020 fiscal years, along with audited statements of financial activity for School 5 for 2015 and 2016. Several findings drawn from the income statements in Table 3 are discussed below:

The main source of income for all schools is registration and tuition fees. Dorm rental and food payment are also important sources of income for Schools 1 and 2. Donations, education offerings from the church members, and fundraising also contribute to earnings. Donations income for Schools 1, 2 and 4 showed a significant increase in 2020. Donations came from the government, alumni, church members, individuals, politicians, and corporate businesses during the Movement Control Order due to the COVID-19 outbreak.

The major expense for all schools was employee salaries, along with administrative and general expenses. Administrative expenses for School 1 increased in 2020 by MYR 154,557 due to a discount given to students (186,734) who studied online during the COVID-19 pandemic.

The allocated funds of Schools 1 and 2 cannot simply be used for operating expenses like to pay salaries. Allocated funds are used to finance projects that have been planned.

Table 3 reveals that all schools experienced deficit budgets (expenses exceeded income) before receiving appropriations (subsidy) from the Sabah Adventist Mission. The Sabah Mission allocated some funds every year to reduce the financial burden of each school. Even though the schools received appropriation, some of them still experienced cash shortages and struggled to pay their salaries on time. Interviews with school administrators revealed that earned operating income was in the form of student receivables. Analysis from the statement of financial position of Schools 1, 2 and 3 showed that student receivables were increasing every year. 2019 GCAS audit reports indicated that educational institutions were the worst performers in terms of self-support percentage (ability to operate without reliance on external resources) (GCAS, 2019). An effective method to collect student receivables and to find other sources of income needs to be implemented by the school management to tackle cash shortages. One possible solution would be to apply for permission from the Malaysian Ministry of Education to increase the school tuition fees.

Table 4 (following page) displays a financial analysis about the days of cash on hand and current ratios of Schools 1, 2, 3, 4, and 5. Days of cash on hand is the number of days during which a business can continue to pay its operating expenses, based on its cash on hand. The current ratio is a liquidity ratio that measures an organization's ability to pay its short-term obligations, i.e. those due in one year or less. A higher current ratio (more than 1) is better because the current assets are sufficient to cover its current liabilities (Rashid, 2018).

Formula:

Days Cash on Hand = Cash and Cash Equivalents / [(Operating Expenses – Noncash Expenses)/365 days]
Current Ratio = Current Assets / Current Liabilities

Table 3. Statements of Financial Activity before Audit

[Unit: Malaysian Ringgit (MYR)]

No	Aspects	School 1			School 2			School 3			School 4			School 5	
		2018	2019	2020	2018	2019	2020	2018	2019	2020	2018	2019	2020	2015	2016
A.	UNALLOCATED FUND														
	<u>Earned Operating Income</u>														
1	Tuition & Registration	436,464	433,652	496,950	280,160	275,334	307,954	523,330	512,570	431,016	243,862	247,249	188,143	21,636	15,577
2	Dormitory & Cafeteria	365,832	362,066	339,005	78,189	66,470	43,751								
3	Donations	902	29,312	92,822	84,332	25,191	149,622	91,945	71,262	196	57,978	50,381	125,099	4,210	5,333
4	Education Offerings	16,182	16,952	1,955	27,221	34,547	658	32,212	35,663	4,508	12,584	4,274	5,692	7,557	8,135
5	Fund Raising	37,578	200	0				7,972	25,799	5,800	828	4,570	203		
6	Income (Others)	217,729	155,955	84,859	138,426	161,849	122,504	151,210	149,209	340,424	91,678	129,850	89,912	44,489	36,784
7	Total Earned Operating Income	1,074,686	998,137	1,015,591	608,328	563,392	624,488	806,669	794,503	781,944	406,929	436,323	409,049	77,892	65,829
	<u>Operating Expenses</u>														
1	Workers Salary / Allowance	940,362	835,497	817,700	519,612	505,308	451,565	610,969	649,521	674,687	295,407	304,561	333,219	96,128	79,496
2	Administrative Expense	192,621	102,721	257,278	319,241	242,129	186,373	138,311	124,422	21,187	175,084	160,635	95,234	9,280	7,753
3	General Expense	221,628	90,920	58,748				147,321	117,433	82,207	30,890	40,739	36,584	8,904	7,384
4	Total Operating Expense	1,354,610	1,029,139	1,133,726	838,854	747,437	637,938	896,601	891,377	778,081	501,381	505,935	465,037	114,312	94,633
5	Increase (Decrease) Before Appropriations	(279,924)	(31,002)	(118,135)	(230,526)	(184,046)	(13,450)	(89,932)	(96,874)	3,863	(94,452)	(69,612)	(55,988)	(36,421)	(28,804)
	<u>Operating Appropriations</u>														
1	Mission Appropriation Received	225,000	150,000	140,567	175,743	147,000	147,000	117,185	117,185	117,185	74,242	74,242	74,242	31,000	32,358
2	Increase (Decrease) after Appropriation	(54,924)	118,998	22,432	(54,783)	(37,046)	133,550	27,253	20,311	121,048	(20,210)	4,630	18,254	(5,421)	3,554
3	Net Increase (Decrease) For Year	(54,924)	118,998	22,432	(54,783)	(37,046)	133,550	27,253	20,311	121,048	(20,210)	4,630	18,254	(5,421)	3,554
4	Fund Balances, January 1	304,108	249,184	368,181	63,742	8,959	(28,087)	459,757	487,050	507,400	71,352	51,142	55,772	8,463	3,043
5	Fund Balances, December 31	249,184	368,181	390,614	8,959	(28,087)	105,463	487,010	507,361	628,448	51,142	55,772	74,026	3,043	6,597
B.	ALLOCATED FUND														
1	Income				92,829	182,309	77,047								
2	Expenses		14,000	213,571	90,758	158,932	99,990								
3	Fund Balances, January 1	303,349	303,349	289,349	82,575	84,646	108,023								
4	Fund Balances, December 31	303,349	289,349	75,778	84,646	108,023	85,080								
	TOTAL OPERATING FUNDS	552,532	657,530	466,391	93,605	79,936	190,543								

Source: School Financial Statements

October 25-26, 2022

Table 4. 2018–2020* Days of Cash on Hand and Current Ratios [Unit: Malaysian Ringgit (MYR)]

Aspects	School 1			School 2			School 3		
	2018	2019	2020	2018	2019	2020	2018	2019	2020
Cash and Cash Equivalents	332,438	283,154	(87,128)	51,709	64,793	91,648	16,090	38,754	(16,592)
Operating Expenses	1,354,610	1,029,139	1,133,726	838,854	747,437	637,938	896,601	891,377	778,081
Depreciation	42,915	0	0	25,552	22,394	21,803	0	0	0
Current Assets	483,764	517,611	376,855	131,020	138,439	197,658	302,842	387,505	457,642
Current Liabilities	405,554	337,246	387,629	193,273	193,144	124,153	298,891	373,782	324,212
Days Cash on Hand	93	100	(28)	23	33	54	7	16	(8)
Current Ratio	1.19	1.53	0.97	0.68	0.72	1.59	1.01	1.04	1.41

Aspects	School 4			School 5	
	2018	2019	2020	2015	2016
Cash and Cash Equivalents	51,142	55,771	74,026	6,588	5,409
Operating Expenses	501,381	505,935	465,037	114,312	94,633
Depreciation	0	0	0	0	0
Days Cash on Hand	37	40	58	21	21

Source: School Statements of Financial Activity and Financial Position

*For School 5, 2015–2016

The working capital and liquidity for Schools 1, 2, and 3 are shown in Tables 5 and 6, with the audited figures for 2015 to 2017, and the unaudited values for 2018 to 2020. These are essential for examining the organization's financial condition. Several concerns were discovered while analyzing working capital and liquidity, which are discussed below.

1. School 2 experienced negative working capital for 2015, 2016, 2018, and 2019, as did School 3 from 2015-2017 (Table 5) because the total actual working capital was negative (current liabilities exceeded current assets). Several accounts payable items that the school needs to pay attention to are a Loan Payable to the Sabah SDA Mission, Tithe Payable, Social Security Organization (SOCISO) Payable, Employees Provident Fund (EPF), Prepaid Expenses, and Pre-registration. The school account and Sabah Mission must be regularly reconciled to present accurate figures in the general ledger.

2. The financial situations at School 1 in 2017 and 2020 and School 3 during the years of 2016, 2017, and 2020 were quite alarming, since the liquidity percentage was negative compared to School 2 (Table 5). This condition may have happened because the cash and cash equivalents figures were negative. The cash on hand and bank should not be zero. The possible reasons may have been (1) a bank reconciliation was not done; (2) a journal entry was wrongly posted which caused the credit balance in the bank account to exceed the debit balance. The school treasurer needs to investigate the transactions involved further to identify the actual problems.

3. The GCAS auditor and the schools used different methods of calculating recommended working capital and liquidity, which may be confusing when determining whether the school can meet its short-term obligations such as pay tithe, SOCISO and EPF contributors, and debts to suppliers.

4. Schools 1 and 3 used 20% of total operating expenses plus allocated funds to calculate working capital, whereas School 2 used 15% of total operating expenses plus allocated funds in its recommended working capital calculation from 2015-2020. Schools 4 and 5 did not prepare working capital and liquidity calculations. Recommended working capital for schools is 15% of the operating expenses of the latest complete fiscal year, not including allocated funds (GC Working Policy, 2017-2018).

Table 5 2015-2020 Working Capital

	School 1						School 2						School 3					
	2015	2016	2017	2018	2019	2020	2015	2016	2017	2018	2019	2020	2015	2016	2017	2018	2019	2020
Working Capital																		
Current Assets	437,991	434,416	476,615	483,764	517,611	376,855	122,963	92,894	140,701	131,020	138,439	197,658	112,896	162,878	251,251	303,009	387,505	457,642
(-) Current Liabilities	275,659	302,128	400,619	359,393	291,086	251,304	143,003	151,674	133,957	152,080	151,951	82,960	189,744	224,457	255,860	297,141	373,782	324,212
Total Actual Working Capital	162,332	132,288	75,996	124,371	226,525	125,551	(20,040)	(58,780)	6,744	(21,060)	(13,512)	114,698	(76,849)	(61,579)	(4,609)	5,868	13,723	133,431
Recommended Working Capital																		
Total Operating Expenses	1,496,812	1,215,356	1,335,390	1,354,610	1,043,139	1,347,297	785,626	706,015	796,779	838,854	747,437	637,938	706,263	857,260	704,494	896,601	891,377	778,081
Recommended Working Capital (15% of Operating Expenses)	224,522	182,303	200,309	270,922	208,628	269,459	117,844	105,902	119,517	125,828	112,116	95,691	141,253	171,452	140,899	179,320	178,275	155,616
Allocated Funds	301,329	305,399		303,349	289,349	75,778	132,015	97,727		84,646	108,023	85,080						
Total Recommended Working Capital	525,851	487,702	200,309	574,271	497,976	345,237	249,859	203,629	119,517	210,474	220,139	180,770	141,253	171,452	140,899	179,320	178,275	155,616
Working Capital Excess (Deficit)	(363,519)	(355,414)	(124,313)	(449,900)	(271,451)	(219,686)	(269,899)	(262,409)	(112,773)	(231,534)	(233,650)	(66,073)	(218,101)	(233,031)	(145,508)	(173,452)	(164,552)	(22,186)
Percentage of actual to recommended Working Capital	30.87%	27.12%	37.94%	21.66%	45.49%	36.37%	-8.02%	-28.87%	5.64%	-10.01%	-6.14%	63.45%	-54.41%	-35.92%	-3.27%	3.27%	7.70%	85.74%

Source: School Financial Statements

Table 6 2015-2020 Liquidity

	School 1						School 2						School 3					
	2015	2016	2017	2018	2019	2020	2015	2016	2017	2018	2019	2020	2015	2016	2017	2018	2019	2020
Liquidity																		
Cash and Cash Equivalents	368,719	376,619	350,173	332,438	283,154	(87,128)	57,438	24,433	59,332	51,709	64,793	91,648	12,415	(24,732)	(2,319)	16,257	38,754	(16,592)
Total Liquid Assets	368,719	376,619	350,173	332,438	283,154	(87,128)	57,438	24,433	59,332	51,709	64,793	91,648	12,415	(24,732)	(2,319)	16,257	38,754	(16,592)
Less Commitments:																		
Current Liabilities	275,659	302,128	400,619	359,393	291,086	251,304	143,003	151,674	133,957	152,080	151,951	82,960	189,744	224,457	255,860	297,141	373,782	324,212
Allocated Funds				303,349	289,349	75,778	132,015	97,727	71,020	84,646	108,023	85,080						
Total Commitments	275,659	302,128	400,619	662,742	580,435	327,082	275,018	249,401	204,977	236,726	259,974	168,040	189,744	224,457	255,860	297,141	373,782	324,212
Net Liquid Assets	93,060	74,491	(50,446)	(330,304)	(297,281)	(414,210)	(217,580)	(224,968)	(145,645)	(185,017)	(195,181)	(76,392)	(177,330)	(249,189)	(258,179)	(280,884)	(335,028)	(340,803)
Percent of Liquid Assets to Commitments	33.76%	24.66%	-12.59%	50.16%	48.78%	-26.64%	20.89%	9.80%	28.95%	21.84%	24.92%	54.54%	6.54%	-11.02%	-0.91%	5.47%	10.37%	-5.12%

Source: School Financial Statements

Notes:

1. Recommended Working Capital for School 1 and School 3 calculated at 20% whereas School 2 at 15% of total operating expenses.
2. Data for the period of 2015 to 2017 are audited statements. Whereas the data for the period of 2018 to 2020 has not been audited.

Internal Control

The data presented in Tables 7 and 8 display internal control deficiencies detected after analyzing the GCAS and SMAS audit communication letters from 2015 to 2017 for the five schools. Among the major accounting control issues for Schools 1 and 2 (secondary schools audited by GCAS) were a lack of bank and higher organization reconciliations, unreviewed severance allowances, improper recording of other revenue sources, receivable and payable misstatements, ineffective collection of student receivables, and government grants not properly recorded. Major administrative control issues involved incompatible or insufficient segregation of duties, delays of cash deposits, inadequate internal control of cash, incomplete lists of purchased or donated equipment and property, physical inventory list problems, and incorrect depreciation figures.

Table 7. Internal Control Deficiencies from 2015 to 2017, Sabah SDA Secondary Schools

No		School 1				School 2			No. of Schools
		2015	2016	2017	No. of A/E	2015-2016	2017	No. of A/E	
<u>Accounting Control Issues</u>									
1	Bank reconciliations not prepared on a timely basis, not initialed, dated and approved			▲		▲	▲		2
2	Reconciliation with Higher Organization / Inter-organization Accounts not prepared on a timely, no approval			▽		▲	▲ 1	1	2
3	Accrued severance allowance understated / not reviewed	▲		▲		▲ 1	▲ 1	2	2
4	Improper recording of other revenue sources (canteen / bakery / commercial crops or farm products / etc.)		▲	▲		▲ 1	▲ 1	2	2
5	Accounts receivable and payable mis stated	▲ 1			1				1
6	Ineffective collection of student receivables						▲		1
7	Inadequate allowance for doubtful accounts	▽	▲ 1	▲ 1	2	▽	▲ 1	2	2
8	Detailed summary of old student Accounts Receivable unavailable			▽			▲		2
9	Opening balances of all assets, liability and net asset accounts did not agree with the audited ending balances			▲					1
10	Expenses/Income year-end cutoff not evaluated properly			▽	1				1
11	Government grant not properly recorded	▲	▲	▽					1
12	Writing off (student receivables / PPE) - no action taken, no approval	▽	▲		1				1
<u>Administrative Control Issues</u>									
13	Minimal Segregation of Duties / Incompatible Duties	▲	▲	▲		▲	▲		2
14	More frequent (daily) cash deposits to bank / Delay in cash deposits			▲					1
15	Inadequate internal control of cash – summary of cash deposits not attached / Unauthorized cash disbursements		▲	▲					1
16	Deficit in receipted cash		▲	▲ 1	1				1
17	Voiding of cash disbursements: supporting documentation not stamped "paid" and signed			▲					1
18	Tithe payable not regularly (monthly) submitted to Sabah Mission		▲	▲			▲		2
19	No fraud risk assessment performed	▽	▽	▽		▽	▽		2
20	Incomplete list / unrecorded purchased or donated PPE	▲ 1	▲	▲ 1	2	▲	▲ 1	1	2
21	Physical inventory not performed for all equipment or other assets	▲	▲	▲		▲	▲		2
22	Incorrect evaluation or calculation of PPE to be depreciated	▲		▲					1
23	Policies: PPE purchased or donated, capitalization and disposal issues	▲				▲	▲		2
24	Allocated funds for specific purposes not monitored properly	▽			1	▲	▲ 1	1	2
25	Written Policies of Internal Control unavailable					▽			1
26	Lack of back-up accounting data					▲			1
27	Administrative Committee meeting minutes not documented properly	▲							1
Total No. of Issues in Table		13	11	19		13	14		
Total No. of Comments in GCAS Letters		24	24	30		24	26		
No. of Specific Adjusting Entries/Significant		4	1	4	9/9	3	6	9/9	

Source: Audit Communication Letters, GCAS Audit Report 2015-2017

Major Issue = ▲ Minor Issue = ▽ A/E = No. of Adjusting Entries

GCAS = General Conference Auditing Service

The major internal control problems faced by School 3 in 2015-2017 are shown in Table 8. Interviews revealed that bank reconciliations were not done, bank accounts were dormant, incomplete signatures of Wage Audit Committee members on the Wage Audit Sheet, a lack of lay members on the Wage Audit Committee, and an unclear asset capitalization policy.

The most notable problem for Schools 4 and 5 was that their financial statements consisted solely of a statement of financial activity (income statement), but lacked a statement of financial position (balance sheet). So school assets and liabilities were not shown, and their inventory records were incomplete. School 5 is facing a cash flow problem which caused a delay in the payment of teacher salaries, and its receipt books were not pre-numbered.

Table 8. Internal Control Deficiencies from 2015 to 2017, Sabah SDA Primary Schools

No		School3				School 4				School5			No. of Schools
		2015	2016	2017	No. of A/E	2015	2016	2017	No. of A/E	2015-2016	2017	No. of A/E	
1	Cash flow problem									▲			1
2	Receipt books not prenumbered									▲			1
3	Printing of general ledger	▽											1
4	Bank reconciliation	▲	▲	▲									1
5	Bank account dormant		▲										1
6	Signature on the wage audit committee	▲											1
7	Wage Audit Committee-Lacking Lay Person		▲	▲									1
8	Capitalization of Assets Policy		▲	▲									1
9	Plant, Property, and Equipment Record	▽	▽	▽		▲	▲	▲		▲	▲		3
Total No. of Issues in Table		4	5	4		1	1	1		3	1		
Total No. of Comments in SMAS Letters		4	5	4		1	1	1		3	1		
No. of Specific Adjusting Entries/Significant													

Source: Audit Communication Letters, SMAS Audit Report 2015-2017

Major Issue = ▲ Minor Issue = ▽ A/E = No. of Adjusting Entries
SMAS = Sabah Mission Auditing Service

Discussion

The focus of this discussion is reasons for deficiencies in internal control issues as elaborated in Table 9 below. These were based on interviewee responses as well as the researcher's observations.

Table 9. Internal Control Issues and Reasons

No	Internal Control Issues	Reasons Given
Accounting Control Issues		
1	Bank reconciliations not prepared on a timely basis, not initialed, dated and approved	Delay in obtaining information such as debit notes, credit notes and other data required for reconciliation with the higher organization.
2	Reconciliation with higher Organization/Inter-organization Accounts not reconciled	Time constraints because the treasurer is also teaching, doing multiple tasks. Not understanding how to prepare a bank reconciliation.
3	Accrued severance allowance understated / not reviewed	Incomplete record for years of service because employees' service records were not updated.

		Inadequate understanding of the method for calculating severance pay.
4	Improper recording of other revenue sources (canteen/bakery / commercial crops or farm /etc.)	Delay in reporting daily, weekly or monthly income to the finance department. Sales are calculated manually rather than using a cash machine.
5	Accounts receivable and payable misstated	Unorganized records, particularly those that do not use accounting software or lack of skills to use that software when recording student charges or other transactions. Shortage of finance staff to handle fee collection.
6	Ineffective collection of student receivables	
7	Inadequate allowance for doubtful accounts	Inexperience in calculating doubtful accounts.
8	Writing off (student receivables / PPE) - no action taken or no approval	Failure to emphasize the importance of writing off accounts.
Administrative Control Issues		
9	Minimal Segregation of Duties / Incompatible Duties	Shortage of employees. The school cannot afford to hire new worker due to financial constraints.
10	Tithe payable not regularly (monthly) submitted to Sabah Mission	Payment delay because not enough cash is available for some months.
11	Incomplete list / unrecorded purchases or donated PPE	Lack of manpower to perform physical inventory.
12	Physical inventory not performed for all equipment or other assets	
13	Incorrect evaluation or calculation of PPE to be depreciated	Incomplete list and lack of capitalization policy. Incomplete records such as costs, date of purchase/use make it difficult to be valued for depreciation.
14	Policies: PPE purchased or donated, capitalization and disposal issues	There is no comprehensive written policy in place at the school. According to interviewee responses, policies were endorsed during the school board meeting, however, they were not compiled into a single book. The absence of a written capitalization policy complicates whether to capitalize or to expense it.
15	Written Internal Control policies are unavailable	The respondent does not have formal written internal control policies.

Source: Interviewee responses and the researcher's personal observations

The interview findings show that not all finance department employees possess accounting qualifications and experience using accounting software. Therefore, the researcher would like to recommend that the Sabah Mission organize several in-house training sessions or workshops for all treasurers and other finance staff to study the financial statement format that follows Generally Accepted Accounting Principles and is in accordance with GCAS policy. Recommended topics are the calculation of cash flow, working capital and liquidity, depreciation, capitalization policy, inventory, allowance for doubtful debts, severance allowance, retirement plan, bank reconciliation, documentation, and other related topics including accounting software training. The Sabah Mission may allocate funds to help the schools buy standardized accounting software for all the schools, or find a non-profit organization (NGO) to donate accounting software.

Limitations and Implications

The limitations of this study were that the researcher was unable to examine monthly financial reports and individual accounting transactions due to time constraints, nor was he able to collect data from all the SDA schools in Sabah. Internal control deficiencies cannot be compared between secondary schools and primary schools due to different audit formats. There were no internal control opinions in the audit reports for the primary schools.

Accounting credentials and knowledge are required to produce high-quality financial statements. In addition, skill in using accounting software is required to prepare financial statements in accordance with Generally Accepted Accounting Principles.

Further study should be conducted on efforts made by schools, particularly primary schools, to produce improved financial statements by introducing a double-entry accounting system and employing accounting software. A study should also be conducted to determine the efforts being made to improve the internal control of financial statement reporting in all Adventist schools.

Conclusion

During the study, it was discovered that Schools 1, 2, and 3 had appropriate financial statements using a double-entry accounting system. However, the financial statements of Schools 4 and 5 did not comply with generally accepted accounting principles because their reports were generated by a single-entry accounting system that tracked only revenue and expenses, with no records kept of assets, liabilities, or owner's equity.

Results of the research show that the Adventist schools in Sabah are facing quality issues for the Statement of Financial Position because large adjustments were made to these accounts after the audits. The working capital and liquidity calculations were inaccurate, which complicated the analysis of the school's financial condition.

Some financial statement reporting quality issues that were identified included inaccuracies in the calculation of severance allowances, allowances for doubtful account were not recorded and adjusted consistently, as well as inaccurate depreciation journal entries due to building and equipment values not being updated on a regular basis. There were also schools where the values for buildings and equipment were not included in the financial accounts, raising the possibility of embezzlement. Transparency was one of the internal control concerns due to a shortage of staff in the finance office. The absence of a clear capitalization policy made it difficult for the finance departments to recognize whether an equipment item or a repair/renovation of a building should be recorded as an expense or a fixed asset to be capitalized. The issue of recording income and expenditures on an accrual basis was also discovered in this research, which resulted in larger adjustments to funding balances.

Internal control reports from the GCAS Audit Communication Letter stated several deficiencies that need to be addressed by the school boards and administrators. Furthermore, a lack of support and effort from the higher organization and administration to improve the financial statement quality reduced the overall effectiveness of financial management.

References

- [1] Aase, B. (2009). Measuring charter school financial health. 1–8.
<https://files.eric.ed.gov/fulltext/ED539290.pdf>
- [2] Barth, M. E., Landsman, W. R., & Lang, M. H. (2008). International accounting standards and accounting quality. *Journal of Accounting Research*, 46(3), 467–498.
<https://doi.org/10.1111/J.1475-679X.2008.00287.X>
- [3] Bushman, R. M., & Smith, A. J. (2003). Transparency, financial accounting information, and corporate governance. *Federal Reserve Bank of New York Economic Policy Review*.
https://statmodeling.stat.columbia.edu/wp-content/uploads/2015/11/abr_benford.pdf
- [4] Dzumira, S. (2014). Internal controls and fraud schemes in not-for-profit organisations: A guide for good practice. *Research Journal of Finance and Accounting*, 5(2), 118–126.
<https://www.iiste.org/Journals/index.php/RJFA/article/view/10685>

- [5] General Conference Auditing Service (GCAS). (2019). Annual Report.
<https://www.gcasconnect.org/2019-annual-report.pdf>
- [6] General Conference Working Policy 2019-2020. (n.d.). General Conference of Seventh-day Adventists.
- [7] Hamra, W., & Namkote, S. (2020). Financial policy compliance and internal control among Adventist Schools in Thailand : issues and reasons. *International Forum Journal*, 23(2), 5–21.
<https://journals.aiias.edu/info/article/view/309>
- [8] Herath, S. K., & Albarqi, N. (2017). Financial reporting quality: A literature review. *International Journal of Business Management and Commerce*, 2(2).
https://www.researchgate.net/profile/Siriyama-Herath/publication/314236476_Financial_Reporting_Quality_A_Literature_Review/links/58bc692d92851c471d563950/Financial-Reporting-Quality-A-Literature-Review.pdf
- [9] International Financial Reporting Standards (IFRS) Foundation. (2018). The Conceptual Framework for Financial Reporting.
https://www.masb.org.my/pdf.php?pdf=BV2018_revised_CONCEPTUAL_FRAMEWORK.pdf&file_path=pdf_file
- [10]Jamil, N. N., Ramli, N. M., Marzuki, A., & Ahmad, N. N. (2021). Compliance factors of Malaysian Private Entity Reporting Standard (MPERS) by small medium enterprises (SMEs). *International Journal of Financial Research*, 12(3), 149–156.
<https://doi.org/10.5430/ijfr.v12n3p149>
- [11]Malaysian Accounting Standards Board (MASB). (2013). MASB Chairman's Statement 2012- MASB. <https://www.masb.org.my/pages.php?id=86>
- [12]Oche, B., & Oche, D. P. (2009). Financial management practices of secondary school principals in Benue State. *University of Nigeria*, 1–87.
[https://www.unn.edu.ng/publications/files/images/PROJECT WORK OCHE DEAN \(FINAL PRINTED\).pdf](https://www.unn.edu.ng/publications/files/images/PROJECT WORK OCHE DEAN (FINAL PRINTED).pdf)
- [13]Osasere, A. O., & Ilaboya, J. O. (2018). IFRS adoption and financial reporting quality: IASB qualitative characteristics approach. *Accounting and Taxation Review*, 2(3), 30–47.
https://www.researchgate.net/profile/Aigienohuwa-Osasere/publication/329012123_IFRS_Adoption_and_Financial_Reporting_Quality_IASB_Qualitative_Characteristics_Approach/links/5bef98b4a6fdcc3a8ddbef0a/IFRS-Adoption-and-Financial-Reporting-Quality-IASB-Qualit
- [14]Raihana, N. M. S., Emilina, N. M. N., Nazif, W. M., & Ku, C. K. H. C. K. K. (2017). Small and medium enterprises: critical problems and possible solutions. *International Business Management*, 11(1), 47–52. https://www.researchgate.net/profile/Noor-Mohd-Nasir-3/publication/320163628_Small_and_Medium_Enterprises_Critical_Problems_and_Possible_Solutions/links/59d1ae7ba6fdcc181ad3b4e1/Small-and-Medium-Enterprises-Critical-Problems-and-Possible-Solutions.pdf
- [15]Rashid, C. A. (2018). Efficiency of financial ratios analysis for evaluating companies' liquidity. *International Journal of Social Sciences & Educational Studies*, 4(4), 110–123.
<https://doi.org/10.23918/ijsses.v4i4p110>
- [16]Salin, A. S. A. P. (2017). Malaysian Private Entities Reporting Standards - benefits and challenges to SMEs. *International Journal of Academic Research in Business and Social Sciences*, 7(11), 1302–1320. <https://doi.org/10.6007/ijarbss/v7-i11/3567>
- [17]Sambo, F., & Benneth, U. I. (2018). Internal control system as a mechanism for effective fund management of universities in Bayelsa State, Nigeria. *Global Journal of Social Sciences*, 17, 77–91. <https://doi.org/https://dx.doi.org/10.4314/gjss.v17i1.8>

- [18]Skaife, H. A., Collins, D. W., Kinney, W. R., & Lafond, R. (2008). The effect of SOX internal control deficiencies and their remediation on accrual quality. *The Accounting Review*, 83(1), 217–250.
<http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.497.4050&rep=rep1&type=pdf>
- [19]SME Corp. Malaysia. (2013). Guideline for SME definition: issued by: SME Corp. Malaysia Secretariat to the National Entrepreneur and SME Development Council.
https://www.smecorp.gov.my/images/pdf/2021/Guideline_on_SMEDefinition_Updated_Sept2020_Final.pdf
- [20]SSD Working Policy Book II - Education. (2015). Southern Asia-Pacific Division, Silang, Cavite, Philippines.
- [21]Szydelko, A., & Biadacz, R. (2016). The role of financial statement in performance management. *Modern Management Review*, 23(4), 205–214.
<https://doi.org/10.7862/rz.2016.mmr.55>

The Impact of Instagram Marketing and Brand Awareness on Consumer Purchase Intention

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Abstract: Instagram Marketing and Brand Awareness must be recognized for their effect on the business process so that the advantages acquired from their utilization can be monitored and maximized to aid in the development of buying interest. The purpose of this study is to investigate the impact of Instagram marketing and brand awareness on the purchasing inclinations of *Helm Palu Murah*. The effect of Instagram marketing and brand awareness on consumer purchase intention may be understood for its advantages or influence via responses to *Helm Palu Murah* respondents and customer experience, which were gathered via questionnaires. The Multiple Linear Regression approach was employed in this study, with the independent variables of Instagram Marketing (X1), Brand Awareness (X2), and Consumer Purchase Intention as the dependent variables (Y). This study also employs a descriptive technique to report research findings, which show that the Instagram Marketing variable has no discernible influence on the consumer purchase intention variable. The variable Brand Awareness has a strong impact on the variable Consumer Purchase Intention.

Keywords: *instagram marketing, brand awareness, consumer purchase intention, Helm Palu Murah, Instagram*

Introduction

In our modern day, technology is always evolving to make life simpler for humans. Current technology processes data, manages data, and analyzes data to produce quick, relevant, clear, and accurate data or information outcomes. Technology is now widely employed in a variety of industries, including government organizations, commercial enterprises, start-ups, transportation, and the medical industry. Technology has the potential to usher in a new era in society, especially in business. Many entrepreneurs nowadays utilize technology to grow their own businesses (Siregar & Irwan, 2020). In the twenty-first century, the media used to give information, such as television, magazines, radio, and even newspapers, are highly effective in carrying out media promotions in order to boost the company's name and compete with other businesses. However, internet-based information media has transformed the popularity of the media (Sulianta, 2015). Social media is an internet-based information media that is popular among young people. Even today, social media plays an important part in communication media since each user has access to a variety of information, expertise, and is linked to others. Social media is a type of digital media that allows users to build user profiles, explain themselves in order to communicate with individuals from various backgrounds, and even share and promote the products or services supplied. That is why businesses employ the technology given by different Social Media platforms to attract customers. Instagram for example provides a business account function that allows us to convert our personal account to a company account. This can assist company owners in attracting clients from both inside and outside the region. As a result, businesspeople utilize this technology to attract clients, progress the business so that it is known to more people, and, of course, raise revenue from the firm.

Many company actors are already beginning to take advantage of social media trends, particularly Instagram, as marketing uses existing accounts to showcase items and services that will be supplied to potential customers. Given the fast advancement of technology, social media has become a vital location for attracting a large number of customers (Arief & Millianyani, 2015). The usage of social media, particularly Instagram, may be utilized as a concept to increase the popularity of business people in order to survive the amount of competition on social media. With the social media trend,

business actors must automatically improve their business, namely by inventing and utilizing Instagram marketing as a promotional media to compete with competitors on social media. However, many business owners nowadays use this function to market the company they have developed. The account @hempalumurah is a business that offers several sorts of helmets. Currently, *Helm Palu Murah* stores not only through the shop, but also through social media Instagram, where *Helm Palu Murah* does Instagram stories and publishes available items and promote products on huge public accounts in Palu. During this epidemic, businesses employ digital marketing, like Instagram, to promote themselves. The benefit of this research is that it will be possible to determine the efficiency of employing digital marketing in terms of Instagram as a promotional medium. Also, consider the impact of Instagram marketing and brand awareness on consumer purchase intention. The business from @hempalumurah is located on Jln. S. Parman bawah no. 10. With the continued growth of Instagram, which attracts a large number of new users, many individuals increasingly use Instagram as a social media platform to purchase online or place orders. When it comes to utilizing Instagram, practically everyone has an account for social interaction and purchasing for things they enjoy. Researchers will determine whether Instagram marketing and brand awareness enhance consumer purchasing intention, in this case asking to purchase helmet items, by utilizing Instagram marketing as a transmission channel for selling a product.

The goal of this study is to characterize the effect of Instagram marketing and brand awareness on customer purchase intention, so that it can be determined how much influence Instagram marketing and brand awareness have on purchasing intention in a product, in this instance helmet items.

Literature review

Instagram

Instagram is an application or website where users can do things like take images, apply filters to their posts, and share them on the platform (Rinata & Dewi, 2019.).

Marketing

Marketing is concerned with determining how to make our product or service available to people in order for it to exist. The aim is to distribute goods in a regulated and selected manner while employing direct marketing strategies (Adha et al., 2020).

Digital Marketing

Digital marketing is one of the strategies used by users to perform promotions and market research using online digital media such as social media (Ariesandy & Zuliestianam, 2019).

Instagram Marketing

During the previous decade, social media, which is a significant aspect of the internet and an efficient marketing tool, has not only helped to promote products and services, but it has also provided numerous chances for marketers to develop new consumer brand awareness. Companies are currently using the advancement of communication technologies such as Instagram to carry out different promotional activities in order to attract customers (Ghozali, 2021).

Brand Awareness

Brand awareness is the capacity of customers to recall the brand of a product or service that meets their specific demands (Ferdy & Sari, 2020).

Consumer Purchase Intention

Consumer Purchase Intention is one of the activities of potential customers in which they contemplate purchasing things from a specific brand. According to the definition, consumer purchase intention refers to the interest of potential customers in a product or service to be purchased (Agam, 2017).

Methodology

This study employs two types of variables: independent variables (free) and dependent variables (bound). In this study, the independent variables were Instagram marketing (X1) and brand awareness (X2). The dependent variable in this study is customer purchasing interest.

This study makes use of primary data from questionnaires administered by researchers. The primary data utilized in this study were gathered from Palu City residents who follow the Instagram account @helmpalumurah. Respondents will be asked to answer questions from the Questionnaire.

In this study, data will be collected by distributing questionnaires with questions that are given directly to Instagram users who have transacted directly at @helmpalumurah by visiting the *Helm Palu Cheap* physical store, and the researcher will directly provide a device that is already connected to the form. questionnaire to every consumer who has recently completed a transaction

The sample is a subset of the population chosen for research purposes, and it will be utilized by researchers to provide an overview of the population (Arikunto, 2019). The researcher will collect data from customers who buy helmets from @helmpalumurah. Because the average number of helmet purchases at @helmpalumurah is 100 per month, 50 persons are the limitation of the sample, and the sampling approach utilized in this study is random sampling. Random sampling is a method of collecting samples in which the sample is chosen at random and the target population has the same chance of being chosen.

The strategy to be used in this study will be a quantitative approach with a descriptive manner. The quantitative method is one of the data measurement strategies used to determine a causal link from research. When performing measurements, each existent phenomenon is transformed into a variable, which is then measured by using various symbols. The quantitative approach's goal is to explain a fact in the phenomena regarding what happened while the study was conducted.

SPSS software will be used to examine the data. SPSS is a program for doing data analysis and computing numbers with parametric and non-parametric features. After the researcher has examined the data in SPSS, the findings may be retrieved to indicate what variables have an impact, what circumstances lead these variables to have an effect, and whether these variables have an effect or not. If it has been explained, the findings will be summarized and recommendations for further research will be made.

To collect data on the facts of the field from this study, researchers employed two methods of data collecting techniques, namely observation and questionnaires.

The process of obtaining data via observing human behavior is known as observation. Observation entails not just paying attention and observing, but also recording the events being researched.

Questionnaires are a type of data collection tool that asks respondents questions using paper or digital forms. A Google Form will be utilized, and it will be delivered to those who have done transactions at a *Helm Palu Murah*.

Result

Researchers examined the availability of samples on the desire in purchasing *Helm Palu Murah* using as many as 50 respondents. If r (corrected item) > 0.279 a valid result is obtained (Sugiyono, 2017). According to the results shown in the figure below, it can be concluded that the measuring instrument employed in this study is valid and acceptable for use as an instrument in conducting research on customer purchase intentions in *Helm Palu Murah*.

Table 1. Result Of Validity Test

		Correlations							
		X1.1	X1.2	X1.3	X1.4	X1.5	X1.6	X1.7	Total X1
X1.1	Pearson Correlation	1	.783**	.680**	.564**	.760**	.767**	.458**	.849**
	Sig. (2-tailed)		.000	.000	.000	.000	.000	.000	.000
	N	58	58	58	58	58	58	58	58
X1.2	Pearson Correlation	.783**	1	.733**	.681**	.747**	.713**	.506**	.878**
	Sig. (2-tailed)	.000		.000	.000	.000	.000	.000	.000
	N	58	58	58	58	58	58	58	58
X1.3	Pearson Correlation	.680**	.733**	1	.587**	.653**	.754**	.582**	.856**
	Sig. (2-tailed)	.000	.000		.000	.000	.000	.000	.000
	N	58	58	58	58	58	58	58	58
X1.4	Pearson Correlation	.564**	.681**	.587**	1	.580**	.621**	.518**	.791**
	Sig. (2-tailed)	.000	.000	.000		.000	.000	.000	.000
	N	58	58	58	58	58	58	58	58
X1.5	Pearson Correlation	.760**	.747**	.653**	.580**	1	.789**	.446**	.845**
	Sig. (2-tailed)	.000	.000	.000	.000		.000	.000	.000
	N	58	58	58	58	58	58	58	58
X1.6	Pearson Correlation	.767**	.713**	.754**	.621**	.789**	1	.519**	.880**
	Sig. (2-tailed)	.000	.000	.000	.000	.000		.000	.000
	N	58	58	58	58	58	58	58	58
X1.7	Pearson Correlation	.458**	.506**	.582**	.518**	.446**	.519**	1	.717**
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000		.000
	N	58	58	58	58	58	58	58	58
Total_X1	Pearson Correlation	.849**	.878**	.856**	.791**	.845**	.880**	.717**	1
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000	
	N	58	58	58	58	58	58	58	58

**. Correlation is significant at the 0.01 level (2-tailed).

		Correlations					
		X2.1	X2.2	X2.3	X2.4	X2.5	Total X2
X2.1	Pearson Correlation	1	.781**	.667**	.774**	.792**	.904**
	Sig. (2-tailed)		.000	.000	.000	.000	.000
	N	58	58	58	58	58	58
X2.2	Pearson Correlation	.781**	1	.669**	.694**	.785**	.885**
	Sig. (2-tailed)	.000		.000	.000	.000	.000
	N	58	58	58	58	58	58
X2.3	Pearson Correlation	.667**	.669**	1	.770**	.604**	.846**
	Sig. (2-tailed)	.000	.000		.000	.000	.000
	N	58	58	58	58	58	58
X2.4	Pearson Correlation	.774**	.694**	.770**	1	.793**	.908**
	Sig. (2-tailed)	.000	.000	.000		.000	.000
	N	58	58	58	58	58	58
X2.5	Pearson Correlation	.792**	.785**	.604**	.793**	1	.890**
	Sig. (2-tailed)	.000	.000	.000	.000		.000
	N	58	58	58	58	58	58
Total_X2	Pearson Correlation	.904**	.885**	.846**	.908**	.890**	1
	Sig. (2-tailed)	.000	.000	.000	.000	.000	
	N	58	58	58	58	58	58

**. Correlation is significant at the 0.01 level (2-tailed).

Correlations								
		Y.1	Y.2	Y.3	Y.4	Y.5	Y.6	Total_Y
Y.1	Pearson Correlation	1	.788**	.788**	.788**	.706**	.678**	.905**
	Sig. (2-tailed)		.000	.000	.000	.000	.000	.000
	N	58	58	58	58	58	58	58
Y.2	Pearson Correlation	.788**	1	.807**	.795**	.705**	.620**	.896**
	Sig. (2-tailed)	.000		.000	.000	.000	.000	.000
	N	58	58	58	58	58	58	58
Y.3	Pearson Correlation	.788**	.807**	1	.854**	.687**	.587**	.898**
	Sig. (2-tailed)	.000	.000		.000	.000	.000	.000
	N	58	58	58	58	58	58	58
Y.4	Pearson Correlation	.788**	.795**	.854**	1	.628**	.595**	.887**
	Sig. (2-tailed)	.000	.000	.000		.000	.000	.000
	N	58	58	58	58	58	58	58
Y.5	Pearson Correlation	.706**	.705**	.687**	.628**	1	.705**	.846**
	Sig. (2-tailed)	.000	.000	.000	.000		.000	.000
	N	58	58	58	58	58	58	58
Y.6	Pearson Correlation	.678**	.620**	.587**	.595**	.705**	1	.807**
	Sig. (2-tailed)	.000	.000	.000	.000	.000		.000
	N	58	58	58	58	58	58	58
Total_Y	Pearson Correlation	.905**	.896**	.898**	.887**	.846**	.807**	1
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	
	N	58	58	58	58	58	58	58

** . Correlation is significant at the 0.01 level (2-tailed).

The Cronbach's alpha value achieved on the independent and dependent variables is larger than 0.7, according to the results of the reliability tests shown in the table below.

Table 2. Result Of Reliability Test

X1	
Reliability Statistics	
Cronbach's Alpha	N of Items
.919	7

X2	
Reliability Statistics	
Cronbach's Alpha	N of Items
.930	5

Y	
Reliability Statistics	
Cronbach's Alpha	N of Items
.936	6

The findings of the multicollinearity test performed by the researchers in table 3 indicate that the independent variable in this study does not exhibit multicollinearity symptoms. Because the obtained VIF and Tolerance values are VIF 10 and Tolerance 0.10 > (Sugiyono, 2018).

Table 3. Result Of Multicollinearity Test

		Collinearity Statistics	
Model		Tolerance	VIF
1	X1	.601	1.665
	X2	.601	1.665

Figure 1 describe the distribution of residual variance in this investigation, demonstrating that the spread of residual variance does not follow any pattern. The resultant pattern stretches below and above Y at 0 on the Y axis. This means that the study's data can be put to good use.

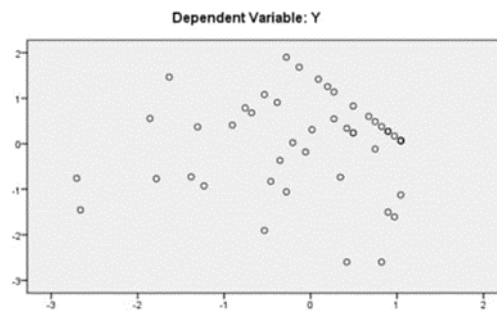


Figure 1. Result Of Heteroscedasticity Test

Table 4 displays the researchers' T-test results, which show:

A. Given that the Sig. value for the effect of X1 on Y is $0.176 > 0.05$ and the t value is $1.373 < 2.011$, it is reasonable to conclude that Instagram Marketing has no significant influence on consumer purchase intention.

B. Given that the Sig. value for the influence of X2 on Y is $0.000 < 0.05$ and the t value is $6.433 > 2.011$, it is possible to conclude that Brand Awareness has a substantial effect on consumer purchase intention.

Table 4. Results Of T-Test

Model	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
1 (Constant)	-4.096	3.476		-1.178	.245
Instagram Marketing (X1)	.174	.126	.151	1.373	.176
Brand Awareness (X2)	1.116	.174	.708	6.433	.000

The significant value for the simultaneous impact of Instagram Marketing and Brand Awareness on Y is $0.000 < 0.05$, according to the findings of the F test performed by researchers in table 4, and the computed F value is $45.306 > F$ table 3.19. As a result, it is possible to conclude that Instagram Marketing (X1) and Brand Awareness (X2) both have an influence on Consumer Purchase Intention.

Table 5. Results Of F-Test

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	268.862	2	134.431	45.306	.000*
Residual	139.458	47	2.967		
Total	408.320	49			

R square was found to be .658 or 65.8% based on the results of experiments done by researchers in table 8. This suggests that the brand awareness variable plus the promotion variable may explain 65.8 percent of purchase choices. This suggests that the criteria collected are adequate, and the remaining 35.5 percent is due to issues outside of the scope of this study.

Table 6. Results Of Coefficient Determination

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.811 ^a	.658	.644	1.72255

The findings in table 9 demonstrate that the regression equation presented produces the following results: $Y = -4.096 + 0.174 (X1) + 1.116 (X2)$.

1. The constant has a value of -4.096, which suggests that if both Instagram Marketing (X1) and Brand Awareness (X2) reach zero, consumer purchase intention (Y) will fall.
2. The Instagram Marketing (X1) regression coefficient value is 0.174, indicating that the Instagram Marketing variable coefficient (X1) is positive, indicating that there is a positive association between brand awareness (X1) and consumer purchase intention (Y). Brand Awareness (X2) gets a score of 1.116, indicating that there is a positive association between brand awareness (X1) and customer purchasing interest (Y).
3. The results suggest that the Brand Awareness Variable is the most important factor influencing Consumer Purchase Interest. Because $1.116 > 0.174$, the Brand Awareness variable has a significant impact on the consumer purchase intention variable.

Table 7. Results Of Multiple Linear Regression

Model	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	T	Sig.
1 (Constant)	-4.096	3.476		-1.178	.245
Instagram Marketing (X1)	.174	.126	.151	1.373	.176
Brand Awareness (X2)	1.116	.174	.708	6.433	.000

Discussions

These results show that the Instagram marketing indicators have no significant influence on the consumer purchase intention variable. This study supports the findings of prior research, namely Meatry and Agung's work titled "The Effect of Social Media Marketing, Brand Awareness on Purchase Decisions with Purchase Intentions as Intervening Variables at J.Co Donuts & Coffee Semarang." This study discovered that social media marketing has no significant influence on consumer purchase intention (Kurniasari & Budianto, 2018). The researchers recommend increasing the use of Instagram Marketing and brand awareness in the future to have an even greater impact on consumer purchasing interest, such as collaborating with influencers or other stores, building a more loyal community, and creating interesting content more frequently to invite customers.

Limitation And Implication

For The Further of @helmpalumurah, the Authors suggest :

1. In order for @helmpalumurah account users to increase their use of Instagram marketing, they should pay attention to several Instagram marketing indicators, such as content creation, sharing content, social networking, and community building, because they are not thought to have a significant impact on consumer buying interest. This is because Instagram marketing has a t-test of $1.373 < 2.011$, indicating that it has had no substantial influence on generating sales through the customer buying interest in @helmpalumurah.
2. In order for *Helmpalumurah* account users to improve their usage of Instagram marketing in accordance with Instagram marketing KPIs, such as community and social network creation.

3. In order for *helmpalumura* account users to boost their utilization of brand awareness in creating advertising with distinguishing characteristics.

The researcher delivers two implications through this research: theoretical benefits and practical benefits. Theoretical benefits include providing insight and understanding in digital marketing, particularly Instagram marketing. The insights and expertise gained from this research can help those who will utilize Instagram for digital marketing media in the future. The Practical benefits of the research are meant to add to and give information for a company and business person in order to understand the effect of Instagram marketing and brand awareness on consumer purchase intention.

Conclusion

Based on the test results from the research, the following conclusions can be drawn:

1. To determine the influence of the independent variable on the dependent variable, the significance value must be 0.05, and the Instagram Marketing variable (X1) has a significance of $0.176 > 0.05$, indicating that Instagram Marketing has no significant effect on Consumer Purchase Intention.
2. The significance value for determining the influence of the independent variable on the dependent variable must be 0.05, and the Brand Awareness variable (X2) has a significance of $0.00 < 0.05$, indicating that Brand Awareness has a substantial effect on consumer purchase intention.
3. The variables Instagram Marketing (X1) and Brand Awareness (X2) have a significance value of $0.00 < 0.05$, indicating that Instagram Marketing and Brand Awareness both have a substantial effect on consumer purchase intention.

References

- [1] Adha, S., Fahlevi, M., Rita, R., Rabiah, A. S., & Parashakti, R. D. (2020). THE IMPACT OF SOCIAL MEDIA INFLUENCER ON THE INFLUENCE OF INTER-BRAND WORK INTEREST. *Journal of Industrial Engineering & Management Research*, 1(1b), 127-130. <https://doi.org/10.7777/jiemar.v1i1.33>.
- [2] Agam, D.N. (2017). Followers Ratio on Instagram Affects the Product's Brand Awareness.
- [3] Arief G. M. and Millianyani, H. (2015). The Influence of Social Media Marketing Through Instagram on Consumer Purchase Intention of Sugar Tribe. *eProceedings Of Management*, 2(3), 2581-2586.
- [4] Ariesandy, P. & Zuliastianam D. A. (2019). THE IMPACT OF SOCIAL MEDIA MARKETING THROUGH INSTAGRAM ON CONSUMER PURCHASE INTENTION IN LADYFAMESHOP. *eProceedings Of Management*, 6(2), 2767-2771.
- [5] Arikunto, S (2019). *Research Procedure*, Jakarta.
- [6] Ferdy, R. & Sari, W. P. (2020). The Effect of Gojek's Billboard Ad Version #UninstallKhatirTo Brand Awareness. *Prologia*, 4(1), 106-112. <http://dx.doi.org/10.24912/pr.v4i1.644>.
- [7] Ghozali, P. S. M. (2021). THE INFLUENCE OF DIGITAL MARKETING ON PURCHASE BUYING AT E-COMMERCE [Degree dissertation Muhammadiyah Surakarta University]. Muhammadiyah Surakarta University. <http://eprints.ums.ac.id/92498/11/NASKAH%20PUBLIKASI.pdf>.
- [8] Kurniasari, M. and Budiatmo, A. (2018). The Influence of Social Media Marketing, Brand Awareness on Purchase Decisions With Interest to Buy as Intervening Variables at J.CO Donuts & Coffee Semarang. <https://ejournal3.undip.ac.id/index.php/jiab/article/view/20968>.
- [9] Rinata, A. R., & Dewi, S. I. (2019). KPOP FANS FANATISM IN SOCIAL MEDIA ON INSTAGRAM. *Interaksi: Jurnal Ilmu Komunikasi*, 8(2), 13-23. <https://doi.org/10.14710/interaksi.8.2.13-21>.
- [10] Siregar, L. Y., & Irwan Padli Nasution, M. (2020). The Development of Information Technology on the Improvement of Online Business . *Journal of Management and Business*, 2(1), 71–75. <https://journal.upp.ac.id/index.php/Hirarki/article/view/331>.
- [11] Sugiyono (2017). *Research Methods Quantitative, Qualitative, dan R&D*. CV. Alfabeta.
- [12] Sugiyono (2018). *Research Methods Quantitative*. CV. Alfabeta.
- [13] Sulianta, F. Fantastic Social Media grows visitors, circles, likes, connections, retweets, and followers. PT. Elex, Media.

A Proposed Procedure in Generating Small Area Estimates of Poverty Incidence: A Case Study in the Autonomous Region in Muslim Mindanao (ARMM)

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Abstract: The main purpose of this study is to propose an alternative procedure in the generation of small area estimates of poverty incidence using imputation-like procedures coupled with a calibration of estimates to ensure coherence in the regional estimates. This study used the Family Income and Expenditure Survey of 2009 and the Census of Population and Housing (CPH form 2) 2010 to come up with reliable estimates of poverty incidence by municipal level. Since CPH is conducted in the Philippines every 10 years, CPH 2010 is the latest data that was used. The researcher was able to produce small area estimates of poverty in Region 15 (ARMM) at municipal level by combining survey data with auxiliary data derived from census. ARMM was chosen because based on the latest PSA estimates of poverty, this region has a poverty incidence greater than the national average. The study fitted different models. By comparing the methods of imputation, it was found that the Stochastic Regression Imputation performed better in attaching the income in census. The error used in Stochastic Regression was estimated using non-parametric method called Kernel Density Estimation.

Keywords: *poverty; small area estimation; imputation; calibration; stochastic regression imputation*

Introduction

According to the World Bank, poverty is pronounced deprivation in well-being, which comprises many dimensions. This includes low income and the inability to acquire basic goods that are necessary for a decent living. In addition, extreme poverty is measured as the number of people living on less than \$1.90 a day in 2018. Poverty has always been a challenge in many countries in the world. In fact, due to the pandemic and war in Ukraine, there will be between 75 to 90 million people who will be living in extreme poverty this year, 2022. Because of this, poverty alleviation has always been a part of each country's development programs.

In the Philippines, the poverty incidence in the first semester of 2021 is estimated to be 18%, according to Philippine Statistics Authority (PSA). This estimate is the proportion of families who have incomes that are not sufficient to buy their basic needs. In ARMM specifically, the poverty incidence is at 39.4%. Thus, a study about poverty is deemed important. A specific poverty alleviation program should be formulated for this region that is consistently having high poverty incidence.

The programs of the government should be in response to the issues mentioned by the Sustainable Development Goals (SDGs). The local government should be involved in the different programs formulated by the national government to be able to reduce poverty. For this to be possible in the smaller levels or domains, reliable data is important. In the Philippines, the provinces and municipalities are considered to be on the small area level. To be able to devise a plan, there should be a picture of the poverty condition of these small areas. And to be able to get a picture, a reliable estimate is necessary. Hence, the importance of small area statistics.

There are many Small Area Estimate (SAE) techniques available. So far, in the Philippines, the official methodology done to generate small area statistics is the one conducted by the National Statistical Coordination Board (NSCB) in their 2005 paper, "Local Estimation of Poverty in the Philippines" with a modification in attaching the income. The said paper estimated the poverty and expenditure for the provincial and municipal level. The procedure basically utilized the Elber's, Lanjouw and Lanjouw (ELL) Methodology. The ELL methodology utilized both the Census of Population and Housing (CPH) and the Family Income and Expenditure Survey (FIES). Regression models were utilized from the FIES for the purpose of predicting income based on variables common to both FIES and CPH. Once the model has

been identified, it is used to predict the income values which are attached to CPH from where a household is identified as poor or non-poor, thereby allowing an estimate of the poverty incidence. However, based on the results, the municipal level estimates do not conform to the regional estimates.

In this regard, a similar approach was done by Pacificador et al. (1996). They conducted the study "Attaching the Income and Expenditure Dimension to the 1990 Census of Population and Housing (CPH)". The study is in response to the call for a more in-depth analysis of the 1990 Census of Population and Housing (CPH) data. This was an initial attempt in developing appropriate file merging technique also called Record Linkage. The income and expenditure variables were attached to the CPH data using Deterministic Regression. The methodologies done by the NSCB and Pacificador are like an imputation approach in coming up with attaching income which can be used to generate small area estimates of poverty incidence. Both methods employed Deterministic Regression approach in imputing data. However, the downside of using Deterministic Regression as a model in predicting income and expenditures is that it is the same as the class mean imputation. In the class mean imputation, the predicted values are the average values of the dependent variable, and the fitted values will have grouping effects. Additionally, there are three problems that can be encountered in using this type of imputation. It reduces the variance of the imputed variables; it shrinks standard errors which invalidates most hypothesis tests and the calculation of the confidence interval, and it does not preserve the relationship between variables such as correlations. Thus, the model was not able to preserve the distribution of the error term.

The disadvantages of the two methodologies are: they will not replicate the distribution because of the grouping effect, and there is no guarantee that the estimates will be coherent with the regional estimates of which direct estimates are available of adequate precision. In the proposed procedure of the researcher, calibration techniques were used to ensure that the estimates conform with the regional estimates.

Building on the weakness of the previous methodologies, this study proposed an alternative procedure in estimating the poverty incidence of the municipalities in the Philippines. The procedure is the same as the procedure used by Pacificador (1996) but borrowed strength from the imputation. The Deterministic and Stochastic Regression are used to address the weakness of using Deterministic Regression only. The imputation procedure is that of a unit level and not area level. In addition, the final estimates were calibrated so that they conform to the regional estimates of poverty incidence in the Philippines.

2. Methodology

2.1 Data

This study utilized the Family Income and Expenditure Survey (FIES, 2009). In the Philippines, it is conducted by the PSA (formerly NSO) every three years. According to the report prepared by the World Bank in cooperation with the NSCB in 2005, the FIES contains information on household income, expenditure and consumption, in addition to socio-demographic characteristics.

Along with the FIES 2009, the 2010 Census of Population and Housing (CPH) was also used in this study. The CPH provides data on which the government planners, policy makers, and administrators base their social and economic development plans and programs (2010 CPH). This full census is conducted every 10 years, with a Census of Population at 5-year intervals.

2.2 Procedure

This study utilized two models: The Deterministic Regression and the Stochastic Regression to predict the income value to be attached to CPH. A comparison was done to ensure the reliability of estimates. The Stochastic Regression was used in order to address the weakness of the Deterministic Regression. Stochastic Regression is the same as that of the Deterministic Regression but with the addition of the error term. The estimation of error term is crucial in this study. The Kernel Density Estimation was used in estimating error since the data is not normally distributed. Kernel Density Estimation (KDE) is

a non-parametric way of estimating error. Non-parametric approaches are more appropriate if it is not possible to make strict assumptions about the form of the underlying density function. This method subdivides the domain into bins and counts the number of samples, n_b , which fall into each bin. The local probability density is obtained by dividing the number of samples in each bin by the number of samples N and the bin width h . It can be expressed as $\hat{f}(x) = \frac{n_b}{Nh}$, for $x_b \leq x < x_{b+1}$

where x_b and x_{b+1} are the extents of bin b , and $h = x_{b+1} - x_b$. The \hat{f} is used to denote a density estimate of the probability density function f . This smoothed rendition connects the midpoints of the histogram, rather than forming the histogram as a step function, it gives more weight to the data that are closer to the point of evaluation.

In this study, different models were fitted in the region which were built using the first three FIES replicates, and the model built was validated in the last replicate. A total of four model building sets and four model validation sets were used. This part is the modification made by the researcher from the methodology employed by NSCB to ensure the accuracy of the models using DRI and SRI techniques.

In this paper, the model used to attach the income is of the form

$$\hat{Y}^* = X\hat{\beta} + e.$$

Here, β represents the regression coefficients giving the effect of the X 's or auxiliary variables on Y (the total income of the household), and \hat{e} is a random error term representing that part of the income that cannot be explained using the auxiliary information.

Some implementations of ELL methodology have fitted separate models for each stratum defined by the survey design. The advantage of this is that it tailors the model to account for the different characteristics of each stratum, but it might increase the problem of over-fitting if the strata is small. Another way of validating the estimates is through bootstrapping. The bootstrap method was introduced by Efron (1979), which is a very general resampling procedure for estimating the distributions of statistics based on independent observations. The bootstrap is shown to be successful in many situations, which is accepted as an alternative to the asymptotic methods. In fact, it is better than some other asymptotic methods such as the traditional normal approximation and the Edgeworth expansion (NSCB, 2005). Bootstrap methodology was used to determine the error term to be considered in the model \hat{e} . A total of 1000 independent samples were drawn, and the mean error was considered.

After predicting the income using the model or imputation method, another variable was created to compute for the per capita income of the households. The per capita income is the ratio of the income and the number of members in a household. This step is necessary to determine the number of poor households per municipality.

According to the PSA website, the annual per capita threshold in the Philippines for 2009 is Php16,871 at the national level. A family living below this value annually is considered poor. In this study, the provincial threshold was used in determining whether a family is poor or not. The total number of poor households per municipality was determined by collapsing the new created data set by municipalities. But before this was done, the variable municipality in the CPH was recoded in such a way that the municipal code is unique for each municipality.

In producing the final estimates, the poverty incidence was computed as:

$$P_R^b = \frac{\sum_{ij \in R} I(E_{ij}^b < z)}{\sum_{ij \in R} n_{ij}},$$

where n_{ij} is the size of household ij in R and $I(E_{ij}^b < z)$ is an indicator function (equal to 1, when the per capita income is below the poverty line/threshold and 0, if otherwise).

After identifying if a household is poor or non-poor, the number of poor households per municipality was obtained and was simulated by using bootstrap methodology. In this paper, the simulated values for the number of poor was obtained by parametric bootstrap. The mean and standard error for the 1000 bootstrapped values served as the estimates for mean number of poor households and standard

error for each municipality. After producing the poverty estimates, the values were calibrated in order to conform to the regional estimates obtained from FIES.

The term calibration estimation was introduced by Deville and Sarndal (1992) as a procedure of minimizing a distance measure between initial weights and final weights subject to calibration equations. In this study, the bootstrapped total number of poor was calibrated using the formula

$$\hat{Y}_m^* = \hat{Y}_m * \left[\frac{\hat{Y}_R}{\hat{Y}_R^*} \right]$$

where \hat{Y}_m^* = calibrated municipal estimates

\hat{Y}_m =municipal estimates from CPH

\hat{Y}_R =regional estimates from FIES

\hat{Y}_R^* =total municipal estimate per region from CPH

The rescaled value of poor is expected to correspond to the total number of poor households in the region. The regional estimates were used in the calibration since FIES was designed for regional level estimates.

3. Results and Discussion

3.1 Common Variables

After careful checking on the questions between FIES and CPH, the common variables were found. The common variables which were denoted by X are called the auxiliary variables. The common variables are: the type of building where the family reside, the construction materials of the roof, construction materials of the wall, the floor area, sex of household head, age of the household head, marital status of the household head, highest grade completed by the household head, province, municipality, and barangay. Among the 11 common variables, six of them were recoded to ensure that the variables were measured in the same way between the two data sets for the modeling purposes. The type of building where the family reside, the construction materials of the roof, construction materials of the wall, the floor area, marital status of the household head, and the highest grade completed by the household head were the six variables recoded and the remaining 5 variables were measured in the same way.

3.2 Association of common variables with income

After identifying the common variables, a first step regression was done in the original FIES data in order to determine the significant variables in predicting the income. In this case, Y is the total income (dependent variable) and the auxiliary variables are the X variables (independent). The result shows that all the variables were found to be significant (generally) except some of the dummy variables. All the variables were used in modeling for the purpose of predicting the total income.

The original FIES has 38,400 observations. The model was found to be significant since the probability of F is 0.00, which is also less than 0.05. However, the r-squared value is just 0.2461. Since the model is used for determining significant predictors of income only and not for explaining the relationships, the r-squared is not expected to be high. Survey regression in STATA was used in order to include the survey weights in the analysis. The sampling weight or survey weight includes the inverse of the probability that the observation is included because of the sampling design in the model. The same set of variables were used in each region to ensure validity of the model.

3.3 Statistical Matching

After running the first regression, all the variables from the CPH that are common to FIES were extracted from the whole data set and statistical matching was done. This part is an important step in any estimation method. It is important that the common variables were measured equivalently.

Kolmogorov-Smirnov test was done in order to assure that the variables are statistically matched. It was shown that the maximum differences are all less than the critical values from the K-S table, with $k-1$ degrees of freedom. This causes the failure of rejection of the null hypothesis that the distribution between the two data sets are the same. Thus, the variables can be used to model the income in the CPH data since they have the same distribution in FIES. CPH data is divided into two: *rt1* and *rt2*. The person level characteristics were encoded in *rt1* while the household level characteristics were encoded in *rt2*.

3.4 Model Building

In constructing the model in FIES, the FIES data set per region were extracted from the whole FIES 2009 data set. For each region, the data set was divided into four replicates and the models were built in the first three replicates then validated in the last replicate. Each region has four building sets and four validation sets. A total of 153 data sets were constructed for the purpose of modeling the total income. Before fitting the model in the regional data, the variable total income (*toinc*) was tested for normality. The Shapiro Wilk's test for normality was utilized.

The probability value of the test is 0.00, which means that the null hypothesis that the distribution of the error term or residuals is normal was rejected. The result implies that the residuals are not normally distributed since it does not form a line that suggests a normal distribution.

Since most of the regression methods rely on the assumption of normality, transformation of dependent variable was done to ensure the aptness of the model using Deterministic Regression. The total income in FIES is expected to have a positively skewed distribution because of the nonnegativity of the values. Thus, the log transformation is the most appropriate transformation. Logarithmic transformation is often used to stabilize the variation in the data. This made the data ready for fitting the model for income. After the transformation, the model

was fitted in the first three replicates of FIES and validated in the last replicate.

The Relative Cumulative Frequencies for each model set and validation set was done. The summary of Kolmogorov-Smirnov tests done between the predicted and actual values of the total income in FIES using Deterministic Regression shows that replicates 1 and 3 were not able to preserve the distribution. Thus, it can be concluded that the Deterministic Regression was not able to predict the income that is similar to the actual income in FIES.

Since the Deterministic Regression was not able to preserve the distribution of the income, another type of regression imputation was used: The Stochastic Regression. In this case, the estimation of the error term is very crucial. Before fitting the Stochastic Regression, the error terms in FIES were tested for normality after fitting the Deterministic Regression.

The normality test shows that the error term is not normally distributed. The Shapiro Wilk's test shows the probability is 0.00, which leads to the rejection of the null hypothesis. Thus, the error terms do not follow a normal distribution.

Since the error is not normally distributed, some transformations were done to normalize the data. However, the transformations did not work for the error terms to be normally distributed. In this case, the non-parametric technique in estimating error was utilized. The non-parametric technique used is called Kernel Density Estimation (KDE).

After generating the error, the data is now ready for attaching income and generating poverty incidence by adding the error terms in the deterministic regression. The generation of uniform random numbers between 0 and 1 is important in many numerical simulations. To ensure randomness of the generated values, the first 1000 iterations were ignored. The process is called burn-in. The burn-in is a term that describes the practice of ignoring some iterations at the beginning of the generation of random numbers. In this study, the first 1000 iterations were ignored. Since 1000 errors were generated, 1000 different models were also produced as bootstrapped values.

3.5 Attaching income to CPH data

After attaching the errors in the CPH data set, the 1000 bootstrapped logarithmic incomes were produced for each observation in the data set. Another set of 1000 bootstrapped columns were produced for the exponential values since the income was transformed to logarithm at the start of the modeling. The next 1000 bootstrapped columns were produced for the per capita income. The per capita is the total income divided by the family size. Another 1000 bootstrapped columns were produced as an indicator whether a household is poor or not based on the per capita threshold in each province. If the per capita income of a household is less than the per capita threshold of the corresponding province, then the household is considered poor (denoted by 1) otherwise non-poor (denoted by 0).

After producing 5000 variables for the estimation of poor households, the data was then collapsed in municipality level to attain the municipal level of poor households in the region. The mean number of poor households out of the 1000 bootstrapped estimates together with the standard errors were used as estimates of the municipality level. The estimates were also calibrated so that they conform to the regional level estimates. Table 1 shows the comparison of distribution of income between the deterministic and stochastic regression.

Table 1. Region 8 Relative Frequency Distribution			
Income Class	True Value(FIES)	Fitted Value (CPH Deterministic)	Fitted Value (CPH Stochastic)
1 12000 to 111999	60.79	38.11	35.57
2 112000 to 211999	21.17	16.63	21.42
3 212000 to 311999	7.41	23.69	14.00
4 312000 to 411999	3.58	12.94	9.02
5 412000 to 511999	2.68	5.24	5.59
6 512000 to 611999	1.44	1.98	3.60
7 612000 to 711999	0.65	0.78	2.31
8 712000 to 811999	0.60	0.33	1.52
9 812000 to 911999	0.45	0.14	1.03
10 912000 to 1011999	0.35	0.07	0.72
11 1012000 to 1111999	0.15	0.03	0.51
12 1112000 to 1211999	0.10	0.02	0.39
13 1212000 and above	0.65	0.02	4.32
Total	100	100	100

Table 1 shows that the distribution of income using SRI is closer than the distribution using DRI. The K-S test shows that the maximum difference is less than the critical value which leads to the failure of the rejection of the null hypothesis. Thus, the SRI produced income that has the same distribution as the true income value in FIES.

Table 2 shows the summary of the number of poor households, the poverty incidence and their corresponding standard errors using SRI with and without calibration. The result shows that the number of poor households produced with calibration is almost the same as the number of poor households in FIES 2009 which is 290,391. The SRI is off by only 4 households as compared to SRI without calibration.

Table 2. Summary of Estimates for Stochastic Regression With and Without Calibration		
Estimates	Without calibration	With calibration
Number of poor households	178817	290387
Standard error of poor households	1.6907	2.7503
Poverty incidence	25.11	34.23
Standard error of poverty incidence	2.8479	0.0507

The poverty incidence is higher with calibration, but the standard error is smaller. Notably, the estimates without calibration are quite far from the estimates with calibration. This does not mean that the SR models are "wrong", since the FIES estimates are subject to sampling error and may in some cases be further from the true values. FIES estimates were used to calibrate the produced estimates of SR in CPH.

4. Conclusions

The Stochastic Regression Imputation (SRI) is better to use as compared to Deterministic Regression Imputation (DRI) in attaching income to CPH. The SRI was able to preserve the distribution of the income as compared to DRI.

Since the error in fitting the DRI in CPH does not follow a well-known distribution (such as the Normal distribution), the non-parametric way of estimating error was used to generate the errors attached in SRI. The technique is called Kernel Density Estimation (KDE) or the histogram method, which was found to be effective in using the SR.

Using the calibration technique achieved municipal estimates that conform to the regional estimates. As claimed by the PSA in their official poverty statement on December 6, 2019, the official poverty statistics show significant progress in increasing overall income. However, there is still a need to sustain and enhance the poverty alleviation programs in the country by targeting the poor efficiently through the use of small area estimation, especially the procedure utilized in this study.

Since the CPH focuses mainly on the socioeconomic variables, the researcher highly recommends that health variables should be included in the small area estimation models. This is because small area estimates based on poverty may not always provide the best possible estimates on health.

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6. References

- [1] Global Policy Forum. (n.d.). Retrieved March 29, 2019, from <https://www.globalpolicy.org/social-and-economic-policy/poverty-and-development/economic-growth-and-the-quality-of-life.html>
- [2] Efron, B. (1979). Bootstrap methods: Another look at the Jackknife. *Ann. Statist.* 71-26. Retrieved from <http://www.math.ntu.edu.tw/~hchen/teaching/LargeSample/notes/notebootstrap.pdf>
- [3] Millennium Development Goals. (n.d.). Retrieved March 29, 2019, from <http://www.ph.undp.org/content/philippines/en/home/library/mdg/fast-facts-MDGs-in-the-Philippines.html>
- [4] National Statistical Coordination Board. (2005). Estimation of local poverty in the Philippines. A World Bank Project in cooperation with the National Statistical Coordination Board. *Estimation of Local Poverty in the Philippines. A World Bank Project in Cooperation with the National Statistical Coordination Board*. Retrieved 2017, from https://psa.gov.ph/sites/default/files/NSCB_LocalPovertyPhilippines_0.pdf
- [5] Pacificador, A. Y, et al. (1996). Attaching Income and Expenditure Dimension to the 1990 Census of Population and Housing. A research study funded by the UNFPA-NSO Project PHI/93/P01-Utilization and Dissemination of Demographic Data.
- [6] Philippine Statistics Authority. (2022, August 16). Retrieved August 16, 2022, from <https://psa.gov.ph/>
- [7] Sarndal, C. E., Swenson, B, and Wretman, J. H. (1989). The weighted residual technique for estimating the variance of the general regression estimator of the population total. *Biometrika*, 76, 527-537.

Foreign Stock Indexes and Indonesian Stock Index: Which Foreign Stock Index is More Important to Jakarta Composite Index?

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Abstract: This study is intended to examine the relationship between foreign stock indexes and the Jakarta Composite Index (JCI). This research is different from previous studies, which mainly used the multiple regression method. The Artificial Neural Network (ANN) is employed as a method to assess the impact of foreign stock indexes on the Indonesian stock index. There are six Asian foreign indexes considered as factors influencing the Indonesian stock index, which are STI, KLSE, KOSPI, NIKKEI, HANG SENG, and ASX. The result shows that ASX is the first foreign index impacting IHSG, followed by STI, KLSE, HANGSENG, KOSPI, and, lastly, NIKKEI. Therefore, the investors in Indonesia should pay attention to the movement of ASX and STI since JCI is sensitive to its movement.

Keywords: ANN, foreign stock indexes, JCI, stock index price movement

Introduction & Literature Review

Investment is a long-term commitment to a variety of assets, such as money or other assets, that generate rewards (Bodie et al., 2014). The capital market is one of the most successful long-term investment vehicles for raising corporate cash; also, investors can get dividends and capital gains through the capital market. Investing in the stock market requires a stock price index as an indicator to track the price fluctuations of securities in the capital market. Stocks are one of the capital market's appealing investment options (Hartono, 2015).

Numerous factors influence the behavior of the Indonesian stock market. These influences might be both internal and external (e.g., global financial market fluctuations) (i.e., Indonesian macro indicators). Numerous studies, such as those by Yuswandy (2013), Gumilang, Hidayat, and NP (2014); Uligoma (2014), Muharam (2015); Haholongan (2016); Harmono (2017); as well as Triyono and Robiyanto (2017), have sought to investigate this issue.

Consequently, the circumstances of a country's capital market will be impacted by external conditions, particularly the state of capital markets of industrialized nations. As a developing nation, Indonesia enables international investors to hold securities listed on the Indonesia Stock Exchange. This action was taken to stimulate capital flows into Indonesia (Husnan, 2015). The United States, Hong Kong, Japan, and so on, are among the developed nations that have a significant impact on the performance of other stock markets. In addition, stock exchanges in the same region might impact one another due to their proximity in terms of geography (Mie and Agustina, 2014). When a country's stock exchange is undergoing a recession, this might have an effect on its investments in other nations. Wijaya, Susanti, Nurhasanah, Mukhlas, and Utari (2020) argue that the movement of the index on the Indonesian capital market was impacted by the movements of developed nations' capital markets, such as the United States and Japan.

This study examines the rank of foreign stock price indexes that affect Jakarta stock exchange (IHSG) the most. This study focuses on these factors because fluctuations or changes in these variables have substantial impact to IHSG. There are six major stock indexes in the Asia Pacific are considered in the study, which are the Singapore stock index (STI), Malaysia stock index (KLSE), Korea stock index (KOSPI), Japan stock index (NIKKEI), Hong Kong stock index (HANG SENG), and Australia stock index (ASX). The indexes are chosen since those indexes have large trading volumes and transactions. This

study employs an artificial neural network (ANN), while most previous studies use the regression method.

This paper consist of the following: an introduction, literature review, data and methodology, result and discussions, and conclusion.

The capital market is a crucial component of economic activity. In nations that have adopted a market-based economic structure, the capital market has become an alternative source of financing for raising long-term external money without financial intermediaries. The banking industry can only give funds in the form of credit, and excessive debt can increase the cost of capital, necessitating those enterprises to raise cash in the form of their own capital. Here, the capital market serves as a venue for enterprises to raise financing using their own capital (Andika & Djamaludin, 2020).

According to Darmadji and Hendy (2006), the capital market is a market for long-term financial products exchanged as debt, equity (shares), derivative instruments, and other instruments. The Indonesian capital market includes emerging capital markets, which are capital markets in the process of development in developing or newly industrialized nations. Emerging capital markets differ from established capital markets such as the New York Stock Exchange and the London Stock Exchange. The economic and social variables, as the legal, economic, and regulatory environment that develops capital markets, contribute to these variances. Next, the JCI is a collection of all stock prices included in the index calculation, and the JCI is the leading indicator that describes stock price fluctuations. In addition, Sunariyah (2004) explains that the JCI provides a series of historical data describing the movement of common stock values up to a given date. The daily stock price fluctuates on the stock exchange's closing price for the day.

Based on these definitions, JCI is comparable to a capital market barometer. Its function is essential since it provides a metric enabling one to observe now-occurring conditions. The JCI is a capital market barometer that can describe the current situation of the stock market. The assembled and generated stock price index is comparable with activities or events, such as stock price fluctuations across time.

The JCI had ups and downs concurrently with market changes and dynamics. The movement of the index value will show market conditions that are changing. The rising stock price index indicates that the market is enthusiastic or active transactions (bullish). This condition reflects the desired state. A constant stock price index indicates stable conditions, while a falling (bearish) stock price index indicates a state of inactivity.

Multiple countries' composite stock price indices, including the IDX, adopt the weighted average technique (Bodie, Kane, & Marcus, 2015). Index calculations on the IDX employ a market value-weighted average index, as do index calculations on other exchanges. The index is calculated using the market value divided by the base value multiplied by 100. The market value is the total number of outstanding shares multiplied by the current market price, also known as market capitalization. In contrast, the fundamental value is the value computed based on the initial price of each share or the price that has been adjusted if the company has engaged in actions that result in a change in the number of shares listed on the stock exchange. Adjustments are made to ensure that the index accurately reflects the fluctuations in stock prices.

According to Krugman and Maurice (2009), the capital market in which individuals from many nations trade assets is known as the international capital market. There is a domino effect (contagion effect) from one country to another, as the JCI movement has the same index movement and is influenced by index movements from many international capital markets. Since the 1997 Asian financial crisis, several studies have demonstrated that the stock market returns of Korea, Thailand, and Indonesia

are highly correlated. According to Achsani (2000), the stock market reacts to shocks from other exchanges like regional exchanges and does not excessively react to a shock in the United States. Only Singapore, Hong Kong, Japan, Taiwan, and New Zealand will respond swiftly, but their populations are insufficient. Conversely, if there is a shock in Singapore, Australia, or Hong Kong, the shock will be relayed rapidly to nearly all stock exchanges in the Asia Pacific, including JCI.

The globalization of the economy, according to Franke (1993), will make capital allocation simpler for investors. But in addition to having a positive impact on globalization, it also has a negative impact, which is the link between one stock exchange and another, which Tan (1998) refers to as the contagion effect.

Methodology

The data used in this study is a daily stock index of six composite indexes (Singapore, Malaysia, Korea, Japan, Hong Kong, and Australia) from 2010 to 2019. The data obtained from Yahoo Finance. This study employed an artificial neural network (ANN). ANNs are nonlinear models composed of interconnected units (neurons) that can perform a range of pattern recognition tasks, such as classification and prediction (Haykin, 1998). ANNs gain information by recognizing patterns in data and storing it in weights, which are sets of connection strengths corresponding to regression coefficients. There are numerous configurations of ANNs, such as radial basis function networks and multilayer perceptrons (MLP). Each ANN learns data patterns by estimating weights using activation functions, but different ANN types learn differently. This study utilizes an MLP, an artificial neural network that learns by backpropagation and adjusts its weights after processing the entire data set or each data point.

ANN weights quantify correlations between independent and dependent variables, similar to regression coefficients. In contrast, ANN weights assess the local effects of independent factors on dependent variables across all data, while regression weights estimate global effects. For example, the weight coefficient of an independent variable could be negative at certain nodes and positive at others. Significant weight fluctuations imply that the independent variables fluctuate in a nonlinear fashion (Intrator & Intrator, 2001). Further, if the ANN weights are nonlinear, the outcomes of repeated regression on the data set will be suboptimal.

Results and Discussion

The aim of this study is to test six foreign stock indexes and rank them based on their importance. Table 1 shows number of data (N) utilized in this study. From 2290 data, 1592 or 69.5% of data is used in training, while 698 or 30.5% used for testing. There is no data excluded from the analysis. Next, Table 2 presents the model summary of the analysis. The relative error for training and testing is consistently low. The relative error for testing and testing is 0.062 and 0.063, respectively. Therefore, the result is reliable.

Table 1. Case Processing Summary

		N	Percent
Sample	Training	1592	69.5%
	Testing	698	30.5%
Valid		2290	100.0%
Excluded		0	
Total		2290	

Table 2. *Model Summary*

Training	Sum of Squares Error	49.436
	Relative Error	.062
	Stopping Rule Used	1 consecutive step(s) with no decrease in error ^a
	Training Time	0:00:00.05
Testing	Sum of Squares Error	22.143
	Relative Error	.063

Dependent Variable: JCI

a. Error computations are based on the testing sample.

Figure 1 and Table 3 show the independent variable importance of stock indexes that affect JCI. The result shows that ASX is the most important foreign stock index that affects JCI, followed by STI, KLSE, HANGSENG, KOSPI, and NIKKEI, respectively. The normalized importance is 100.0%, 46.6%, 36.7%, 32.9%, 32.5% and 25.8%, respectively. It implies that from the six foreign indexes, investors should be aware of the movement of ASX and STI regarding the fluctuation of JCI.

Table 3. *Independent Variable Importance*

	Importance	Normalized Importance
STI	.170	46.6%
KLSE	.134	36.7%
KOSPI	.119	32.5%
NIKKEI	.094	25.8%
HANGSENG	.120	32.9%
ASX	.364	100.0%

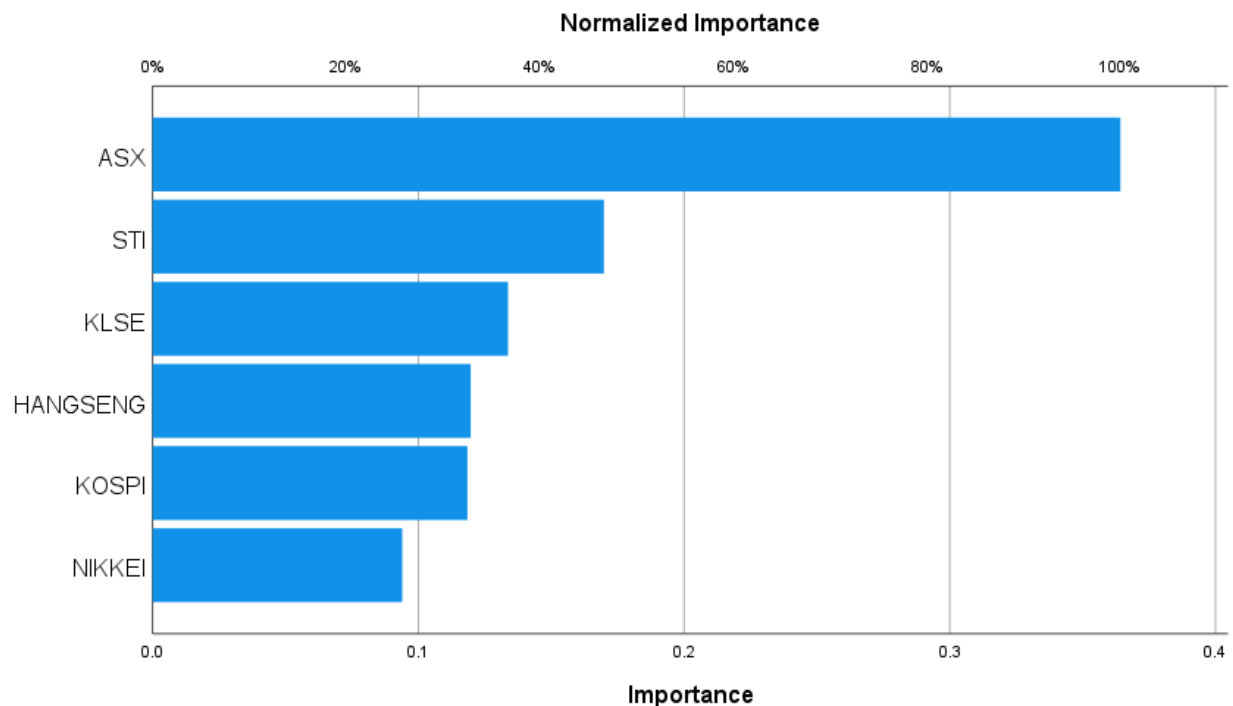


Figure 1. *The rank of foreign stock indexes that affect JCI*

Pulungan, Wahyudi, Muharam, and Suharnomo (2019) argued that the Australian Stock Exchange and Singapore Stock Exchange exerted the largest effect on the Indonesia Stock Exchange relative to other capital markets. This circumstance may develop due to the proximity of the Australian Stock Exchange and Singapore Stock Exchange to the Indonesia Stock Exchange in Jakarta, as well as the fact that the trading time difference between the three exchanges is only one to two hours. Other capital markets located reasonably near Indonesia also exhibited comparable situations. It was discovered, however, that the New York Stock Exchange and the London Stock Exchange had a higher impact than the capital markets that were geographically closer to Indonesia, such as the Seoul Stock Exchange and the Taiwan Stock Exchange.

Furthermore, when making investments, Indonesia Stock Exchange investors must be mindful of the conditions of global capital markets. It's empirical demonstration has an increase in the index that measures market conditions on each overseas capital market serve as a predictor of a similar occurrence on the Indonesia Stock Exchange. Foreign markets that exhibit bullish and negative patterns will have an impact on the Indonesia Stock Exchange. If the general condition of foreign capital markets improves, investors on the Indonesia Stock Exchange can buy positions on Indonesia Stock Exchange stock. Since the improvement in overseas markets will favorably impact the stocks. If overseas capital markets experience a drop, investors on the Indonesian Stock Exchange wait before acting.

Conclusion

The study aims to examine the rank of foreign stock indexes that is important to JCI. ASX and STI are two of the most crucial foreign stock indexes that affect the movement of JCI based on the ANN method employed in this study. Investors in Indonesia should carefully monitor the fluctuation of ASX and STI in order to predict the JCI movement. In addition, investors and regulators should be aware of the contagion effect that might impact the fluctuation of JCI.

Further research should include extending the period of data and examining the significant international stock indices that may have an influence on stock indexes on the Indonesia Stock Exchange (IDX), not only on the JCI but also on the sectors index.

References

- [1] Achsani, N. A. (2000). Mencermati Kejatuhan Indeks Dow Jones: Akankah Indeks BEI Ikut Terseret. *University of Potsdam. Potsdam*.
- [2] Andika, Y. A., & Djamaluddin, S. (2020). THE EFFECT OF DOW JONES INDEX AND INDONESIA MACRO VARIABLES INDEX ON FINANCIAL SECTOR PRICE INDEX POST GLOBAL FINANCIAL CRISIS 2008. *Dinasti International Journal of Economics, Finance & Accounting*, 1(2), 291-314.
- [3] Bodie, Z., Kane, A., & Marcus, A. J. (2015). *Portfolio management*. McGraw Hill/Learning Solutions.
- [4] Frankel, J. A. (1993). Monetary and portfolio-balance models of the determination of exchange rates. *On Exchange Rates, MIT Press, Cambridge*, 95-116.
- [5] Gumilang, R. C., Hidayat, R. R., & Np, M. G. W. E. (2014). Pengaruh variabel makro ekonomi, harga emas dan harga minyak dunia terhadap indeks harga saham gabungan (Studi pada bursa efek indonesia periode 2009–2013). *Jurnal Administrasi Bisnis*, 14(2).
- [6] Haholongan, R. (2016). Kinerja lingkungan dan kinerja ekonomi perusahaan manufaktur go public. *Jurnal ekonomi dan bisnis*, 19(3), 413-423.
- [7] Haykin, S., & Principe, J. (1998). Making sense of a complex world [chaotic events modeling]. *IEEE Signal Processing Magazine*, 15(3), 66-81.
- [8] Harmono, H. (2017). RELATIONSHIP BETWEEN MACROECONOMIC FUNDAMENTALS, BANK'S CREDIT SCHEME, FIRM'S PERFORMANCE AND FIRM'S VALUE DIMENSIONS. *Jurnal Keuangan dan Perbankan*, 21(1), 82-95.
- [9] Husnan, S. (2018). Dasar-dasar teori portofolio & Analisis Sekuritas.
- [10] Intrator, O., & Intrator, N. (2001). Interpreting neural-network results: a simulation study. *Computational statistics & data analysis*, 37(3), 373-393.
- [11] Krugman, P. R., & Obstfeld, M. (2009). *International economics: Theory and policy*. Pearson Education.
- [12] MUHARAM, H. (2015). The world oil price movements and stock returns in several Southeast Asia's capital markets.
- [13] Pulungan, D. P., Wahyudi, S., Muharam, H., & Suharnomo, S. (2019). THE INTEGRATION OF THE INDONESIA STOCK EXCHANGE WITH REGIONAL AND INTERNATIONAL CAPITAL MARKETS.
- [14] Tan, J. A. R. (1998). *Contagion effects during the Asian financial crisis: Some evidence from stock price data* (pp. 98-106). Center for Pacific Basin Monetary and Economic Studies, Economic Research Department, Federal Reserve Bank of San Francisco.
- [15] Triyono, D. (2017). The effect of foreign stock indexes and Indonesia's macroeconomics variables toward Jakarta Composite Stock Price Index (JCI). *Advanced Science Letters*, 23(8), 7211-7214.
- [16] Uligoma, M. N. (2014). Identifikasi korelasi nilai tukar rupiah dan indeks harga saham gabungan melalui ensemble empirical mode decomposition.
- [17] Wijaya, J. H., Susanti, S. R., Nurhasanah, O., Mukhlas, A., & Utari, N. R. (2020). COINTEGRATION OF GLOBAL INDEXES TO THE COMPOSITE STOCK PRICE INDEX FOR THE PERIOD OF 2017 TO 2019. *PalArch's Journal of Archaeology of Egypt/Egyptology*, 17(4), 3473-3478.
- [18] YKPN, S. (2011). Pengantar Pengetahuan Pasar Modal, Edisi Keenam.

- [19]Yuswandy, Y. (2013). *Analisis pengaruh harga minyak dunia, harga emas dunia, nilai tukar RP terhadap USD dan indeks IHSG terhadap return saham (Studi kasus saham-saham Sinarmas Group)*. Working Paper.

Cash Conversion Cycle and Profitability on Manufacturing Firms in ASEAN+3

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Abstract: This study examined the effect of the cash conversion cycle on profitability. The sample sizes in this study were selected from manufacturing firms in Indonesia, in Thailand, in The Philippines, in Malaysia, in Singapore, in China, in Japan, and in South Korea (ASEAN+3). Profitability in this study is proxied by using net profit margin, return on assets, and equity. This study also used control variables; firm size, leverage, variability in net operating income, sales growth, and gross domestic product growth. The fixed effect (FE) model in the multiple regression method was used on 23,800 observations from 5139 manufacturing firms located in ASEAN+3 from 2012 to 2016. While it is found that the cash conversion cycle has a negative effect on return on assets and return on equity, it does not have a significant effect on net profit margin. Meanwhile, further tests on the differences in the effect of the cash conversion cycle on profitability in each country show different results.

Keywords: *cash conversion cycle, profitability, manufacturing firms, ASEAN+3*

Introduction & Literature Review

Company profitability cannot be separated from company liquidity because if a company's liquidity is insufficient to pay short-term obligations, this will affect the company's operations and impact on profitability (Saleem & Rehman, 2011). Companies that have adequate liquidity will not use their operational funds to finance short-term liabilities. Therefore, liquidity management of a company is needed to maximize the company's profit. In addition, profitability can reflect the efficiency of planning and controlling liquidity (Eljelly, 2004).

To company liquidity management, two methods are used to measure a company's liquidity, namely the static method and the dynamic method (Majeed, Makki, Saleem & Aziz, 2013). The measurement of liquidity using the dynamic method uses a cash conversion cycle related to the company's operations, and the data needed in this measurement comes from the balance sheet and income statement (Majeed et al., 2013). The cash conversion cycle can measure how long it takes to convert cash out into cash in (Padachi, 2006). Furthermore, Anser and Malik (2013) state that the cash conversion cycle can measure how efficient a company is in paying bills, collecting bills, and selling inventory. In addition, the cash conversion cycle can be used to assess and measure the benefits and risks. Furthermore, the cash conversion cycle is one of the tools used to measure how effective the company is in managing liquidity (Titman, Keown, & Martin, 2011).

Several previous studies that examined the effect of the cash conversion cycle on profitability found that the cash conversion cycle had a negative effect on company profitability. The longer the cash conversion cycle, the less profitable it is for the company. This is because the company will keep extended inventory of goods, so there are additional costs, then the company will be slower in collecting receivables and pay debts faster (Majeed et al., 2013; Nobanee et al., 2011). This is supported by research from Padachi (2006) on manufacturing companies in Mauritian, Uyar's research (2009) on the retail industry and wholesale trade in Turkey, research by Syarief (2010) on the food and beverage sector in Indonesia, research by Nobanee et al. (2011) on all non-financial companies in Japan, research by Anser and Malik (2013) on manufacturing companies in Pakistan, research by Majeed et al. (2013) on the manufacturing, chemical, automotive, construction and materials sectors in Pakistan, research by Yazdanfar and Ohman (2014) on 4 Industries in Sweden,

research by Bhutto et al. (2015) on non-financial companies in Pakistan, research by Bahtia & Srivastava (2016) on companies on the S&P BSE 500 Index on the Bombay Stock Exchange.

However, the above studies contradict the study conducted by Soekhoe (2012) on non-financial companies and research from Attari and Raza (2012) on the automotive, cement, chemical, and food manufacturers in Pakistan, which stated that there was a positive and significant correlation between cash conversion cycle and company profitability, where a long cash conversion cycle can increase the company's profitability because one strategy to attract consumers is to extend the time for collecting accounts receivable (Muscatella, 2014).

In addition to positive and negative effects, some studies find that the cash conversion cycle does not significantly effect profitability. Research from Al-Subhiri and Aburumman, (2013) on several sectors in Jordan, including the chemical, mining, textile, food and beverage, pharmaceutical and health sectors. The measurement of variables of profitability can cause this is different from other studies. The profitability variable in this study is proxied by using the profitability index.

Based on previous studies, there are inconsistencies in the results of these studies. This is an empirical issue that needs to be investigated. This study aims to analyze whether the cash conversion cycle affects the profitability of manufacturing companies in ASEAN+3. Therefore, the following hypothesis was developed:

Ha: The cash conversion cycle has a significant effect on company profitability.

Cash conversion cycle

The cash conversion cycle concerns how long a business can sell merchandise inventory, collect payments, and make payments to suppliers (Harrison et al., 2014). Turnover on accounts receivable is an indicator of the frequency at which the average company's receivables are converted into cash. Changes in the company's credit policy directly impact the average balance of receivables so that it will impact the length of days it takes the company to collect accounts receivable (Richard and Laughlin, 1980). Companies can improve the efficiency of the receivable collection process by offering discounts to customers who pay early and charging interest on late customers. Uyar (2009). However, companies must maintain long-term relationships with customers. The credit policy must be balanced with long-term relationships, customers, and reinvesting the cash received (Al-Shubiri & Aburumman, 2013). Because, if the credit period given to customers is longer, the company can retain customers.

Inventory management relates to how companies manage inventories of raw materials, goods temporarily in production, and finished goods in product sales (Richards & Laughlin, 1980). Scheduling the purchase of raw materials, storing goods, and distribution strategies are processes that must be controlled in managing merchandise inventory. According to Al-Shubiri and Aburumman (2013), companies can reduce the inventory period by asking suppliers to send raw materials on time to reduce costs and prevent damage to goods (Uyar, 2009). Even so, the company must maintain a level of merchandise inventory so as to maintain sales when demand from customers increases.

Turnover on accounts payable differs from the turnover on accounts receivable and merchandise inventory. While shortening the turnover on inventory and accounts receivable can shorten the cash conversion cycle, shortening the turnover on accounts payable will lengthen the cash conversion cycle (Richards & Laughlin, 1980). To extend the accounts payable period. the company can delay

payments to suppliers. However, this policy can lead to additional interest costs, loss of discounts, and loss of company reputation (Al-Shubiri & Aburumman, 2013).

Clark's Dynamic Theory of Profit

Profitability is not obtained from a stagnant economy where there is no change but only through a dynamic, changing economy (Clark, 1908). Owolabi and Obida (2012) even emphasize that change is the main cause of profitability. The company must embrace these changes to remain competitive and gain profit. The dynamic economic world, according to this theory is a healthy and competitive because it opens the eyes of businesspeople to continue to actively adapt to changes and even be proactive in making changes or innovations to compete with competitors in gaining profits.

Meanwhile, the benefits referred to here are pure profits that are only obtained when a change occurs or in a dynamic economic situation (Clark, 1891). Pure profits are short-lived because competitors sooner or later can imitate the changes or innovations made. Therefore, the production of goods or services increases, which cause consumers to have many choices at competitive prices. That way, the pure profit will be lost. However, this pure advantage did not go away. Continuous changes in a dynamic economy make business actors strive to realize changes that will provide new pure profits. This profit is the dream of entrepreneurs (Owolabi & Obida, 2012).

Companies can use Clark's dynamic theory of profit to generate profits. Because, the primary purpose of a business is to make a profit, and the ratios that measure the company's profitability are widely reported by companies (Harrison et al., 2014). Profitability can be measured using the net profit margin and profitability ratios. Net profit margin is obtained from the income statement by measuring the percentage of each sales dollar from net income (Kimmel, Weygandt, & Kieso, 2016). Meanwhile, the profitability ratio measures the ability of a company to earn a profit (Reeve et al., 2014). Furthermore, Reeve et al. (2014) explain that the company's ability is seen in the company's operating results (income statement) and the use of assets for operational activities (statement of financial position). Similarly, Weygandt et al. (2013) provide a definition of profitability ratios as ratios that measure the "revenue or success of a company's operations at a certain time" (p. 699). For this study, researchers only use Net Profit Margin, Return on Assets, and Return on Equity in measuring company profitability which will be explained in the following section.

Methodology

This study used multiple regression to evaluate whether the cash conversion cycle influences company profitability. Before the researcher conducted regression analysis, the classical assumption test was first carried out to detect and overcome the problems of multicollinearity and heteroscedasticity. In this study, the normality test was not carried out because the number of samples was > 30. The distribution of the average sample was close to the normal distribution. The autocorrelation test was not carried out because this study used panel data (time series and cross-section).

For the regression model, the following formula was used:

$$\text{PROF} = \beta_0 + \beta_1\text{CCC} + \beta_2\text{SG} + \beta_3\text{LEV} + \beta_4\text{SIZE} + \beta_5\text{VNOP} + \beta_6\text{GDP} + \varepsilon$$

Descriptions:

PROF = Profitability (ROA, ROE, net profit margin)

CCC = Cash conversion cycle

SG = Sales growth

LEV = Leverage

SIZE = Logarithm of natural *total assets*

VNOI = Variability of net operating income

GDP = Gross domestic product

This study used two main variables. The independent variable in this study is liquidity which is measured using the Cash conversion cycle. The dependent variable is profitability proxied by ROA, ROE, and net profit margin. In addition to the two variables above, this study uses control variables: sales growth, leverage, total assets, variability in net operating income, and growth in gross domestic product (GDP). Previous studies have used these five variables as control variables, such as research from Soekhoe (2012) using firm size, leverage, and GDP. Furthermore, research from Bhatia and Srivastave (2016) uses size, sales growth, leverage, variability in net operating income, and GDP.

Sampling in this study used a purposive sampling technique. The criteria for selecting the sample in question were as follows:

The sample was first composed by the companies in ASEAN+ 3 countries: Indonesia, Malaysia, Philippines, Singapore, Thailand, China, Japan, and South Korea.

The sample also included manufacturing company that publishes the required financial data on the stock exchange in each country.

Based on the sampling criteria, 5,139 manufacturing companies in ASEAN+ 3 were obtained as research samples.

The researcher chose 5 out of 10 countries in ASEAN because of the stock exchanges in these countries and the availability of data. In addition, 3 additional countries, namely China, Japan, and South Korea, were used in this study because these three countries are members of ASEAN+ 3. China, Japan, and South Korea have economic agreements with countries in ASEAN. The agreement includes strengthening the trade and investment system, technology transfer, strengthening small and medium enterprises, and promoting tourism (Hew & Anthony, 2000). This agreement and cooperation began during a crisis in 1997, so ASEAN began to expand cooperation with neighboring countries, namely China, Japan, and South Korea, as a way of widening economic integration (Soesastro, 2003). Hew and Anthony (2000) added that one of the purposes of widening economic integration is because China, Japan, and South Korea have the potential to be used to help ASEAN countries affected by the 1997 economic crisis.

Results

Overall, in manufacturing companies in ASEAN+ 3 during the study period, there is a significant positive relationship between ROA and net profit margin, ROE and net profit margin, ROE, and ROA. In addition, there is a significant negative relationship between ROA and cash conversion cycle, ROE, and cash conversion cycle. The results of the correlation between variables can be seen in Table 1.

Table 1. *Correlation results of variables for ASEAN+ 3*

ASEAN+ 3	CCC	NPM	ROA	ROE	SG	Lev.	Size	VNOI	GDP
CCC	1.00								
NPM	0.05 0.00	1.00							
ROA	-0.07 0.00	0.81 0.00	1.00						
ROE	-0.09 0.00	0.57 0.00	0.73 0.00	1.00					
SG	-0.07 0.00	0.17 0.00	0.19 0.00	0.16 0.00	1.00				
Lev	0.04 0.00	-0.30 0.00	-0.31 0.00	-0.20 0.00	-0.01 0.03	1.00			
SIZE	-0.18 0.00	-0.06 0.00	0.02 0.02	0.03 0.00	-0.02 0.00	0.13 0.00	1.00		
VNOI	-0.15 0.00	-0.10 0.00	-0.04 0.00	-0.02 0.00	-0.06 0.00	0.13 0.00	0.93 0.00	1.00	
GDP	0.19 0.00	0.18 0.00	0.11 0.00	0.05 0.00	0.10 0.00	0.08 0.00	-0.42 0.00	-0.42 0.00	1.00

Notes: CCC=Cash Conversion Cycle; NPM = Net Profit Margin; ROA = Return on Assets; ROE = Return on Equity; SG = Sales Growth; Lev = Leverage; Size = Firm Size; VNOI = Variability on Net Operating Income; GDP = GDP Growth

Based on the regression results, the hypothesis testing results can be summarized in Table 2.

Table 2. *The effect of the Cash Conversion Cycle on Net Profit Margin, Return on Assets, and Return on Equity ASEAN+ 3*

ASEAN+ 3	NPM	ROA	ROE
CCC	-0.0000181 (-0.61)	-0.0000760*** (-3.45)	-0.000344*** (-4.26)
Sales growth	0.0283*** (8.11)	0.0366*** (14.61)	0.0713*** (9.91)
Leverage	-0.233*** (-18.44)	-0.202*** (-18.98)	-0.307*** (-7.50)
Firm Size	0.0110*** (3.38)	0.00819** (3.25)	0.00332 (0.42)
VNOI	0.00279*** (3.69)	0.00184** (2.94)	0.00580** (2.94)
GDP	0.344*** (4.46)	0.439*** (6.78)	0.682*** (3.68)

Cons.	-0.137*	-0.0981*	-0.0143
	(-2.52)	(-2.35)	(-0.11)
N	23800	23800	23800
Adjusted R2	0.086	0.1285	0.0465
F-Stat	80.58	109.43	38.45
Probability	0.0000	0.0000	0.0000

Notes: the value shown in the table is the coefficient of the regression result. The significance value of the coefficient is indicated by the sign * indicated * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Numbers in parentheses are calculated t values. The value of the t table of p-value of 0.05 is ± 1.96 .

The regression results in Table 2 show that the cash conversion cycle does not effect the net profit margin because $p > 0.05$. The cash conversion cycle significantly negatively effected ROA and ROE in manufacturing companies in ASEAN+ 3 for the period 2012-2016. This can be seen in the p-value < 0.05 , and the coefficient values are -0.0000760, and -0.000344, respectively. The probability F-Stat in the table is $0.00 < 0.05$ so that this model is acceptable and the independent variables in this model can explain the dependent variable, namely ROA and ROE of 12.8% and 4.6% respectively, while the rest was influenced by other factors outside the model. This can be seen in the value of the coefficient of determination or adjusted R^2 .

Discussion

Based on the results of this study, the cash conversion cycle has a negative effect on ROA and ROE in manufacturing companies in ASEAN+ 3. The results of this study are in line with research from Syarief (2010), Anser and Malik (2013) Yazdanfar and Ohman (2014), and Bhutto et al. (2015) who found that the cash conversion cycle had a negative effect on company profitability.

The cash conversion cycle can negatively affect company profitability because a short cash conversion cycle can be caused by fast inventory turnover, fast collection of accounts receivable or slow payment of accounts payable. Thus, the capital turnover will be faster, and the company's profitability will increase.' However, on the one hand, extending the cash conversion cycle can extend the collection of receivables which is one strategy to attract consumers, by accelerating the payment of accounts payable the company can get a cash discount, and increase Inventory in the warehouse is one way to anticipate the demand that exceeds safety stock (Muscetolla, 2014). The company must calculate the optimal point of extending or shortening the cash conversion cycle that can increase the company's ROA and ROE. This can be a dilemma for the company, so the results of this study can explain the tradeoff theory. In deciding to extend the cash conversion cycle or increase ROA and ROE, the company can choose the alternative with the highest economic value so that the decision made is the best decision. In determining alternatives, the concept of decision making theory can be applied.

Furthermore, the cash conversion cycle does not significantly affect on the net profit margin of manufacturing companies in ASEAN+ 3. This result is also in line with research from Al-Subhiri and Aburumman, (2013) Thuraisingam (2015), who found that liquidity had no significant effect on the profitability' of the company.

The cash conversion cycle does not affect the company's profitability and can be caused by other variables that affect the company's profitability. Other variables that can affect profitability, such as information technology (Mithas, Tafti, Badhan & Goh, 2012), family ownership structure can have a negative effect on company profitability, while foreign ownership has a positive effect (Wiranata &

Nugrahanti, 2013), advertising has a positive effect on long-term company profitability (Jedidi, Mela & Gupta, 1999). In addition, according to Clark's Dynamic Theory of Profit, five variables can benefit business people. Such as population growth, capital growth, production methods (innovation), improvements, industry and business, and human wants (Clark, 1908). Thus, the profitability of manufacturing companies in ASEAN+ 3 can also be influenced by the five variables in Clark's Dynamic Theory of Profit.

Limitations and Implication

This study examines whether the cash conversion cycle can predict the profitability of manufacturing companies in ASEAN+3 for the 2012-2016 period. This research is limited to manufacturing companies in ASEAN+3. Further research can conduct tests to compare the effect of the cash conversion cycle on profitability in different industries without limiting it to manufacturing companies.

Conclusion

The cash conversion cycle has a negative effect on the ROA and ROE of manufacturing companies in ASEAN+ 3. Furthermore, the cash conversion cycle does not significantly affect the net profit margin of manufacturing companies in ASEAN+ 3.

References

- [1] Anser, R., & Malik, Q. A. (2013). Cash conversion cycle and firm's profitability—a study of listed manufacturing companies of Pakistan. *IOSR Journal of Business and Management*, 8(2), 83-87.
- [2] Attari, M. A., & Raza, K. (2012). The optimal relationship of cash conversion cycle with firm size and profitability. *International Journal of Academic Research in Business and Social Sciences*, 2(4), 189.
- [3] Al-Shubiri, F. N., & Aburumman, N. M. (2013). The relationship between cash conversion cycle and financial characteristics of industrial sectors: An empirical study. *Investment Management and Financial Innovations*, 10(4), 95-102.
- [4] Bhatia, S., & Srivastava, A. (2016). Working capital management and firm performance in emerging economies: Evidence from India. *Management and Labour Studies*, 41(2), 71-87.
- [5] Bhutto, N. A., Abbas, G., ur Rehman, M., & Shah, S. M. M. (2015). Relationship of cash conversion cycle with firm size, working capital approaches and firm's profitability: A case of Pakistani industries. *Pakistan Journal of Engineering, Technology & Science*, 1(2), 45-64.
- [6] Clark, J. B. (1891). Distribution as determined by a law of rent. *The Quarterly Journal of Economics*, 5(3), 289-318.
- [7] Clark, J. B. (1908). *The distribution of wealth: A theory of wages, interest, and profits*. New York: The Macmillan Company. Diakses dari https://www.econlib.org/library/Clark/clkW.html?chapter_num=26#book-reader
- [8] Eljelly, A. M. (2004). Liquidity-profitability tradeoff: An empirical investigation in an emerging market. *International Journal of Commerce and Management*, 14(2), 48-61.
- [9] Harrison W. T. Jr., Hongren C. T., Thomas C. W., & Suwardy T. (2014). *Financial accounting: International financial reporting standards*. (Edisi 9). USA: Pearson.
- [10] Hew, D., & Anthony, M. C. (2000). ASEAN and ASEAN+ 3 in postcrisis asia. *NIRA Review*, 7(4), 21-26.

- [11]Jedidi, K., Mela, C. F., & Gupta, S. (1999). Managing advertising and promotion for long-run profitability. *Marketing Science*, 18(1), 1-22.
- [12]Kimmel, P. D., Weygandt, J. J., Kieso, D. E. (2016). *Financial accounting. tools for decision making (edisi 8)*. USA: Wiley.
- [13]Majeed, S., Makki, M. A. M., Saleem, S., & Aziz, T. (2013). The relationship of cash conversion cycle and profitability of firms: An empirical investigation of Pakistani firms. *Journal of Emerging Issues in Economics, Finance and Banking*, 1(1), 35-51.
- [14]Mithas, S., Tafti, A., Bardhan, I., & Goh, J. M. (2012). Information technology and firm profitability: mechanisms and empirical evidence. *MIS Quarterly*, 36 (1) 205-224.
- [15]Muscettola, M. (2014). Cash conversion cycle and firm's profitability: An empirical analysis on a sample of 4,226 manufacturing SMEs of Italy. *International Journal of Business and Management*, 9(5), 25.
- [16]Nobanee, H., Abdullatif, M., & AlHajjar, M. (2011). Cash conversion cycle and firm's performance of Japanese firms. *Asian Review of Accounting*, 19(2), 147-156.
- [17]Owolabi, S. A., & Obida, S. S. (2012). Liquidity management and corporate profitability: Case study of selected manufacturing companies listed on the Nigerian stock exchange. *Business Management Dynamics*, 2(2), 10-25.
- [18]Padachi, K. (2006). Trends in working capital management and its impact on firms' performance: an analysis of Mauritian small manufacturing firms. *International Review of Business Research Papers*, 2(2), 45-58.
- [19]Reeve, J. M., Warren, C. S., Duchac, J. E., & Wang, W. (2014). *Principles of financial accounting with conceptual emphasis on IFRS*. USA: Cengage Learning Asia Pte Limited.
- [20]Richards, V. D., & Laughlin, E. J. (1980). A cash conversion cycle approach to liquidity analysis. *Financial Management*, 32-38.
- [21]Saleem, Q., & Rehman, R. U. (2011). Impacts of liquidity ratios on profitability. *Interdisciplinary Journal of Research in Business*, 1(7), 95-98.
- [22]Soekhoe, S. G. (2012). *The effects of working capital management on the profitability of Dutch listed firms*. Thesis Masteral tidak terpublikasi. Univeristy of Twente, Netherlands. Diakses dari https://essay.utwente.nl/61448/1/MSc_S_Soekhoe.pdf
- [23]Soesastro, H. (2003). An ASEAN economic community and ASEAN+ 3: How do they fit together. Diakses dari <https://openresearch-repository.anu.edu.au/bitstream/1885/41965/2/pep-338.pdf>
- [24]Syarief, M. E. (2010). Cash conversion cycle dan analisis likuiditas perusahaan. *Jurnal Ekonomi, Keuangan, Perbankan dan Akuntansi*, 2(2), 183-194.
- [25]Thuraisingam, R. (2015). The effects of liquidity management on firm profitability: Evidence from Sri Lankan listed companies. *Research Journal of Fianance and Accounting*, 6(5), 129-134.
- [26]Titman, S., Keown, A. J., Martin, J. D. (2011). *Financial management (edisi 11.)*. USA: Prentice Hall.
- [27]Uyar, A. (2009). The relationship of cash conversion cycle with firm size and profitability: An empirical investigation in Turkey. *International Research Journal of Finance and Economics*, 24(2), 186-193.
- [28]Weygandt, J. J., Kimmel, P. D., & Kieso, D. E. (2013). *Financial accounting IFRS Edition*. New Jersey: John Wiley & Sons, Inc.
- [29]Wiranata, Y. A., & Nugrahanti, Y. W. (2013). Pengaruh struktur kepemilikan terhadap profitabilitas perusahaan manufaktur di Indonesia. *Jurnal Akuntansi dan Keuangan*, 15(1), 15-26.
- [30]Yazdanfar, D., & Ohman, P. (2014). The impact of cash conversion cycle on firm profitability: An empirical study based on Swedish data. *International Journal of Managerial Finance*, 10(4), 442-452.

Family Financial Stability, Employment Opportunities, and Career Empowerment: Their Influence on Migration Intention among Senior College Students

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Abstract: The “brain drain” phenomenon has been present in the Philippines since the early seventies because of the migration of highly competent individuals from the country. This led to this study on determining the influence of family financial stability, employment opportunities, and career empowerment together with their relationship and implications to the migration intentions of senior college students using a survey questionnaire. This correlational study utilized the 121 senior college students chosen using convenience sampling. This study found that there is a high level of family financial stability among the respondents, a high level of perceived employment opportunities abroad, joined with strongly perceived career empowerment in the Philippines. Additionally, it implies that the presence of family financial stability among the respondents and their positive perception of career empowerment in the Philippines will not affect the migration intention of the students, while their perception of higher employment opportunities abroad leads them to an intention to migrate. The researchers mainly recommend that future researchers increase the number of respondents from different kinds of academic programs and include students from state universities to further classify whether the results of data gathered from private university students will differ from public university students.

Keywords: *family financial stability, employment opportunities, career empowerment, migration intention*

Introduction and Literature Review

Migration is as old as humankind; it was present in primitive times where the mobility of people was used to migrate in search of food and shelter. Nowadays, people are moving to improved their living conditions and provide support to their love ones. One of the numerous reasons for their departure is to escape dramatic situations in their homeland. Migration has become significant with the development of current industrialization and urbanization worldwide, and it is a complex occurrence affected by many factors (Castelli, 2018).

In 1996, Everett Lee claimed that the origin and destination were the flow between two places on her proposed push and pull theory. Push factors often include the lack of opportunities from sending countries, and the pull factors were often characterized by the availability of opportunities from receiving countries (Center, 2017). According to Milasi (2020), the following factors increased the tendency of employed and unemployed youths to migrate abroad: the individual-level labor market factors, negative economic outlook, the amount of existing work openings, and the chances for increasing job mobility. Beyond the social and economic factors, the weak social networks of the country, the dissatisfaction with the local services, and lack of confidence in the administration would also deepen the migration intention of youths, but these cannot constantly determine whether their intentions will be executed through actual plans. The possible movement of adults abroad was frequently motivated by the same reasons, but the tendency of youths to migrate was strongly focused on adverse labor market situations and one's degree of education.

Passive economic growth resulted in financial instability, high unemployment rates and poor career development; all of which influence the youths' intention to migrate after graduation. Calzado (2007) stated that the movement of global labor has attracted interest in the past years because of the increase in migrant flows of individuals looking for opportunities to fulfill greater aspirations. The author also pointed out that the growing diversity of migrating individuals fueled the interest of other people. The migration movements resulted in an upward impact from various push and pull factors like better job openings accessible abroad, insufficient income levels at home, opening of borders, simpler mobility because of better connections, infrastructure, transportation, and the increasing demand for various services around the globe.

The research also raised concerns about the brain drain phenomena as many Filipino youth emigrants were highly educated. Reports presented by the Philippine Statistics Authority and the University of the Philippines Population Institute (PSA, 2019) on the 2018 National Migration Survey described that about one in seven Filipinos (14%) intended to migrate in the next five years. Also, it specified that young adults garnered 38%, the highest percentage among all the age groups who had intentions to migrate. They also added that the percentage planning to move in the next five years was directly proportionate with increasing education and wealth. This was supported by data which stated that migration intentions of those who completed college or higher accumulated the highest percentage of 21%. One evident factor that also influences the migration intentions of people was the level of financial stability. A person striving to provide for their basic needs will look for various ways to survive. NMS 2018 also provided that 36% of the migrants belonged to a household that had difficulty meeting its basic needs and therefore was financially unstable.

In discussing the increasing number of migration flows and the growing interest of the immigrants to search not only for a job but also for career development, Calzado (2007), also adds that the Philippines expects the deployed workers to return in order for the country to reap rewards with advanced knowledge and better skills from the individuals who spent their time abroad. The experience they have attained from other countries may be relevant in helping the needs of the Philippines.

There have been many knowledgeable and skillful graduates in the Philippines who could not practice their professional skills in their homeland because of factors that may affect their lifestyle and growth as a skilled professional. Knowing the possible solutions to improve the economic growth of the country was the reason why the researchers conducted this study.

This present study aims to identify which of the three independent variables highly influenced the migration intentions among senior college students. The variables analyzed in this study recognized that migration requires complex intention formation and planning to satisfy a financially stable life, achieve a good employment opportunity and develop a wide and purposeful career of choice.

Methodology

The nature of the study is correlational. It quantified the relationship between family financial stability, employment opportunities, career empowerment, and migration intention.

The respondents of this study were 121 senior college students from a university located in Silang, Cavite which were selected through convenience sampling procedure. Further, they are Filipino citizens, and must be residing in the Philippines. Among them, 53 (43.8%) are male and 68 (56.2%) are female.

The study utilized a questionnaire in data gathering which was composed of five major parts: Part 1 – Demographic Profile, Part 2 – Family Financial Stability, Part 3 – Employment Opportunities, Part 4 – Career Empowerment, and Part 5 – Migration Intention. The demographic profile includes sex, academic program, and nationality. The questionnaire used a five-point Likert scale for parts 2-4 with a degree of intensity of 5 – Strongly Agree, 4 – Agree, 3 – Slightly Agree, 2 – Disagree, and 1 - Strongly Disagree. The reliability results revealed an acceptable index of .945, .911, & .633 for family financial

stability, employment opportunities, and career empowerment, respectively. The reliability was not computed for the migration intention since the measure was not constructed in Likert scale.

Ethical matters were considered in the conduct of the study. The respondents were informed that participation is voluntary, so their consent is necessary with assurance that confidentiality and anonymity are strictly observed. The questionnaires were distributed to the participants through electronic mails via Gmail and personal message via FB Messenger and MS Teams. The questionnaire led any respondents directly to the end of the google form if they did not give their consent for the study.

Data collected were encoded, organized and analyzed using Statistical Package for the Social Science (SPSS). Descriptive statistics specifically mean and standard deviations were used to quantify family financial stability, employment opportunities, career empowerment, and migration intention. Pearson Product-Moment Correlation was utilized to describe the relationship of family financial stability and migration intention, employment opportunities and migration intention and career empowerment and migration intention. Logistics regression was used to verify predictors of migration intention. Crosstabs and chi-square test were utilized to identify the degree of association between the demographic variables and migration intention.

Results

After gathering enough responses, data was encoded in SPSS. Results of different statistical analyses are discussed as follows.

Assessment of Respondents' Family Financial Stability, Employment Opportunities and Career Empowerment

Descriptive results for the level of family financial stability, employment opportunities abroad, and career empowerment in the Philippines are presented in Table 1. It shows that family financial stability has a mean that is equivalent to a response scale of agree ($M = 3.9118$, $SD = .83029$) and is interpreted as *high*. Likewise, employment opportunities are also high ($M = 3.5087$, $SD = .76049$). Lastly, career empowerment is strong among the respondents ($M = 3.7410$, $SD = .65615$).

Table 1. *Descriptive Statistics for Family Financial Stability*

Variable	Mean	Std. Deviation	Scaled Response	Verbal Interpretation
Family Financial Stability	3.9118	.83029	Agree	High
Employment Opportunities	3.5087	.76049	Agree	High
Career Empowerment	3.7410	.65615	Agree	Strong

Scoring System: 4.51-5.00 = Strongly Agree – Very High/Strong, 3.51-4.50 = Agree – High/Strong, 2.51-3.50 = Slightly Agree – Moderate, 1.51-2.50 = Disagree – Low/Weak, 1-1.50 = Strongly Disagree – Very Low/Very Weak.

Migration Intention of the Respondents

The respondent's response when asked "*Are you thinking seriously to move abroad to live and work at the moment?*" is tabulated in Table 2. It shows that 50.4% or 61 out of 121 respondents answered No, which implies that they don't have intention to migrate while 49.6% or 60 out of 121 respondents answered Yes, which indicates their intention to migrate abroad, and only the 49.6% of the senior college students have the tendency to realize their migration intentions.

Table 2. *Migration Intention Profile*

Response	Frequency	Percent
No	61	50.4
Yes	60	49.6
Total	121	100.0

Recency of Migration Intention

Table 3 indicates that out of the 60 people who answered Yes, 17 (14%) of them would leave the Philippines within 2 years, 14 (11.6%) would leave within the next 3 years, 8 (6.6%) and 17 (14%) would leave the Philippines within the next 4 and 5 years respectively. Additionally, there are 4 (3.3%) senior college students that would leave the Philippines within 6 months or approximately 1 year.

Table 3. *Recency of Migration Intention Profile*

Number of Years	Frequency	Percent
2 Years	17	14.0
3 Years	14	11.6
4 Years	8	6.6
5 Years	17	14.0
6 Months	4	3.3
Total	60	100.0

Likelihood of the Respondents' Intention to Migrate

Table 4 shows that out of the 60 respondents who answered Yes, 27 (22.3%) of them stated that their intention to migrate is quite likely to happen, while the remaining 33 (27.3%) have a very likely intention to migrate

Likelihood of Intention	Frequency	Percent
Quite Likely	27	22.3
Very Likely	33	27.3
Total	121	100.0

Relationship of Family Financial Stability, Employment Opportunities, Career Empowerment to Migration Intention

Table 5 shows the degree of association of family stability, employment opportunities, and career empowerment on migration intention. The results revealed that family financial stability is not significantly related to migration intention ($r=.114$, $p=.214$). On the contrary, employment opportunities is positively and significantly related to the recency of migration intention ($r=.434$, $p=.000$). Further, the relationship between career empowerment and migration intention is significant but negatively correlated ($r=-.181$, $p=.047$).

Table 5. *Correlation of Family Financial Stability, Employment Opportunities, Career Empowerment on Migration Intention*

	Coefficients	Migration intention
Family Financial Stability	Pearson Correlation (<i>r</i>)	.114
	Sig. (2-tailed) (<i>p</i>)	.214
Employment Opportunities	Pearson Correlation (<i>r</i>)	.434**
	Sig. (2-tailed) (<i>p</i>)	.000
Career Empowerment	Pearson Correlation (<i>r</i>)	-.181*
	Sig. (2-tailed) (<i>p</i>)	.047

** Correlation is significant at the 0.01 level (2-tailed).

Predictors of Migration Intention

Results of logistic regression are presented in Table 6. The migration intention in this study was assessed by answering Yes or No and was used as dependent variables of this study. In this study, the explained variation in the dependent variable based on the model ranges from 39.2% to 52.30% as reflected by Cox & Snell R² and Nagelkerke R². This study preferred to report the Nagelkerke R² value in model 2. This means that the 52.3% of the variation in migration intention is explained by the significant predictors of this study.

Table 6. *Logistic Regression to Determine Predictors of Migration Intention*

Variables in the Equation		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I. for EXP(B)		-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
								Lower	Upper			
Model 1	Employment Opportunities	2.529	.470	28.966	1	.000	12.543	4.993	31.508	113.019 ^a	.364	.485
	Constant	-8.917	1.674	28.383	1	.000	.000					
Model 2	Employment Opportunities	2.631	.511	26.510	1	.000	13.884	5.100	37.795	107.479 ^b	.392	.523
	Career Empowerment	-.865	.383	5.108	1	.024	.421	.199	.892			
	Constant	-6.076	2.063	8.674	1	.003	.002					

a. Variable(s) entered on step 1: Employment Opportunities.

b. Variable(s) entered on step 2: Career Empowerment.

Classification of Migration Intention

Table 7 presents the results for the classification associated with the logistic regression. The overall percent in the classification table represents the cases that are correctly predicted by the logistic model. In this study, 81% of the cases are correctly predicted by the logistic model.

Table 7. *Classification Table*

		Are you thinking seriously to move abroad to live and work?		Percentage Correct
		No	Yes	
1. Are you thinking seriously to move abroad to live and work?	No	43	18	70.5
	Yes	13	47	78.3
Overall Percentage				74.4
1. Are you thinking seriously to move abroad to live and work?	No	46	15	75.4
	Yes	8	52	86.7
Overall Percentage				81.0

a. The cut value is .500

Migration Intention of the Senior College Students in Terms of Sex

Table 8 shows the results when respondents are grouped by sex. There are 68 female respondents, 34 of them have no intention to migrate and the other 34 of them have an intention to migrate. On the other hand, of the 53 male respondents, 27 of them have no intention to migrate while 26 have an intention to migrate all shown.

Table 8. *Difference in the Migration Intention of the Respondents by Sex*

		Female	Male	Total	Chi-square	df	Interpretation
Are you thinking seriously to move abroad to live and work?	No	34	27	61	.011	1	Not Significant
	Yes	34	26	60			
Total		68	53	121			

Migration Intention of the Senior College Students in Terms of Academic Program

Table 9 shows the results in the cross-tabulation by *academic program*. It is reflected that respondents who have intentions to migrate are 9 out of 15 from College A, 24 out of 50 from College B, 9 out of 22 from College C, 5 out of 10 from College D, 3 out of 4 from College E, 4 out of 4 from College F, 3 out of 8 from College G and another 3 out of 8 from College H.

Table 9. *Academic Program Cross tabulation*

		Academic Program								Total
		A	B	C	D	E	F	G	H	
Are you thinking seriously to move abroad to live and work?	No	6	26	13	5	1	0	5	5	61
	Yes	9	24	9	5	3	4	3	3	60
Total		15	50	22	10	4	4	8	8	121

Discussion

A high family financial stability indicates that respondents experience good living conditions and are financially stable within their family. Dako-Gyeke (2016) asserts that the migration intention among youths are mainly due to the push factors such as low income, poor living conditions and inadequate job openings while the key pull factors are the existence of friends, families and job offers in the target country. Meanwhile, according to Drozdowski (2008) and Theodori & Theodori (2014), youths with middle-class backgrounds (low poverty but have high education) are most likely to leave and usually decide to look for better opportunities elsewhere after pursuing their education.

The respondents assess that there are a lot of employment opportunities and benefits once they choose to work abroad. According to Lu, Zong, & Schissel (2009), opportunities for professional progress is categorized to be part of migration motivations, and further assert that better employment opportunities do come in play when talking about migration intentions. Additionally, Tan (2019) claims that Filipino youths today have grown up with a mentality that working abroad in search for employment opportunity has become a fact of life.

For the career empowerment, respondents believe that the Philippines could also offer a lot for its citizens like training, opportunities and other resources that could uplift the professional growth, capabilities, and skills of the respondent. According to Craig (2016), career empowerment for an individual helps them shift from one role to another. If this is something that organizations could invest in, then they could likely and effectively transform the mindsets from passive to active responsibility

for profession and talent development. If not, this could affect the intentions and decisions of individuals who have a sense of curiosity and thirst for continuous improvement and might be pushed to look for it abroad.

Results reveal that when it comes to migration intention, out of the 60 people who answered Yes, 17 (14%) of them would leave the Philippines within 2 years, 14 (11.6%) would leave within the next 3 years, 8 (6.6%) and 17 (14%) would leave the Philippines within the next 4 and 5 years, respectively. Additionally, there are 4 (3.3%) senior college students who would leave the Philippines within 6 months or approximately 1 year. According to Lu, Song, and Schissel (2009), migration intention was a dependent aspiration and was related to the individuals' long-term or short-term aspirations. It should be noted that the permanent settlement of an individual arises from initial temporary migration, and temporary migration arises from an intention which needs to be addressed and studied.

Influences of family financial stability, employment opportunity and career empowerment to migration intention were taken into consideration. The results revealed that family financial stability and migration intention are not significantly related. This result implies that whether their family financial status is stable or not, the respondent's intention to migrate will remain the same. Yet, employment opportunities indicated a positive significant correlation to migration intention. This outcome means that the higher the employment opportunities abroad, the respondent's intention to migrate becomes higher and sooner. On the other hand, the relationship between career empowerment and migration intention is significant yet negative. This means that the intention to migrate is low for those respondents with better career empowerment, and high for those respondents who assessed poor career empowerment in the Philippines.

This study also revealed that employment opportunities and career empowerment are the significant predictors of migration intention. It implies that the higher the employment opportunities abroad, the more likely they will intend to migrate. Meanwhile, the less career empowerment is available in the Philippines, the more likely the senior college students will intend to migrate.

The result regarding the family financial stability of students contradicts the claim of Lu, Zong, & Schissel (2009) where family financial situations of students were significantly related to their migration intentions because they found that an undergraduate's family financial situation that is not stable drives their intention to migrate. This might be because financial instability or poverty cannot fully describe why individuals choose to leave their home countries which is what Becerra, et al. (2010) claimed in their previous study about the factors that affects youth migration intentions. On the other hand, the results for employment opportunities supports the assertion of Dako-Gyeke (2016) that youth migration intentions usually come from the limitations and deficiencies of the home countries and the opportunities offered in desired target countries. This is the same as the results for career empowerment which strengthens the claim of Roman & Vasilescu (2016) that individuals who assessed a poor professional development in their home countries usually intend to migrate.

Results showed that there is no degree of association between sex and migration intention. This refutes the claims of authors like Agadjanian, Nedoluzhko, & Kumskov (2008) that men show signs of greater intention to migrate than women, but their differences usually just differ with the manifested plans and desires in migrating. Instead, this backs up the claim from Lu, Zong, & Schissel (2009) which was about the differences of male and female with regards to their migration intentions, where males usually consider career-oriented decisions while females usually lean on emotional or family-related factors.

Chi-square tests were not applied to the data for academic programs due to sample size limitation. That is why the degree of association was not determined and the data only underwent cross-tabulation computation. It revealed that the number of those who do not intend to migrate abroad and those who do intend to migrate are almost the same when grouped according to academic programs.

Limitations and Implications

The study focused only on the economic factors such as family financial stability of the respondents, the employment opportunities abroad and the career empowerment movements provided by the Philippines, all with regards to the intentions of the respondents to migrate, and how individuals perceive and make sense of these factors in formulating their migration plans. Aside from the family financial stability, employment opportunities and career empowerment, the researchers also decided to investigate a possible connection with the demographic profile such as sex and academic program that might lead to migration intentions, but the focus was on the former variables mentioned.

Implications of the results include the claim that family financial stability and career employment show no predicting effect to migration intention. Yet employment opportunities emerged as a factor that shows significant influence on migration intention. On the other hand, demographics such as sex and academic program are also not significantly related to the migration intentions of senior college students.

Based on the findings, it is recommended that there is a need for further investigation about the average monthly income of the respondents who have an intention to migrate. By doing this, future researchers will find out if there is a relationship between migration intention and the average monthly income of a family, and not just limit the variable to their financial stability.

The study is limited to senior students. It is recommended that for future studies, there should be inclusion of people from other sectors as respondents to this study. This will expand the range and significant reach of the study, and further, will become a better guide for future decisions of a broader audience.

Conclusion

The results of this research conclude that there is a high level of family financial stability among the respondents, a high level of perceived employment opportunities abroad and a strong perceived career empowerment in the Philippines. Additionally, it implies that the presence of family financial stability among the respondents and their positive perception of career empowerment in the Philippines will not affect the migration intention of the students, while their perception of higher employment opportunities abroad leads them to an intention to migrate. Thus, the government of the Philippines should strive to provide more jobs for its citizens to empower them to stay in their country.

References

- [1] Agadjanian, V., Nedoluzhko, L., & Kumskov, G. (2008). Eager to leave? Intentions to migrate abroad among young people in Kyrgyzstan. *International Migration Review*, 42(3), 620-651.
- [2] Becerra, D., Gurrola, M., Ayon, C., Androff, D., Krysik, J., Gerdes, K., . . . Segal, E. (2010). Poverty and other factors affecting migration intentions among adolescents in Mexico. *Journal of Poverty*, 14(1), 1-16.
- [3] Calzado, R. J. (2007). Labour Migration and Development Goals: The Philippine Experience. *International Dialogue on Migration* (p. 1 & 12). Geneva: WMO Conference Center.
- [4] Castelli, F. (2018). Drivers of Migration: Why Do People Move? *Journal of Medicine*, 1-7.
- [5] Center, S. M. (2017). *Interrelations between Public policies, Migration and Development in the Philippines*. Paris: OECD Publishing.
- [6] Dako-Gyeke, M. (2015). Exploring the migration intentions of Ghanaian youth: A qualitative study. *Journal of International Migration & Integration*, 17(3), 723-744.
- [7] Drozdowski, D. (2008). 'We're moving out': Youth out-migration intentions . *Geographical research*, 46(2), 153-161.

- [8] Lu, Y., Zong, L., & Schissel, B. (2009). To stay or return: Migration intentions of students from People's Republic of China in Saskatchewan, Canada. *Journal of International Migration and Integration/Revue de l'integration et de la migration internationale*, 10(3), 283-310.
- [9] Milasi, S. (2020). What Drives Youth's Intention to Migrate Abroad? *IZA Journal of Development and Migration*, 1-11.
- [10] Philippines Statistics Authority. (2019, December 4). Retrieved from <https://psa.gov.ph/content/annual-family-income-estimated-php-313-thousand-average-2018>
- [11] Roman, M., & Vasilescu, M. (2016). Explaining the migration intentions of Romanian youth: Are teenagers different. *Romanian Statistical Review*, 64(4), 69-86.
- [12] Tan, E. A. (2019). Prospects of Philippine migration. UPSE Discussion Paper.
- [13] Theodori, A. E., & Theodori, G. L. (2014). Perceptions of community and place and the migration intentions of at-risk youth in rural areas. *Journal of Rural Social Sciences*, 29(1), 5.

SunPlus Accounting Software and Southeast Asian Users' Satisfaction

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Abstract: Due to the mandatory requirement that SunPlus accounting software be used in many Seventh-day Adventist organizations, it is important to understand user experiences with the software. Therefore, the purpose of this study was to study the relationship between SunPlus software user satisfaction and three independent variables, namely, features, training, and customer service. It was conducted by interviewing selected users to identify relevant issues, which were then converted into survey questions for larger scale data collection. The respondents were SDA workers from Cambodia, Laos, Malaysia, Singapore, and Thailand. Results indicated that SunPlus users were satisfied with all three variables with the highest score for features, followed by customer service, and training respectively. However, improvements need to be made to increase user satisfaction, especially with training. Furthermore, users also explained why they were not satisfied with specific issues. The data provided by users is valuable and informative for development of the software to better meet the needs of users.

Keywords: *SunPlus accounting software, user satisfaction, features, customer service, training*

Introduction

The Seventh-day Adventist Church is a non-profit worldwide religious organization, and tithes and offerings from its members are its main sources of operating income. The software package that the denomination has developed for its treasury personnel to use in their accounting work is the SunPlus system. Users of SunPlus software are from different parts of the world. The features provided on the SunPlus accounting software are based on how an organization itself operates. Most Adventist organizational units—conferences, divisions, unions, missions, fields, schools, colleges, and universities—are required to use SunPlus accounting software. This study only focused on users in certain Southeast Asian countries, including Cambodia, Laos, Malaysia, Singapore, and Thailand.

All the participants in this research study were required to use SunPlus software in their work. Even though the software was not chosen by the users, it is important that accounting software is able to fulfil the need of its users. If SunPlus users are not satisfied with the software due to different problems with its use, then how could they perform their work efficiently? For example, older versions of SunPlus do not allow users to use it online. During the COVID-19 outbreak, many workers had no choice but to work from home. But they were not able to do this because SunPlus could only be used in the office. There are also software features that users like and dislike, and features that they wish were part of the SunPlus software, too. So these matters were investigated in this study through short interviews and survey questionnaires.

Literature Review

The main goal of accounting is to track transactions and to generate reports related to financial operations. An accounting system makes accountants' work more convenient. Moreover, it can provide information that reflects how a business or organization is doing in terms of its financial performance. Accounting software helps businesses to manage their finances, and many accounting software packages are available for users. But at the same time, users may need advanced software that can be used internationally because there are more global businesses and organizations now. So, if software is only for domestic use, it may be hard to connect with branches that are located in other countries. Many global companies or organizations often face issues related to different areas of focus. Current research shows that it is very important that organizations and businesses check to see

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which accounting software is best for their field of work. One main reason why people use accounting software is so that both internal and external users can access it. Users are exposed to cloud accounting software, which means that users can use all its features anytime and anywhere. Since a company's performance is influenced by the information received and its software's operational efficiency, good quality software undoubtedly has a positive influence on the effectiveness of firm operations (Lesia, et al. 2021).

A study was conducted by Chong and Nizam (2017) in Malaysia to better understand the impact of accounting software on business performance. They found that it was important to have the right accounting software because when users were satisfied with it, they could get their jobs done more effectively, too. Companies and businesses use financial data that is produced by accounting software. Being able to produce reliable financial data benefits businesses, helping them to plan better, as well as to identify issues or opportunities. Overall, this helps in operating their businesses. Decision making depends on information and data held in the accounting system, so it is important that accounting software is speedy, accurate, and reliable. Accounting software holds great value for businesses and the growth of economy. Chong and Nizam's study highlighted the close relationship between accounting software and business performance. Reliable and accurate accounting information leads to business success.

Benwell et al. (2017) conducted a study about the effectiveness and efficiency of training in the use of digital healthcare packages to find out if the training was helpful, and if the usage of the digital program was accurate for clinical practice. The Fiona Stanley Hospital was one of the first hospitals to implement digital medical records. Since it was a new digital platform, training was provided to all staff. In the study, a test was performed with intern doctors who had completed the information communication technology training. The major finding from the study was that training was more effective when given early. Moreover, daily practice on the system helped users make rapid improvements.

A positive relationship has been found between the quality of service and customer satisfaction. Özkan et al. (2020) discussed customer evaluation of service performance and then compared it to their expectations before purchase or consumption. After customers made an overall evaluation, then it could be concluded whether they were satisfied with the service or not. This study focused on the banking industry in Turkey. The findings showed that customer loyalty to the company, products, or services depended on their satisfaction, and also their perception of service quality. Customer satisfaction also affected corporate image and reputation. If customers were not satisfied with the service quality, they were less likely to purchase the service again.

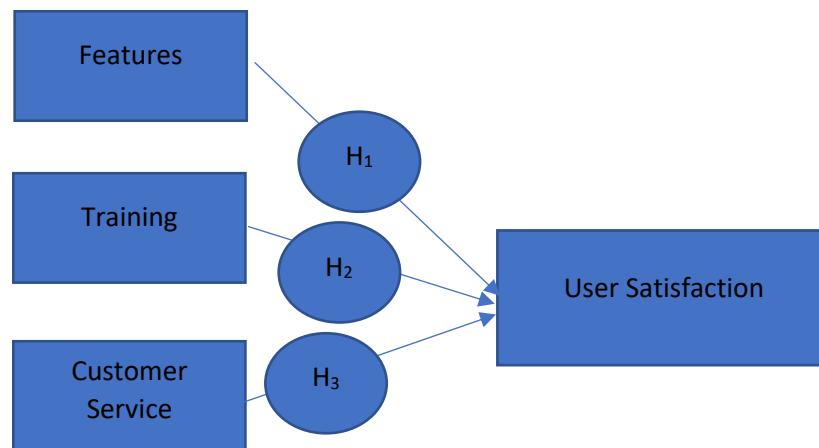
In a study conducted by Schaeffer (2017), he discussed the importance of updating software, and that this should be done along with updates to the hardware. The connection cited in the paper was illustrated by using cars as an example. Cars may be very old, but purchasing a new car may not always be affordable. It was emphasized that even with old hardware, just as with car parts, the software can make a big difference. Owning an old computer does not mean that work cannot be done efficiently. People would rather not buy a new machine, but have their computer software updated instead. This can make their computer seem like it is new, even with the old hardware, as long as the system inside the computer is running well. The author of this study endeavored to explore how important it is to not only focus on the hardware, but at the same time, to pay attention to the software. It is not about parts of computers or cars, but the experience of users really depends on the software that runs the hardware.

In recent years, software users have higher expectations than in the past. While many software packages can perform their functions very well, users now also expect them to be adaptable and flexible so that those performance qualities are preserved, even with changes in the working environment. Users hope for self-adaptive software that can monitor changes in the environment or the system itself, and can dynamically modify its behavior or structure in response to these changes. The main focus of this study was about software features. The meaning of the environmental feature model is that, by applying it, relationships between software features and its requirements are

identified. It is important to develop a software model that helps the software to adapt itself in different environments, which is what users hope to have in their software (Li & Sun, 2021).

Conceptual Framework

Figure 1. *Conceptual Framework*



The conceptual framework showed the three independent variables that this study used to determine SunPlus users' satisfaction. The software features are the functions provided by the software itself. Were the features/functions provided by the software sufficient for users to complete their tasks? The users were from different fields of work, so did the features satisfy them? The training in this study focused on the number of trainings provided to users, and if training was provided, how effective was it? Customer service was mainly about the SunPlus team's communication with users. Could users easily contact them? When users needed help in solving issues, or questions related to the software, was the service team available and able to respond in time?

Justification of the Study

Seventh-day Adventist organizations consist of different workplaces in different countries around the world. SunPlus users are from countries that use different currencies, have different tax policies, and must adapt to other practices based on their locations. Does SunPlus provide the same software features for users from all regions? How can the SunPlus software team help to make users' work more productive and convenient? An important way to improve the software is by obtaining feedback from users. SunPlus should collect data about their users' satisfaction. This study focused only on some countries in Southeast Asia; no previous studies on this topic were found. So this study is not able to provide results that reflect to all of the countries in the world that are using the SunPlus software.

Purpose of the Study

The purpose of this study was to find the relationship between SunPlus software user satisfaction and three variables, namely, features, training, and customer service. The study's findings may provide useful information for SunPlus in order to improve the software. User satisfaction is one of the best sources of feedback, and this information can be used in improving the software. What are the issues that users are struggling with, and how could these problems possibly be resolved? Feedback can be both positive and negative, and either way can help the software company to understand more about their users, and the extent to which users are satisfied with the software. This researcher was unable to find any previous studies of user satisfaction with the SunPlus software package. Thus, the results of this study are designed to fill this gap, and may be helpful for other SunPlus users in different regions around the world. Users in other countries may also experience the same issues related to the software.

In this research study, answers were sought to the following questions:

What is the relationship between SunPlus program functions/features, training, and customer service programs, and levels of user satisfaction?

What could the SunPlus accounting company do to better understand user needs and to improve the software based on these findings?

As the objective of the study was to seek SunPlus software users' feedback, data was obtained from the users based on their experiences with the software. This information indicated the software features with which users were happy or unhappy. It also provided some details and guidelines to SunPlus developers and managers that would enable them to improve the software, along with their training and customer service programs.

The research study had two objectives:

To study the relationship between SunPlus program users' satisfaction and users' self-perceived ease used of functions/features, SunPlus software training, and SunPlus customer service for the software program.

To build connections between users and the SunPlus company, as well as to improve SunPlus software by conveying information about the user issues encountered, if any, to the company.

Methodology

Research Design

A descriptive design was employed that used interviews and surveys to gather information related to SunPlus user satisfaction. The answers were written by the users, and the researcher did not try to influence their responses in any way. This was the most suitable research design, as it required that users share their perceptions by answering questions about the SunPlus software.

Research Instruments

The study used both interviews and questionnaires for data collection. The study research method was primarily quantitative, but interviews were done for the purpose of developing suitable survey questions. It was deemed important to use the experiences of users to identify common issues that they were facing. Only six denominational workers were interviewed: two from Cambodia, one each from Laos and Malaysia, and two from Thailand. The number of interviewees might appear to be small, but that was because of the relatively small number of SunPlus users in Southeast Asian SDA organizations.

For example, one user was facing a problem because of incorrect depreciation calculations by the software, which other users using the software might also encounter. The purpose of the interviews was to find out about any problems with the SunPlus software from the users' perspective. That is why it was necessary to include open-ended questions in the questionnaires.

The draft survey questions were reviewed and critiqued by several experienced researchers as part of the instrument development process. These questions utilized a four-point Likert rating scale as follows (4 points–*Very Satisfied*; 3 points–*Satisfied*; 2 points–*Dissatisfied*; 1 point–*Very Dissatisfied*).

Cut-off points are important in research. The class interval formula was used to help determine suitable cut-off points, and the class interval was set at 0.75.

Population and Sampling Frame

The population for this research study consisted of treasurers, accountants, and cashiers working for Seventh-day Adventist organizations in the Southeast Asian countries of Cambodia, Laos, Malaysia, Singapore, and Thailand who use SunPlus in their work. This group included treasury employees working at Adventist schools, a university, missions, a conference, an attached field, and a related

organization (the Adventist Development and Relief Agency, or ADRA). Although this agency is financially separate from the other SDA organizations, it works closely with them in some of the surveyed countries.

The study population of SunPlus users was 68 employees; the survey was distributed to all of them, and 30 of them completed it. Since one respondent did not identify his/her location, only 29 surveys could be used to analyze some questions. The majority of respondents (15) were from Thailand.

Data Collection Methods and Procedure

The online interviews were conducted through Zoom and Messenger. Before sending out the surveys, permission from each workplace was requested and granted. After permission was granted, then a link to the survey was sent out directly to respondents. This link could be clicked to fill out the survey; when it had been completed, it could be submitted with a click. This made completing the survey convenient for respondents, and it was not too time consuming.

After the raw data had been collected, it was analyzed with the help of statistical tools.

Research Results

The majority of the respondents (36.7%) worked at missions, a region, or a conference. This was followed by respondents from Asia-Pacific International University in Thailand (26.7%). In terms of educational level, all respondents had at least a bachelor degree. A majority of them had been working for 2–5 years, but 36.7% had worked for 10 years or more years. Fifty percent of SunPlus users were using Version 5. Some respondents did not answer all the questions in the survey; a total of 16.6% of questions were not answered fully.

Descriptive Statistics

The study analyzed SunPlus user satisfaction levels with the software's features/functions, training, and the customer service program; the results are shown below in Table 1.

Table 1. Descriptive Statistics of SunPlus Satisfaction Levels

Variables	N	Mean	Standard Deviation
Features	30	3.12	0.473
Training	30	2.18	0.680
Customer	30	2.70	0.481
Satisfaction	30	2.79	0.557
Valid N (listwise)	30		

In Table 1, SunPlus features variable had the highest mean score. This indicates that respondents were generally satisfied with SunPlus features and functions. Under the customer service and overall satisfaction sections, the mean scores were slightly lower than for the features variable. This indicates that respondents were also satisfied with the customer service provided, and they showed overall satisfaction for the three dependent variables.

The training variable showed a lower level of satisfaction among SunPlus users. The lower value may have been due to inadequate training that left some users struggling to use the software properly.

Relationship between Independent and Dependent Variables

The study also examined the correlation between overall satisfaction and features, training, and customer service. Table 2 below revealed statistically significant relationships among these variables.

Table 2. *Correlations between Variables*

Variables	Overall Satisfaction	Features	Training	Customer Service
Overall Satisfaction	1			
Features	.659**	1		
Training	.457*	.36	1	
Customer Service	.737**	.490**	.511**	1

* $p < .05$, ** $p < .01$

These results indicated links between user satisfaction levels with the variables that were studied; if users were generally satisfied with the SunPlus software, their answers tended to be similar for the specific variables that were examined.

ANOVA Analysis of Demographic Factors

A One-Way ANOVA analysis was conducted to see if significant differences were present related to respondents' workplaces, education levels, work experience, or version of SunPlus being used. It was found that only the workplace variable had a statistically significant score. Table 3 below shows that a significant difference between scores was found only for the training variable; which was 0.034.

Table 3. *One-Way ANOVA Analysis of Respondent Workplaces*

Variables	Effect	Sum of Squares	df	Mean Square	F	Sig.
Training	Between Groups	3.825	3	1.275	3.38	.034*
	Within Groups	9.432	25	0.377		
	Total	13.258	28			
Features	Between Groups	0.635	3	0.212	0.959	.427
	Within Groups	5.521	25	0.221		
	Total	6.156	28			
Customer	Between Groups	0.7	3	0.233	0.987	.415
	Within Groups	5.909	25	0.236		
	Total	6.609	28			
Satisfaction	Between Groups	1.44	3	0.48	1.638	.206
	Within Groups	7.329	25	0.293		
	Total	8.769	28			

Note: *The mean difference is significant at the .05 level.

Users from missions and the attached region were more satisfied with training provided by SunPlus when compared to other workplaces such as schools. This finding may indicate that the level of training provided for some organizations was more thorough than for others. The level of employee turnover might also have played a role in differences in training satisfaction mean scores, as employees in workplaces with higher turnover rates may have had fewer training opportunities.

Hypothesis Testing

This study tested six hypotheses by using the SPSS program to analyze the collected data.

Hypothesis 1

Hypothesis 1: H_1 can be accepted as SunPlus users were satisfied with the features of the software ($p = .659$ at a statistically significant level of .01).

Hypothesis 2

Hypothesis 2: H_2 can be accepted as SunPlus users were satisfied with the training of the software ($p = .457$ at a statistically significant level of .05). The satisfaction level was the lowest among all of the independent variables.

Hypothesis 3

Hypothesis 3: H_3 can be accepted as SunPlus users were satisfied with the customer service of the software ($p = .737$ at a statistically significant level of .01).

Hypothesis 4

Hypothesis 4: as shown in Table 4 below, the Beta value was 0.775 with a p-value of less than 0.05. This indicates a positive relationship between the features and overall SunPlus user satisfaction.

Table 4. Simple Regression Results for Features Predicting SunPlus User Satisfaction

Independent Variable	Beta	t	P-Value
Feature	.775*	4.635	0.00

* $p < .05$

Hypothesis 5

Hypothesis 5: as seen in Table 5 below, the Beta value was 0.374 with a p-value of less than 0.05, meaning that a positive relationship was found between training and overall SunPlus user satisfaction.

Table 5. Simple Regression Result for Training Predicting SunPlus User Satisfaction

Independent Variable	Beta	t	P-Value
Feature	.374*	2.722	.011

* $p < .05$

Hypothesis 6

Hypothesis 6: the Beta was also a positive value of 0.853, and there was a significance difference of less than 0.05, showing that there was a positive relationship between customer service and SunPlus user satisfaction. This means that if respondents were satisfied with the customer service, this also positively affected overall SunPlus user satisfaction, too.

Table 6. Simple Regression Result for Customer Service Predicting SunPlus User Satisfaction

Independent Variable	Beta	t	P-Value
Feature	.853*	5.773	0.00

* $p < .05$

A summary of the hypotheses tests is shown below in Table 7; it can be seen that all of the alternative hypotheses were supported.

Table 7. *Summary of Six Sets of Hypotheses Testing*

Hypotheses		Description	Result
Hypothesis 1	H_0	SunPlus users are not satisfied with the software features.	Rejected
	H_1	SunPlus users are satisfied with the software features.	Supported
Hypothesis 2	H_0	SunPlus users are not satisfied with the software training program.	Rejected
	H_1	SunPlus users are satisfied with the software training program.	Supported
Hypothesis 3	H_0	SunPlus users are not satisfied with the software customer service.	Rejected
	H_1	SunPlus users are satisfied with the software customer service.	Supported
Hypothesis 4	H_0	Functions/Features of the SunPlus software are not positively related to user satisfaction.	Rejected
	H_1	Functions/Features of the SunPlus software are positively related to user satisfaction.	Supported
Hypothesis 5	H_0	The SunPlus training program is not positively related to user satisfaction.	Rejected
	H_1	The SunPlus training program is positively related to user satisfaction.	Supported
Hypothesis 6	H_0	SunPlus customer service is not positively related to user satisfaction.	Rejected
	H_1	SunPlus customer service is positively related to user satisfaction.	Supported

Discussion

The Relationship between SunPlus Features and User Satisfaction

SunPlus users were generally satisfied with the features provided by the software package. All user groups from different workplaces, education levels, and SunPlus versions agreed that they were satisfied with the features they were currently using. Moreover, a simple regression analysis showed that there was a positive relationship between the SunPlus features and overall user satisfaction. If satisfaction with the features is low, then overall user satisfaction will be low as well, but if satisfaction with the features is high, this will result in high overall user satisfaction

The Relationship between Software Training and User Satisfaction

The analysis showed that users were satisfied with software training, but not as satisfied as they were with the features and customer service. The training program provided by SunPlus had a positive relationship with overall user satisfaction; however, the level of satisfaction for training was the lowest among the three independent variables, and it negatively affected overall user satisfaction. Three respondents mentioned that the amount of training that they had received was too short. Another respondent complained that no training had been received since 2016, while yet another said he/she had never received any training at all - not even once - and that there should be more training available for users. Some training sessions were combined for schools and a local mission; however, this made the training ineffective, because schools and missions do not use the same settings in their accounting work.

Limitations of the Study

Since all data collection was done through an online platform, contacting potential respondents and encouraging them to participate in the study was a challenge. Since their workplaces were located in different countries, merely getting in touch with them was difficult. Another limitation was the number of targeted countries surveyed in this study. There are many SunPlus users from countries

besides Southeast Asia, such as in the United States, Africa, Mexico, and many more places. Users from other countries might have had different experiences with the SunPlus software.

Conclusion

In conclusion, this study found positive relationships between SunPlus software user satisfaction and three variables: software features, training, and customer service. While they were satisfied with SunPlus, users nevertheless suggested some changes to improve the software. Longer training periods and specific training bases at each workplace were deemed necessary, and users also hope that customer service will improve so that they receive faster responses from the SunPlus support team. Users also desire improvements in the software features so that it can fit the needs in their workplaces and hope for more user-friendly future versions of SunPlus software.

References

- [1] Asare, Y. O., & Boachie, E. (2018). The impact of IT-technological innovation on the productivity of a bank's employee. *Cogent Business & Management*, 5(1). <http://dx.doi.org/10.1080/23311975.2018.1470449>
- [2] Benwell, N., Hird, K., Thomas, N., Furness, E., Fear, M., & Sweetman, G. (2017). Effectiveness and efficiency of training in digital healthcare packages: training doctors to use digital medical record keeping software. *Australian Health Review*, 41(5), 479–484. <http://dx.doi.org/10.1071/AH16090>
- [3] Boon, L. C., Gan, C. C., Imrie, B. C., & Mansori, S. (2019). Service recovery, customer satisfaction and customer loyalty: Evidence from Malaysia's hotel industry. *International Journal of Quality and Service Sciences*, 11(2), 187–203. <http://dx.doi.org/10.1108/IJQSS-09-2017-0081>
- [4] Chong, Yvonne & Nizam, Ismail. (2017). The impact of accounting software on business performance. 10.24924/ijise/2018.04/v6.iss1/01.26.
- [5] Choudhury, D. K., & Gulati, U. (2020). Product attributes based on customer's perception and their effect on customer satisfaction: The kano analysis of mobile brands. *Decision*, 47(1), 49–60. <http://dx.doi.org/10.1007/s40622-020-00233-x>
- [6] Đorđević, N. D. (2017). Usability: Key Characteristic of Software Quality. *Military Technical Courier / Vojnotehnicki Glasnik*, 65(2), 513–529. <https://doi.org/10.5937/vojtehg65-11028>
- [7] Elikai, F., Ivancevich, D. M., & Ivancevich, S. H. (2007). Accounting software selection and user satisfaction: Certified public accountant. *The CPA Journal*, 77(5), 26–31. <https://www.proquest.com/scholarly-journals/accounting-software-selection-user-satisfaction/docview/212275694/se-2?accountid=39909>
- [8] Farquharson, P. H. L. (2009). *The perception of information technology investment and its impact on productivity at small private colleges* (Order No. 3364167). Available from ABI/INFORM Global; ProQuest One Business. (305123299). <https://www.proquest.com/dissertations-theses/perception-information-technology-investment/docview/305123299/se-2?accountid=39909>
- [9] Gray, T. (2013). Accounting software technology. *Construction Accounting & Taxation*, 23(1), 28–30. <https://www.proquest.com/trade-journals/accounting-software-technology/docview/1462507869/se-2?accountid=39909>
- [10] Lim, M. K., Li, Y., & Song, X. (2021). Exploring customer satisfaction in cold chain logistics using a text mining approach. *Industrial Management & Data Systems*, 121(12), 2426–2449. <http://dx.doi.org/10.1108/IMDS-05-2021-0283>
- [11] Li, Q., & Sun, R. (2021). Software environment modelling method. *Journal of Physics: Conference Series*, 1815(1). <http://dx.doi.org/10.1088/1742-6596/1815/1/012013>
- [12] Louis-A Lefebvre, & Lefebvre, E. (1988). The Impact of Information Technology on Employment and Productivity: A Survey: What are the human-resource consequences of introducing information technology? Survey responses from about 1,700 Quebec firms

- provide some answers. *National Productivity Review* (1986-1998), 7(3), 219.
<https://www.proquest.com/trade-journals/impact-information-technology-on-employment/docview/236647868/se-2?accountid=39909>
- [13]Marushchak, L., Pavlykivska, O., Liakhovych, G., Vakun, O., & Shveda, N. (2021). Accounting software in modern business: *Advance in Science, Technology and Engineering System Journal*, 1, 862–870. https://www.astesj.com/publications/ASTESJ_060195.pdf
- [14]Nnamdi, O. M., (2012). Consumer perception. https://www.researchgate.net/publication/328676646_Consumer_Perception
- [15]Özkan, P., Süer, S., Keser, İ. K., & İpek Devenci Kocakoç. (2020). The effect of service quality and customer satisfaction on customer loyalty: The mediation of perceived value of services, corporate image, and corporate reputation. *The International Journal of Bank Marketing*, 38(2), 384–405. <http://dx.doi.org/10.1108/IJBM-03-2019-0096>
- [16]Schaeffer, E. (2017). Chapter 06: Zoom in: How to handle digital product development. London: Kogan Page Ltd. <https://www.proquest.com/books/chapter-06-zoom-how-handle-digital-product/docview/2460106628/se-2?accountid=39909>
- [17]Slack, N. J., & Singh, G. (2020). The effect of service quality on customer satisfaction and loyalty and the mediating role of customer satisfaction: Supermarkets in Fiji. *TQM Journal*, 32(3), 543–558. <http://dx.doi.org/10.1108/TQM-07-2019-0187>
- [18]Survey shows sales and support agents waste over a half-billion hours every year using bad software; U.S. companies lose over \$8 billion in productivity: Top-down "software dictatorship" needs democratic overhaul to increase employee productivity and customer satisfaction. (2019, Sep 05). PR Newswire. <https://www.proquest.com/wire-feeds/survey-shows-sales-support-agents-waste-over-half/docview/2284640488/se-2?accountid=39909>
- [19]Syah, L. Y., Nafsiah, S. N., & Saddhono, K. (2019). Linear regression statistic from accounting information system application for Employee integrity. *Journal of Physics: Conference Series*, 1339(1). <http://dx.doi.org/10.1088/1742-6596/1339/1/012131>
- [20]Zakaria, W. Z. W., Ilias, N., & Wahab, N. (2017). A survey on the impact of accounting information system on tasks efficiency: Evidence from Malaysian public sector agencies. *Econ Journals*, 7(1), 183–190.
 file:///C:/Users/ACER/Documents/IS/reference/A_Survey_on_the_Impact_of_Acco.pdf

Challenges and Opportunities for Startup Food Business Amidst the Pandemic: A Phenomenological Study

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Abstract : The Covid-19 pandemic changed the way people live, mostly falling to unfavorable consequences. The worldwide economy plunged roughly, and businesses barely operated. Startup businesses' efforts were more difficult, especially in penetrating the market and reaching out to customers. Nonetheless, there are those who turned this hostile happening into success. The study was conducted to determine the hindrances to startup food businesses in Laguna and Batangas as well as the open chances and plausible strategies to overcome the negative effects of the pandemic. Five participants were interviewed thru Facebook Messenger. The result shows that most challenges confronting the startup food businesses were the mandated decrease of business capacity, restrictions on delivery, false information circulation, and the difficulty of creating new marketing styles. Meanwhile, opportunities were also present in terms of technological breakthroughs, and the increase in dependency on food deliveries as face-to-face transactions were discouraged. Most startup food businesses cope with the adverse effect of the pandemic by formulating strategies that minimize the "challenges" and optimize the "opportunities." Based on the results, the strategies that startup food businesses should adopt are the use of third-party delivery services, filtering legitimate resources of information, and utilizing social media sites for marketing purposes.

Keywords: *challenges, opportunities, food business, pandemic, phenomenological study*

Introduction & Literature Review

Startups have continued to play a vital role for countries during the COVID-19 crisis, and frequently play a significant role in innovation. Some creative young companies have responded quickly and flexibly to the pandemic and have been crucial in helping many countries move towards completely digital jobs, education, and health care, and provide medical products and services with innovative solutions (Calvino et al., 2020). Pak et al. (2020) reports that the Covid 19 Crisis affects the global economy alongside markets. Problems arise that involve income reduction, unemployment, and disruptions of day-to-day life.

The economy is devastated by the crisis, and the WHO organization expresses its concerns to world leaders that international cooperation can only solve this through international collaboration. Global threats from the pandemic should be a "wake up" call towards the international community. Disruption of global supply chains and a decline in income generation because of deaths and absenteeism, leads to the worsening of productivity (Pak et al., 2020).

The Philippine Government began its lockdown of Metro Manila on Sunday, March 15, 2020, aiming to halt the virus's spread. Talabong (2020) & Ranada (2020) report, "The strictest lockdown involves only essential industries, such as healthcare, pharmacies, veterinary clinics, food manufacturing, supply chains, and groceries." The focus of this research is to explore the various experiences of the food startup business, and their ability to cope with the difficulty of pandemic procedures.

In response to lockdowns and lack of local face-to-face contact, startups adapt and use various internet applications such as Paymaya or Gcash for seamless cashless transactions, and transport providers such as Lalamove, Grab food, and Panda-express to deliver their food (Endo, 2020; Sanchez, 2020; Chang & Meyerhoefer, 2020).

Taiwan is a country that has proactively prepared itself for the coronavirus. Despite the lockdown, it has continued to thrive through prior experience from the 2004 SARS outbreak. Summer et al. (2020) added that there would be a connection with Taiwan regarding food shopping because even without a lockdown, sales from food shopping continued to grow. Aning (2020) states, "according to the department of tourism, small scale contactless transactions will remain the norm along with home-cooked food products, while small scale food and beverage establishments are expected to thrive as the country gets back on its feet." This would make food businesses a possible step towards the success of the Philippines.

The Philippines is a home of many cultures, and different food has risen across history from Spain, America, Japan and so much more. We need to understand that its rich history gives its culture a very unique blended melting pot take that can be a true indicator that it is open to many undiscovered flavors around the world. (Asia Someday, 2020) According to an article by Subido (2019), a survey that involved 25,000 Filipinos showed that they are open to tasting new types of foods. This is a good opportunity that many business entrepreneurs can take advantage of despite the challenges of the pandemic.

Covid 19 effects on the world economy and various countries.

According to the figures presented by Pak et al. (2020), financial markets such as FTSE 100 (UK) S&P 500 (USA), DAX 30 Germany) Shanghai Composite (China) and Nikkei 225 (Japan) slumped from February 28 to March 28, 2020. In research from Chudik et al. (2020), economic consequences on the GDP and long-term interest rates were affected, making the IMF give pessimistic long-term forecasts that involve the GDP and Global Volatility. Chudik et al. (2020) conclude in their research report that no country in the world will escape the Pandemic effects; however, it is noted that China and some Asian countries would wrongly be predicted by Chudik et al. (2020) to recover much sooner than their European and American counterparts. Chudik et al. (2020) also explain how policymaking that involves the management of risk is essential towards lessening the effects of different crises.

According to the World Bank (2020), the outlook towards the economy is generally negative due to the effects of the Covid19 Pandemic, due to the contractions of per capita income, damage towards potential output, and growth in productivity. The reduced demand for oil led to lower oil prices.

The World Bank (2020) states, "Many emerging and developing economies were already experiencing weaker growth before this crisis; the shock of COVID-19 now makes the challenges these economies face even harder."

Policymaking and global cooperation are the keys to minimizing the pandemic's effects and the economic damages that this pandemic poses (World Bank, 2020).

Based on these report in the articles cited above, they reiterate that policymaking is of utmost importance regarding handling the pandemic's difficulties globally. Exemplifying the use of SWOT analysis in policymaking, Wang and Wang (2020) used this method to analyzing China's response towards the Covid19 Pandemic. They assessed China's Strengths involving their healthcare systems and its advancement during the prior SARS outbreak, cooperation from different government departments making the necessary policymaking that evaluates the Chinese Government's strengths and inward capability. Wang and Wang (2020) concluded in their research, "In short, based on the SWOT analysis of the COVID-19, we have integrated the relevant factors that are currently scattered, and have a more systematic and intuitive strategy for the prevention and control of COVID-19 in China."

Challenges of Startup Micro Food Businesses During COVID-19 Pandemic

There is no denying the disruption of the COVID-19 crisis towards the world economically; however, according to OECD (2020), despite the situation, there are opportunities that may arise. Startups are essential for innovation of new technology despite the drop in business registrations during the crisis. Applications such as Pinterest, Airbnb, Uber, and Dropbox were founded after or during world crises.

During the prior coronavirus outbreak named SARS, Tao Bao was created in PRC 2003 (OECD 2020). However, it is worth noting that it is essential for policymakers to create rules and regulations to give more opportunities and provide resilience towards different industries. They should aim towards incentivizing growth and increasing the ease of doing business. Policymaking is essential for the success of startups and

MSMEs and will help stimulate the economy to recover faster (OECD, 2020).

A new research article from (Alves et al., 2020) involving SMEs and the effects of the Covid19 Pandemic on them, is a study conducted via an interview on five different firms arranged from A to F:

Firm A is involved in Wholesale and Retail, started by two young individuals selling sports equipment and gear. According to the researchers, firm A had a crisis management plan and strategy that involves diversification of their products to ensure profit margins.

Firm B is in the Education sector that provides training and education. They currently created their crisis management plan due to their extensive operating for 38 years.

Firm C is said to operate as a mid-range hotel that is in the tourism district of Macau. Their Lodge has been working for 30 years, and the COVID-19 outbreak resulted in lesser occupants; however, due to the government intervention, they conducted quarantine policies that would make use of hotels. This allowed the business to maintain their occupants and survive amidst the pandemic. According to the owners, the Government promoted a well-thought-out plan regarding handling crises, therefore, prompting them to be better prepared for future emergencies.

Firm D, a real estate agency that several young entrepreneurs started, and due to their lack of experience with the crisis, they could not prepare for the situation and is only needed.

Firm E is stated to be a law firm that has been operating for 5 years. The Covid-19 Crisis resulted in limited operations with delayed services. They are planning on investing in Crisis Management.

Firm F is a small cafeteria, and due to the pandemic, the business owners required them to close for three weeks. They have their crisis plan. According to the interview, they now focus more on food safety.

In conclusion, Alves et al. (2020, p. 7) says their research proves that crisis management systems are essential towards the survivability of SMEs amidst the pandemic. The Government's policies played a huge role in the survival and the recovery of these small businesses.

Mehrotra et al. (2020) stated that the COVID-19 Pandemic has a significant impact on micro, small, and medium enterprises (MSMEs). Only companies listed as "primary services" were authorized to operate by the Philippine Government. Many of the other businesses were closed. As a result, low consumer demand, combined with the lockdown restrictions, has caused MSMEs' income to collapse. MSMEs' earning potential has been harmed by supply chain disruptions. Their revenue has decreased because of shortened operating hours and low customer footfall. MSMEs' earning potential has been further undermined by a fragmented supply chain and a drop in the number of sales per customer. The cost of transportation and supplies has risen due to the lack of public transportation.

Some firms took advantage of opportunities that arise, like increasing the price of their essential high-demand products. Few enterprises have been marketing in-demand items, while others have been looking for new product categories in order to diversify and stay afloat. Some MSMEs have had to borrow money to stay afloat, while others have had to sell their properties. MSMEs needed all the help they could get because their companies were struggling. MSMEs are unsure how long the economic downturn will last. Within rural areas, the above value rises to a median of eight weeks. In their recommendations, policies that support MSMEs that involve, financial and technological aid will allow them to survive in this pandemic. By encouraging financial institutions to automate, they should enhance the capacity of MSMEs to implement applicable digital technology (Mehrotra et al., 2020).

In research by Hidayat et al. (2020), they analyze the factors that influence MSMEs during the Covid-19 Outbreak in South Sulawesi, an Indonesian province. The respondents were business owners of MSMEs in this region and were chosen via purposive sampling that was to MSMEs that have been

operating for three years before the COVID-19 outbreak. The total respondents were 211 people. Hidayat et al. (2020) stated in their management implication that their research provides data and information with regards to crisis management and being prepared to deal with various crises. Hidayat et al. (2020) concludes by saying, "Business resilience is strongly influenced by the entrepreneurial spirit possessed by business actors with a strong entrepreneurial spirit. Entrepreneur will be able to encounter

various situations and struggle to survive confronting challenges afore."

Qualitative research conducted by Madeira et al. (2020, p. 40) involving Portuguese restaurant owners' perceptions towards the pandemic, states how before the pandemic, they were experiencing a boom in the restaurant industry, and it halted the continuous growth that was occurring for ten years.

Madeira et al. (2020) researched by interviewing their respondents, and the results of their coding commonly included the words pessimism, resilience, and uncertainty. There was evidence of a sense of negativity and the willingness to act towards a post-pandemic restaurant world. Madeira et al. (2020) noted that their respondents acknowledged shock their comments on recovering from this pandemic. The researchers recommend spending on advertising that promotes educating consumers regarding health protocols, and creating early evaluations that involve making policies based on evidence. (Madeira et al. 2020) This recommendation proves that Crisis Management is essential with regards to handling restaurants in a time of crisis. According to a study made by Chowdhury, Sarkar, Paul, and Moktadir (2020), food and beverages play a vital role in the economy, so when COVID-19 hit, it made a massive loss in every sector of the global economy.

Opportunities for Micro Startup Food Businesses Amidst the Pandemic

Due to the emergence of lockdowns worldwide, people were inclined to do their daily activities at home to combat the spread of Covid-19. According to Research and Markets (2020), there was a substantial increase in demand for food services that cater to delivery services. Online applications increased, for example, JustEat, Deliveroo, UberEats, and Postmates in the United States. Some restaurants opted to turn to online services as well, in order for them to adapt and survive amidst this pandemic. This resulted in supermarkets adapting to the situation and adjusting by partnering with these online delivery services to ensure their products and service would reach consumers. (Research and Markets, 2020).

Strategies of Micro Food Businesses during Pandemic/Crisis Setting

As said by the OECD (2020), "Startups are critical drivers in OECD economies, and are a crucial driver of job growth but are negatively affected by the pandemic" and according to a case study by PricewaterhouseCoopers (2020), the Philippines is not exempt from the disruptive effects of the COVID-19 crisis. PricewaterhouseCoopers (2020) surveyed 90 founders from April 12 to 26. According to these entrepreneurs, 51% adapt by reducing operations, 49% began offering new services/products to diversify income strategies, 36% conducted cost reductions, layoffs, and much more.

Most Investors are assessing whether they should immediately invest in the Philippines. According to startup entrepreneurs, government policies would give them incentives such as tax exemptions and financial aid to help with the recovery and survival (PricewaterhouseCoopers 2020).

Food Businesses are in distress. But with the recent developments in technology, Distance Dining have risen, and through this, many restaurateurs survive amidst the Pandemic (Lim Uy, 2020).

Filipinos adapt to making COVID-19 quarantine easy by using online food businesses that help sell their startup foods amidst the enhanced community lockdown administered by the Government held in Metro Manila and other regions in the Philippines. Operations of restaurants are classified as non-essential. Most, if not all, have been mandated to limit their services. In ECQ areas eating in restaurants is forbidden to combat the spread of the virus. Despite this, Filipino food business owners adapt by opting to deliver and take out so that consumers can eat various foods without having the risk of infection. Big and small businesses adapt through using delivery applications like GrabFood, Angkas Food, FoodPanda, and Lalamove (Malasig, 2020).

Theoretical and Conceptual Framework

Gurel (2017) reviewed and defined that SWOT Analysis is a tool used for strategic planning and strategic management in organizations. According to new research, startups usually operate unorganized but play a key role in economies. Through the use of the SWOT framework, it addresses the *strength, weaknesses, opportunities, and threats* that the business ventures may face identifying the internal and external factors that are favorable or unfavorable to achieve an objective (Yadav & Gulati, 2019, p. 399). It involves the specification of businesses or project's internal and external factors that will bear favorable or non-favorable outcomes. Morrison (2016) emphasizes that the SWOT analysis approach provides a good framework for reviewing strategy, position, or direction for a company. Nordmeyer (2019) declared that new businesses should create products or services that the customers value, enter the contest or stay competitive. Thus, companies engage in brainstorming sessions to address varieties of business issues and develop possible and clever solutions. SWOT analysis supported this structured brainstorming.

Most businesses are suffering today due to the consequences of the COVID-19 global pandemic. The current outbreak has had severe economic outcomes globally. Indeed, the pandemic's effect has been a significant setback for most businesses, as it led to a dramatic change in customer behavior (Donthu, 2020). On the bright side, some business establishments have had to find ways to cope with the present economic issues. Some of them are performing better than when the market is at normal status. The difference is that most of these businesses became adaptive to changes by converting the current obstacle into an opportunity (Papazougou, 2020). SWOT-analysis helps startup companies to adapt to the current market situation.

As for this study, the strengths, weaknesses, opportunities, and threats are the core ideas to be analyzed for their significance. Therefore, we categorize them as such:

Strengths. Characteristics that give an advantage over others in the industry (Gurel, 2017). Strengths are the characteristics that make your business more unique than others, and what makes you more advantageous than others. The Covid-19 crisis truly limits many strengths that specific food businesses offer, but food businesses can discover their new strengths by analyzing them.

Weaknesses. According to research, it refers to not having the form and competency of something. It is a quality that many of the competition has, but you lack, and your business does poorly. And as an entrepreneur, it is essential to assess this and understand that these can lead the organization to inefficiency. Ineffectiveness should be known and improved (Gurel, 2017, p. 995).

Opportunities: These are situations and conditions suitable for positive results and yield benefits for the externally founded startups. In fact, "opportunities are conditions in the external environment that allow an organization to take advantage of organizational strengths, overcome organizational weaknesses or neutralize environmental threats" (Harrison & St. John, 2004).

Threats/Challenges: These are situations or conditions that jeopardize the actualization of an activity. It refers to a disadvantageous position externally (Gurel 2017).

The researchers are aware of the SWOC analysis principle that involves challenges instead of threats, and the difference is clearly explained by Shata (2019). SWOC analysis changes the term "threat" because of the origination of the word from strategies within the military, making the difference between the two terms practically the same. Therefore, since the term "SWOT" is more commonly known, the researchers choose to use SWOT instead of SWOC.

Based on the literature, it was found that no study has been conducted on how these micro food startup businesses managed to thrive despite the struggle of contactless shopping; moreover, there is no study on the lived experiences of these food business entrepreneurs that can be a basis for future references when starting a food business in times of crisis.

The researchers have chosen the topic as it will provide substantial information and further explorations to the people who are planning to launch businesses amidst the pandemic.

Statement of the Problem

The main purpose of the study is to determine the challenges and opportunities for a startup food

business amidst the pandemic using a phenomenological approach.

Specifically, the study aimed to answer the following research questions:

What are the challenges experienced by startup micro food businesses amidst the COVID-19 pandemic?

What are the opportunities that micro startup food businesses have experienced amidst the pandemic?

How did micro food businesses cope with the challenges of the Pandemic?

The study was conducted to provide information in relation to the challenges and opportunities for startup food businesses amidst the pandemic. It is valuable for researchers, food business entrepreneurs, students, business instructors, and local government units.

Methodology

The university has the ERB or the Ethical Research Board to ensure that the study falls under good and moral standards; therefore, approval from the ERB is a requirement towards assuring that the study is ethical and meets all proper standards. The researchers identified 4 participants that have started their micro food businesses with an asset size of 3 million pesos or less as described by Law. (2020). Table 1 shows the respondents' demographic chart.

Table 1. *Respondents demographic Chart*

No.	Name (Pseudonym)	Age	Gender	Food Category
1.	Le	23	Female	Pizza Delivery
2.	May Anne	30	Female	Korean Food
3.	Beth	24	Female	Filipino Mexican
4.	Dave	21	Male	Corn Dogs & Mozzarella Treats

For this research, the researchers began searching for participants through the use of Facebook, and looking at available food businesses in Laguna and Batangas provinces area. A message was sent to the target participant in advance to know their convenient time to conduct the interview. During the interview the researchers asked the participant if it is fine with them to record the conversation. The researchers conducted their interviews according to the methods of research that focus on each participant's lived experience of the Phenomena on the Challenges and Opportunities of startup micro food businesses amidst the pandemic. The results were transcribed, read, and analyzed accordingly for qualitative design, and then themes were formed and made concrete through cross checking the data.

Results

The phenomenological inquiry aims to know the subjective nature of 'lived experience' from those who experience it, by exploring meaningful explanations that individuals attribute to their experiences.

Challenges of Micro Startup Food Businesses during the Pandemic

Of the challenges that they were facing, were the hindrances in performing the deliveries, dealing with false information circulating online, or crafting adaptable marketing strategies.

Table 2. *Challenges to Startup Micro Food Businesses*

Research question:

Question #1. What are the challenges experienced by startup micro food businesses amidst the COVID-19 pandemic?

Themes Generated:

-Delivery Hindrances due to lockdowns and checkpoints

-False Information Circulation on Covid19 lockdown classifications

-Marketing without face-to-face Contact

Delivery Hindrances due to the Pandemic mainly involve checkpoints and localized lockdowns.

Filipinos in general have been struggling amidst the covid-19 pandemic while lockdowns have been the primary force the government is using against the virus. One participant said that:

"There were checkpoints and although our business started, one of the struggles was having to have our business to be certified to be assured of not being stopped at checkpoints due to our main delivery person being a senior citizen." – Leah 23 San Pablo

Although her experience was unique of having their delivery person a senior citizen, it is important to note that checkpoints are particularly strict towards 2 wheeled vehicles.

False information online circulating with the lockdown classifications

A data base "Coronavirus Fact Alliance" have tracked that there are nearly 4,000 covid-related hoaxes in circulation all around the world. Telecom regulators all around the globe have reported that 58% of adults have reported fake news on the outbreak.

The participants of this study support this report and mention a great deal of misinformation is circulating all around social media, particularly Facebook, in terms of the lockdown information. Two participants said that *"We had an experience on the many news of classifications such as MEGCQ ECQ MECQ, and this was really confusing as it really disrupted our decisions on whether or not we should deliver to these areas."* *"Many classifications may tend to confuse individuals which is a concern, and is definitely a challenge for micro business owners starting amidst the pandemic"*. – Dave 21 Cabuyao City

Marketing without face-to-face Contact

Traditional face-to-face marketing is important for the establishment and engagement and in brand connections that are essential for penetrating markets. They are irreplaceable for dining out with friends and family. One claimed:

"We had to change our strategy towards having the usual marketing of signage, and flyers and such. Face to face was limited, so we had to adjust making use of social media."

Micro Startup Food Businesses' New Opportunities Amidst the Pandemic

Businesses were forced to explore and create innovative methods of conducting the business. These were introduced, and implemented. Due to that, many establishments were able to cope with the current situation and avoid the growing negative implications of this unprecedented crisis.

Table 3. *Opportunities to Startup Micro Food Businesses*

Research question:

Question #2. What are the opportunities that micro startup food businesses have experienced amidst the pandemic?

Themes Generated:

-Technological Breakthroughs amidst the pandemic

-Increase of dependency on food deliveries due to at home quarantine

Technological breakthrough amidst the pandemic.

Many technological breakthroughs during the pandemic have undeniably fast tracked—their innovation. There has been a great increase in demand towards advancement in many business sectors like online shopping, contactless payments, remote working, distance learning, telehealth, online entertainment, and others. Respondents mentioned the usage of third party delivery apps that are mediators between customers and entrepreneurs. They were available prior to the pandemic, but not so commonly as it is today. Food Panda and Grab food, act as delivery partners, and at the same time provide customers a market where food businesses flourish.

Increase of dependency on food deliveries due to at home quarantine.

Localized lockdowns of subdivisions, apartments, and buildings were not expected to be an opportunity by the research prior to the gathering of data. Respondents said "There has been a boom in the food-delivery industry amidst the pandemic, and due to the virus, face-to-face delivery is limited."

The comments the interviewees made on how they communicated with homeowner associations provides an opportunity for food business owners to access the target markets. "Only food and essentials were allowed to be bought during the pandemic".

Coping with the New Normal

The challenges mentioned by the respondents were recurring amongst interviewees and are resolved with similar methods that will be mentioned in this portion to answer research question 3.

Table 4. *Strategies of Startup Micro Food Businesses*

Research question:
Question #3. How did micro food businesses cope with the challenges of the Pandemic?
Themes Generated:
-Usage of Third-Party Delivery Applications to address Delivery Problems
-Combatting the challenge of false information
-Social Media Marketing to deal with the lack of traditional face-to-face contact

Delivery Hindrances due to lockdowns and checkpoints were handled by the participants through mainly securing permits and making use of third-party services like Food-Panda and Lala Move. As delivery partners, they are complete with uniforms and identification that help with checkpoints.

False information is a challenge in times of the pandemic especially with the lockdown classifications presented by the government, and different localized classifications particularly for barangays, etc. The participants mentioned that access to reliable information is essential for combating false information and misinformation, and to do this one of the participants mentioned that verified government pages are the only ones to be trusted.

"There is no denying nowadays the boom in information especially in social media fake news and such, but to handle this as entrepreneurs it is important to listen and follow verified government official pages." – Kath 33 Calamba Laguna

"To get away from the false information, the best solution is to only read and trust pages that are recommended by the government, like the DOH website or legitimate government websites. Even for some news outlets, it's truly necessary to even fact check reputable news websites as well, because fake news is really a problem" – Dave 21 Cabuyao City

Marketing without face-to-face contact is a challenge to many sectors, and restaurant businesses are greatly affected by this. As stated in this research, dining in is an experience that is unique, and participants mention how they coped with this was through making use of social media, and assuring their products were well packed and presentable to recreate a unique dining experience. The actual interview revealed that:

"We had to change our strategy away from having the usual marketing of signage, and flyers and such. Face to face was limited so we had to adjust, making use of social media and making sure our packaging was superb" – Kath 33 Calamba Laguna

Discussion

Presented are the results from interviews with five participants who are entrepreneurs and operated their food businesses amidst the pandemic that began in March 2020.

The questions of the participants were primarily based on the questions on the four topics that involve the challenges of the pandemic and lockdowns, such as delivery problems, checkpoints and lockdowns, false information, and marketing without face-to-face contact.

The participants expressed their challenges that have risen amidst the pandemic involve delivery

problems due to lockdowns and checkpoints, false Information, and marketing without face-face-contact.

Addressing the utilization of technology and online resources was also considered, because they provide an excellent bridge to handle the customers in future situations similar to the Covid 19 pandemic.

The researchers adopted the data analysis of Alase (2017), which follows the same systematic approach called Interpretative Phenomenological Analysis (IPA) which gives researchers the best opportunity to understand the innermost deliberation of the 'lived experiences of research participants.' The analysis was to be individually carried out by the researchers, and research themes were to be cross-checked. To explore more on the thematic analysis model, the researchers have broken it down into steps such as *transcribing interview data, reading through participants transcript, transforming and coding, revisiting and merging codes, organizing codes, processing analysis, cross checking of categories, developing themes, finalizing themes, and writing the narrative of final themes*. This implies that this pattern is then organized into themes that should be explicitly described so that the data is taken by actual context.

Based on the **challenges** experienced by startup micro food business amidst the Covid-19 pandemic, it is confirmed with the explanation in the study of Chowdhury, Sarkar, Paul, and Moktadir (2020), that Food and beverages play a vital role in the economy, so when COVID-19 hit, it made a massive loss in every sector of the global economy.

As indicated in the results of the interviews about the **opportunities** that micro food businesses experienced amidst the pandemic, it is important to have an understanding similar to Research and Markets (2020). Due to the emergence of lockdowns worldwide, people were inclined to do their daily activities at home to combat the spread of Covid19. That caused a substantial increase in demand for food services that cater to delivery services.

In regard to analyzing how the micro business food business **coped with the challenges** of the pandemic, their experience ~~is~~ was related to the interaction by Malasig (2020). In ECQ areas, eating in restaurants was forbidden to combat the spread of the virus. Despite this, Filipino food business owners adapted by opting to deliver and offering take out so that consumers could eat various foods without the risk of infection. Big and small businesses adapted through using delivery applications like GrabFood, Angkas Food, FoodPanda, and Lalamove (Malasig, 2020).

Limitations and Implications

This study is focused on the challenges and opportunities for startup businesses amidst the pandemic which involved only five participants with perceived experience. They were chosen as micro sole proprietorship food startup businesses within the Laguna and Batangas provinces as "micro" businesses for having an amount of 3,000,000 pesos or below, as defined by Law P.L (2020). The interview was conducted and recorded virtually with permission of the participants.

This study aims to be a guide for those seeking to start a food business in a time of adversity, not only in a pandemic situation but in a time where norms are changed.

There is no denying that data is everywhere in today's society. It is essential for micro sole proprietorships to use data analytics. According to Gartner (2019) descriptive analytics, predictive analytics, and prescriptive analytics are the three degrees of analytics. Descriptive analysis requires manually evaluating data and content in order to figure out what happened. Business intelligence and visualizations are two approaches that a company might use to accomplish this. Predictive analysis, on the other hand, uses techniques like regression analysis, forecasting, and predictive modeling to try to anticipate the outcome.

Conclusion

This research gives light towards the challenges and opportunities that have risen, and gives insight into the thoughts and experiences of these individuals in running their businesses. There is no denying the limitations of this research, however it takes into consideration the valuable journey

that the individuals of this research face during this unique situation that is not common in a person's lifetime. It is necessary to study and analyze experiences of micro business owners. Small it may be, but they still take part in the flow of the massive economy of the Philippines.

Recommendations

Based on the discussion, businesses that appeared successful amidst the pandemic are the entrepreneurs that addressed business' challenges and made use of opportunities. Business owners deal with the current constraints that limit their capabilities, and made innovative strategies and actions to at least offset the negative impact of the current circumstances. Thus, the following are recommended for consideration by all aspiring food business entrepreneurs such as a *change of marketing strategy, the selection of authentic information only, and the maximizing of digital networks*.

Currently, there are very few studies, resources, and materials available regarding the challenges and opportunities for startups, particularly for micro food businesses in the Philippines. With that, it is recommended that more studies be conducted by future researchers. This will be of help to business owners, especially Micro, Small and Medium Enterprises (MSMEs).

References

- [1] Alase, A. (2017). The Interpretative Phenomenological Analysis (IPA): A Guide to a Good Qualitative Research Approach. *International Journal of Education and Literacy Studies*, 5(2), 9. <https://doi.org/10.7575/aiac.ijels.v.5n.2p.9>
- [2] Alves, J. C., Lok, T. C., Luo, Y., & Hao, W. (2020). Crisis Management for Small Business during the COVID-19 Outbreak: Survival, Resilience and Renewal Strategies of Firms in Macau. *Research Square*, 5–10. <https://doi.org/10.21203/rs.3.rs-34541/v1>
- [3] Aning, J. (2020, May 24). Among businesses, small-time food services may be the next big thing. *INQUIRER.Net*. <https://business.inquirer.net/298111/among-businesses-small-time-food-services-may-be-next-big-thing>
- [4] Chowdhury, M. T. (2020, September 30). A case study on strategies to deal with the impacts of COVID-19 pandemic in the food and beverage industry. *Operations Management Research*. https://link.springer.com/article/10.1007/s12063-020-00166-9?error=cookies_not_supported&code=88d5960c-8b7e-4c11-8248-61580325794e
- [5] Chudik, A., Mohaddes, K., Pesaran, M. H., Raisi, M., & Rebucci, A. (2020, October 19). Economic consequences of Covid-19: A multi-country analysis. *VOX, CEPR Policy Portal*. <https://voxeu.org/article/economic-consequences-covid-19-multi-country-analysis>
- [6] Donthu, N., & Gustaffson, A. (2020). <https://doi.org/10.1016/j.jbusres.2020.06.00>. *Journal of Business Research*, 1(1), 284–289. <https://doi.org/10.1016/j.jbusres.2020.06.008>
- [7] Gurel, E. (2017). SWOT Analysis: A Theoretical Review. *Journal of International Social Research*, 10(51), 994–1006. <https://doi.org/10.17719/jisr.2017.1832>
- [8] Hidayat, M., Latief, F., Nianti, D. A., Bahasoan, S., & Widiawati, A. (2020). Factors Influencing Resilience of Micro Small and Medium Entrepreneur (MSME) during Covid 19 Outbreak in South Sulawesi Province Indonesia. *STIE Nobel Indonesia*, 26707–26721. <https://doi.org/10.31219/osf.io/cme2j>
- [9] Law, P. L. (2020, June 11). *Micro, Small and Medium Enterprises: What Businesses are Considered*
- [10] MSMEs. Philippine E-Legal Forum. <https://pnl-law.com/blog/micro-small-and-medium-enterprises-what-businesses-are-considered-msmes/>
- [11] Lim Uy, S. (2020, November 5). Through COVID-19, top Philippine restaurants just want to survive. *Rappler*. <https://www.rappler.com/life-and-style/food-drinks/top-philippines-restaurants-just-want-survive>

- [12]Madeira, A., Palrão, T., & Mendes, A. S. (2020). The Impact of Pandemic Crisis on the Restaurant Business.
- [13]*Sustainability*, 13(1), 40. <https://doi.org/10.3390/su13010040>
- [14]Malasig, J. (2020, April 30). How Filipinos are making food delivery services easy amid COVID-19 quarantine.
- [15]*Interaksyon*. <https://interaksyon.philstar.com/trends-spotlights/2020/04/30/167577/how-filipinos-making-food-delivery-services-easy-amid-covid-19-quarantine/?fbclid=IwAR0nCaNSqWQR55uuPN73uo1E6Z-GTp0YtLMdZmAZSj2c0o7ucev5BZLMCiQ>
- [16]Mehrotra, A., Community Economic Ventures, (A Microfinance NGO) Inc., Gayatri, Cepe, L., Srivastava, C., Narain, N., & Mishra, S. (2020, June). *Philippines: Impact of COVID-19 on Micro, Small, and Medium Enterprises (MSMEs)* (No. 1). Microsave Consulting. <https://www.microsave.net/2020/08/04/philippines-impact-of-covid-19-on-micro-small-and-medium-enterprises-msmes/>
- [17]OECD. (2020, May). *Startups in the time of COVID-19: Facing the challenges, seizing the opportunities*. <https://www.oecd.org/coronavirus/policy-responses/start-ups-in-the-time-of-covid-19-facing-the-challenges-seizing-the-opportunities-87219267/>
- [18]Pak, A., Adegboye, O. A., Adekunle, A. I., Rahman, K. M., McBryde, E. S., & Eisen, D. P. (2020). Economic Consequences of the COVID-19 Outbreak: the Need for Epidemic Preparedness. *Frontiers in Public Health*, 8,4–10. <https://doi.org/10.3389/fpubh.2020.00241>
- [19]Papazoglou, P. (2019, March 4). https://www.ey.com/en_gr/covid-19/how-can-business-cope-with-covid-19- Chron.https://www.ey.com/en_gr/covid-19/how-can-business-cope-with-covid-19-
- [20]PricewaterhouseCoopers. (2020, May 15). *Startups and COVID-19: PwC Philippines*. PwC. <https://www.pwc.com/ph/en/publications/startups-pwc-philippines/startups-covid19.html> Public Relations Research, 13(4), 321-340.
- [21]Raco, J. R., & Tanod, R. H. (2014). The phenomenological method in entrepreneurship. *International Journal of Entrepreneurship and Small Business*, 22(3), 276. <https://doi.org/10.1504/ijesb.2014.063776>
- [22]Shata, H. (2019). *Why SWOT analysis become SWOC analysis?* Think Marketing. <https://thinkmarketingmagazine.com/swot-become-swoc/#:~:text=A%20SWOC%20analysis%20identifies%20your,better%20prepared%20to%20act%20effectively.>
- [23]Statista. (2020). *Reasons for rising orders from food delivery apps during COVID-19 Philippines 2020*. <https://www.statista.com/statistics/1147540/philippines-reasons-for-increasing-orders-from-food-delivery-apps-during-covid-19/>
- [24]Subido, L. K. (2019, April 14). *This Survey Says that Filipinos Are the Biggest Foodies in the World*. Esquiremag.Ph.<https://www.esquiremag.ph/food-and-drink/food/filipinos-biggest-foodies-a00288-20190314>
- [25]Summers, D. J., Cheng, D. H. Y., Lin, P. H. H., Barnard, D. L. T., Kvalsvig, D. A., Wilson, P. N., & Baker, P. M. G. (2020).
- [26]Potential lessons from the Taiwan and New Zealand health responses to the COVID-19 pandemic. *The Lancet Regional Health - Western Pacific*, 4, 100044. <https://doi.org/10.1016/j.lanwpc.2020.100044>
- [27]Sundler, A. J., Lindberg, E., Nilsson, C., & Palmér, L. (2019). Qualitative thematic analysis based on descriptive phenomenology. *Nursing Open*, 733–799. <https://doi.org/10.1002/nop2.275>
- [28]Talabong, R. (2020). Metro Manila lockdown begins. *Rappler*. <https://www.rappler.com/nation/coronavirus-metro-manila-lockdown-begins>

- [29]The Global Economic Outlook During the COVID-19 Pandemic. (2020, June 8). World Bank. <https://www.worldbank.org/en/news/feature/2020/06/08/the-global-economic-outlook-during-the-covid-19-pandemic-a-changed-world>
- [30]Wang, J., & Wang, Z. (2020). Strengths, Weaknesses, Opportunities, and Threats (SWOT) Analysis of China's Prevention and Control Strategy for the COVID-19 Epidemic. *International Journal of Environmental Research and Public Health*, 17(7), 2235. <https://doi.org/10.3390/ijerph17072235>
- [31]Yadav, J. & Gulat, N. (2019). SWOT Analysis of Micro Entrepreneurship and Start-ups in Haryana. *International Journal of Business and Economics Research*, 8(6), 399. <https://doi.org/10.11648/j.ijber.20190806.20>

Implementing the Balanced Scorecard: Performance Measurement Motives and Impact

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Abstract: A number of normative studies and consulting reports state that comprehensive models such as the Balanced Scorecard (BSC) should lead to superior performance, yet not many empirical researches have particularly addressed this issue. This study follows the similar line developed by Malina and Selto (2001), studying the BSC using the Cybernetic Control Model. Therefore, the purpose of this study was to answer three research questions stated in the form of aims statements. This study employed a case study research method. A series of structured interviews were conducted and then questionnaires were distributed for further responses. This qualitative interview data were obtained from individuals working for Chrystal & Co. Pty. Ltd. The findings clearly indicate that BSC is effective in enhancing organizational control (first order control and second order control). Furthermore, these results document some of the key factors which facilitate the BSC's role as an effective performance management model in for-profit organization. However, this study does not provide any clear evidence as to whether a Cybernetic Control Model explains the emergence of the BSC. Future research is needed to replicate this study in different type of organizations, larger companies, and further exploration of the Cybernetic Control Model.

Keywords: *balanced scorecard, cybernetic control model, performance measurement, organizational control*

Introduction and Literature Review

Otley and Berry (1980) explored the applicability of a cybernetic model of control to the control of human organizations. The cybernetic control model consists of four controls. Firstly, first-order control is achieved through the provision of information about the level of inputs required. Secondly, second order control is achieved through the provision of information about the achievable objectives. Thirdly, internal learning is achieved through the provision of information that facilitates an understanding of the transformation process. Finally, systematic learning is achieved through the provision of information that allows the transformation process to be changed.

It is important to integrate literatures which are related to organization controls and performance measurement. Nevertheless, this discussion is restricted to providing a limited coverage, keeping in mind the need to stay focused on the topic of this research. It is believed that the following discussion provides an adequate information of how organizations come to adopt a particular form of organizational structure and control models. The researchers also seek to identify and discuss the factors inducing a firm to adopt a particular performance measurement system, such as the Balanced Scorecard (BSC), and the choice of measures that are collected and reported to corporate managers by this performance measurement system.

It is considered appropriate to start by introducing the organizational setting that leads to a discussion on contingency theory and agency theory. An overview of the principal-agent relationship is also succinctly discussed. As a result of agency costs such as monitoring and bonding costs, there arises the need for organizations to develop and implement sound control systems. The concept of organizational control is then discussed with attention being focused on a particular control model, the cybernetic model. Finally, the contemporary empirical literature on organizational control is reviewed.

The researcher then provides an extended discussion of the Balanced Scorecard (BSC) by integrating the prior works on the BSC. It is believed this discussion is necessary so as to place the perspectives and the performance measures reported by the BSC within the context of the cybernetic control model discussed in previously. The review will also delineate the reasons that motivate a firm's decision to adopt a performance measurement system, such as the BSC, and the measures that are collected and reported.

More recently, the BSC has been widely accepted as a comprehensive performance measurement model when compared to traditional performance measurements used by many firms. While Kaplan and Norton (1992) initially developed the BSC a few decades ago, it is a relatively new performance measurement system for many firms. Apart from giving managers a comprehensive view of their business, the BSC is also a suitable framework for studying the linkages across the components of a firm's management control system (Atkinson et al., 1997). To many scholars (e.g., Otley, 1999; Malina & Selto, 2001; Bryant, Jones & Widener, 2002), the BSC is one of the most significant developments in management accounting and is deserving of detailed research.

As with any other performance measurement system, BSC measures in reporting upon past performance provide opportunities for organizational behaviors to be controlled. However, the BSC differs from traditional control systems where, in addition to its function as a controlling system, it can also be used as a communicating, informing, and learning system. Whilst recognizing that organizational control can be facilitated through communicating, informing and learning roles of the BSC, this study focuses on the organizational control properties of the BSC.

The researcher introduces the BSC and what constitutes the BSC by providing an overview of the perspectives within the BSC framework. Common perspectives found in the BSC framework are financial perspective, customer perspective, internal business process perspective, and learning and growth perspective. Further insights on the Performance Measurement System (PMM) are extensively discussed, describing the attributes of the PMM and the related literatures on the PMM and/or BSC. Finally, this section presents the hypotheses tested in this study.

The purpose of this study was to answer three research questions stated in the form of aims statements. The research questions or research aims are:

1. To examine the Balanced Scorecard as means for enhancing organizational control.
2. To explore whether a Cybernetic Control Model explains the emergence of the Balanced Scorecard.
3. To document the key factors which facilitate the Balanced Scorecard's role as an effective performance management model in for-profit organizations.

Methodology

This study employed a case study research method. A series of structured interviews were conducted and then questionnaires were distributed for further responses. This qualitative interview data were obtained from individuals directly involved with the design and use of the company's Balanced Scorecard (BSC).

A for-profit organization has been selected for the purpose of addressing the research questions or research aims as documented above. To qualify for this research, the organization must be currently using the Balanced Scorecard as its main or part of the main performance measurement model or management control system. Because of its proven track record and its extensive use of the BSC, Chrystal & Co. Pty. Ltd. was selected as the research site.

The company chosen as the subject of the research is currently registered as Chrystal & Co. Pty. Ltd. It was first established in 1950 and had been through stages of developments and reorganizations ever since (including having divested some of the businesses during unfavorable times). Chrystal & Co is a hundred percent family owned business. Currently the ownership is distributed equally among five members of the Chrystal family. Lloyd Chrystal is the Chairman of Chrystal and Co. One member of the next generation of this family, Haydn Chrystal is currently the Chief Executive Officer (CEO) of this family business.

Chrystal & Co. comprises of three divisions: Caterlink Division, Administrative Division, and Grocery Division. Based on the Balanced Scorecard Tree, the Caterlink Division is made up of four departments: Caterlink Administration, Caterlink Factory, Caterlink Projects, and Caterlink Sales. The Grocery Division consists of five departments: Grocery Administration, Grocery Operations, Grocery Sales, Grocery Warehouse, and Grocery Support.

The company has a total work force of 85 employees, including 3 personnel of the corporate administrative division and about 40 employees with a joint venture in Indonesia. Chrystal and Co. has a total yearly revenue of AUD\$22 millions. AUD\$20 ns.

This study investigates its research question with qualitative, interview and questionnaire data obtained from managers directly involved with the formulation and day-to-day use of the BSC. By adopting a case study approach to a single organization, the researchers intend to test inductive generalizations, at least within the organization studied (Otley, 1999). Otley (1999) stated that such a case study of a single organization can also include an interview of several managers and a survey of the same people or possibly including several more subordinates of those managers.

The company Chrystal & Co. Pty. Ltd. henceforth will be referred to as Chrystal & Co. The researchers interviewed seven senior management personnel consisting of a general manager, a financial controller, and five departmental managers. The same seven senior managers that were interviewed were also asked to provide the data collected through a questionnaire.

The research process was divided into three major stages: (1) preliminary work and documentation, (2) interviews process, and (3) questionnaire data collection process.

Preliminary Work and Documentation

The idea of carrying out the research at Chrystal & Co. came after a conference session. One of the participants in that session is the General Manager of one of Chrystal & Co.'s divisions or business units. It was learned that Chrystal & Co. had adopted the BSC and has had quite a success in its implementation. Though the BSC has been used for a relatively short time, the owners, managers, and the employees are quite keen on benefiting from this relatively new performance measurement and control system.

The BSC facilitator, the Financial Controller of Chrystal & Co., then provided the researchers with some of the BSC documents comprising the corporate scorecard, the divisional scorecard, and right down to the departmental scorecard. Newsletters and other relevant documents were made available to the researchers. One such document is the organizational structure of Chrystal & Co. which is called The Balanced Scorecard Tree, presumably in keeping with the BSC spirit and for consistency reason. The researchers were presented with the most current complete set of BSC at all levels, comprising of targets, actual achievement and the summary of the scores of the BSC.

A review of those documents provided insights on the BSC and the extent of its use within the company. Such useful information provided an added motivation to proceed with the actual fieldwork making up the core of this research.

As the next step in this preliminary stage, a second meeting was arranged with the General Manager of the Grocery Division. It was decided that the scope of this case study, would be focused on one particular division rather than the whole organization (Chrystal & Co.). It was a decision made not only considering the time constraints the researchers have, but more so because the BSC was not fully implemented in the other divisions.

Interviews were arranged with the General Manager of the Groceries Division of Chrystal & Co. and all of the departmental managers within that division. An interview with the financial controller of Chrystal & Co. was also arranged. With that, we move on to the next stage of the research process, the interviews.

Interviews Process

The purpose of this interview is to obtain the managers' perception of the value of the BSC as a performance measurement and evaluation tool. Whilst most questions were directed at addressing the perceptions of the BSC and its use in Chrystal & Co., other questions required the

interviewees to reflect upon the performance information that they and the company used prior to the implementation of the BSC.

The interview instrument was developed based on some of the documents provided in the preliminary meetings, while referring to the literature on BSC as provided in Chapter 3, and staying focused on the aim of the research provided earlier in this chapter. The interview consists of three sections. Section A presents demographic questions that are intended to provide some general background for our analysis. Section B identifies the performance measures that were previously used prior to the introduction of the BSC. Section C considers the emergence and use of the BSC within the Grocery Division of Chrystal & Co.

The interviews were in a semi-structured form of questionnaire, and were provided to each interviewee ahead of the actual interviews so that the participants could spend some time becoming familiar with the questions that would be asked during the interview, and hopefully to enable the participants to answer more appropriately. A possible response bias in terms of eliminating spontaneity and having pre-determined or prepared answers could be a likely outcome of this technique. But as a justification to this compromise, the researchers offer the explanation that there could also be a non-response bias by the participants as a result of not properly understanding the questions being asked. Overall, it is believed that this technique helped the researchers with both the interview process as well as in obtaining a more relevant set of responses.

Participants were asked to jot some notes down (if they wish to do so) on the questionnaire before the interview. Furthermore, confidentiality was also assured to the participants to encourage them to speak freely on the matter. Participants were given the message that all information that they provide through the interview will be received in the strictest confidence and will not be reported in any way that identifies them as the respondent to the questions that we ask them to answer. That, too, we believe to be an important factor in order to achieve our objective of getting the true response from the participants, getting responses on what they really think and believe concerning the BSC.

A total of seven interviews were conducted, done in four sessions. Two of the sessions, each lasting approximately an hour, only one participant was interviewed. Those were the sessions with the General Manager and the Financial Controller. In the other two sessions which were interviews of the department managers, there were three and two participants respectively.

Each interview lasted between 30 minutes to 65 minutes. The interviews with the General Manager and the Financial Controller lasted 50 minutes and 65 minutes, respectively. The departmental managers' interviews lasted between 30 minutes to 37 minutes each. The researchers believe this big range of difference, between the departmental managers and their senior managers, was a normal and logical outcome. The senior managers, obviously, have a more comprehensive view of the BSC, and certainly, have more areas of responsibilities with more performance measures and insights to consider.

Before each interview the participants were asked if they object to our taping the interviews but none of the interviewees objected. As a result, we have the advantage of providing some of the comments as they were said.

Useful information and deeper insights were gathered from this series of interviews, especially regarding the emergence and use of the BSC within the Grocery Division. It was our intention that these responses address to some extent the research questions number two and three.

At the end of each interview, participants were provided with a questionnaire to be completed in their own spare time. The researchers did not press them too much to a designated time of completion but gave a reasonably appropriate time of one week following its distribution. They were briefly told of the intention of this project and the purpose for conducting such a research. Those explanations then led us to the next stage of the research process, the questionnaire data collection.

Questionnaire Data Collection Overview

At the end of the interview process (previous stage) and on being handed the questionnaire to be completed on a later date, the researchers explained briefly about the structure and content of this questionnaire. Participants were informed of the cost versus benefit rating of the performance

information provided to managers (performance measures). Participants were then explained about this performance information (performance measures) in respect to the level of relevancy and reliability through the rating of objectivity versus subjectivity.

Participants were then asked to identify the usefulness of the performance information (performance measures) through the rating of slightly useful to extremely useful with a non-relevant option also provided. Finally, the participants were asked to provide the reason or reasons for why the performance information (performance measures), provided as highly or extremely useful by the participants, are so useful.

On testing done by the researchers, the questionnaire takes about 30 minutes to 45 minutes to be adequately and appropriately completed. The questionnaire consists of two main sections, each section containing two parts. An example of the structure and content of this questionnaire is presented in Appendix 2.

Findings

This section reviews and analyses the result of the second stage of the research process that is the interviews. When did the respondent become aware of the BSC, and the source of this awareness?

Respondent A - attended an ICAA professional development course 5-6 years earlier.

Respondent B - attended a professional development course 5-6 years earlier.

Respondent C - attended Mandurah workshop in September 2002.

Respondent D - attended Mandurah workshop in September 2002.

Respondent E - has a partner that works at BankWest that uses BSC.

Respondent F - attended Mandurah workshop in September 2002.

Respondent G - once read an article about BSC before attending the Mandurah workshop in September 2002.

These results generally present an indication that there was no real exposures to the BSC before the company implementation of the BSC.

Table 1. Respondent Understanding of BSC in General

Respondent	Poor 1	Fair 2	Moderate 3	Good 4	Excellent 5	Mean
A				✓		
B				✓		
C			✓			
D			✓ (3.5)			
E			✓			
F				✓		
G			✓			
		0.5	3.5	3		3.35

Analysis = 3.35 (moderate to good understanding)

Overall results as seen from Table 5 indicate that participants appreciate the role of the BSC and its potential for the company.

Table 2. *Respondent Understanding of BSC. Specifically within Chrystal & Co.*

Respondent	Poor 1	Fair 2	Moderate 3	Good 4	Excellent 5	Mean
A				✓		
B				✓		
C				✓		
D				(4.5) ✓		
E				✓		
F				✓		
G				✓		
				6.5	0.5	4.07

Analysis = 4.07 (good understanding)

This result indicates that overall the participants appreciate the role of the BSC.

Table 3. *The Level of Subordinate Understanding of BSC*

Respondent	Poor 1	Fair 2	Moderate 3	Good 4	Excellent 5	Mean
A						
B						
C			(3.5) ✓			
D		✓		✓		
E				✓		
F				✓		
G			✓			
		1	1.5	3.5		3.42

Analysis = 3.42 (moderate to good understanding)

The above Table 3 indicates that participants believe that their subordinates generally have developed a good understanding of the application of the BSC. Factors affecting this understanding may be the results of the monthly meetings and reviews of the existing BSC. Other factors contributing to this understanding may have been the continuous learning facilitated by the BSC. Participants responding with fair and moderate levels of understanding offered the following reasons: (1) BSC have been in place only a short time, thus subordinates need more familiarization. (2) Subordinates were not involved right from the beginning.

Although these subordinates have been with the company for quite a while, the BSC offers something more innovative at the same time a bit complex, thus not easily accepted and understood by subordinates. This is mentioned by one of the participants having an older subordinate and two younger ones, for example:

"BSC is a modern tool or system. Thus, it is not grasped well by my older subordinates compared to the two younger ones."

Factors encouraging the adoption of the BSC by Chrystal & Co. can be differentiated into four main parts: accuracy, accountability, incentives, and leadership. Included in the key word leadership are reasons such as, top management commitment, consultant's recommendation, or rival firms use.

Almost all respondents feel that at the strategic business unit level, BSC ability to provide more accurate performance measurement encouraged its implementation. More importantly, most of the

respondents believe that the ability of the BSC to provide a stronger link between incentive pay and performance of employees/managers led to its adoption.

Table 4. *Factors Encouraging the Adoption of the BSC*

Factors	A	B	C	D	E	F	G	#
More accurate performance measurement of								
A = individual product lines?		✓						1
B = strategic business units?		✓	✓	✓	✓	✓	✓	6
C = the Grocery Division?		✓		✓	✓	✓		4
Stronger business accountability at								
D = individual product line level?	✓	✓	✓	✓				4
E = strategic business unit level?	✓	✓	✓	✓	✓	✓	✓	7
F = the Grocery Division level?	✓	✓	✓	✓	✓	✓	✓	7
Stronger link between incentive pay and performance for employees/managers at								
G = individual product line level?		✓	✓	✓	✓		✓	5
H = strategic business unit level?		✓	✓	✓	✓		✓	5
I = the Grocery Division level?		✓		✓	✓	✓	✓	5
Other given reasons?								
J = top management commitment?	✓	✓	✓	✓	✓	✓	✓	7
K consultant's recommendation?								
L = rival firms use?								
Other reasons?								
M = Prior to introduction of BSC no formal measurement apart from financials. Recognition of the need for broader scope performance data. What gets measured gets done (BN)			✓	✓	✓		✓	4
N = BSC facilitates cross-functional understanding – team building.	✓			✓	✓	✓		4
O = Get everybody focused on strategy.	✓				✓	✓		3
P = Means of evolving into a progressive company.	✓							1

The ability of the BSC to manage and measure all a whole range of aspects contributes to its adaptation at Chrystal & Co. Examples of respondents' comments supporting that argument:

"Other performance tools measure no other forms of measurement apart from mostly financial results, whereas BSC helps manage and measure all aspects of business including customers, employees, internal business process, etc."

"What gets measured gets done."

Notwithstanding the above arguments and comments, as seen also from Table 4, top management commitment (leadership) plays a big role in encouraging the adoption of the BSC by

Chrystal & Co. This is stated by one participant who is an important member of the corporate management team and is the driving force behind the implementation of the BSC.

"Top management commitment to the BSC is the single most important reason for its adoption."

Nevertheless, when participants were asked to rank the three most influential reasons behind the BSC implementation, surprisingly top management commitment did not score as highly. More accurate performance measurement at the strategic business units, getting everybody focused on strategy, and stronger business accountability at the Grocery Division made up the top three (see Table 5).

Table 5 *Three Most Important Reasons Encouraging the Adoption of the BSC*

Factors	A	B	C	D	E	F	G	#
More accurate performance measurement of								
A = individual product lines?								0
B = strategic business units?			25	60		50		135
C = the Grocery Division?		35						35
Stronger business accountability at								
D = individual product line level?								0
E = strategic business unit level?			35	20				55
F = the Grocery Division level?		35				30	30	95
Stronger link between incentive pay and performance for employees/managers at							10	3.3
G = individual product line level?							*	3
H = strategic business unit level?							*	3.3
I = the Grocery Division level?		30				20	*	53.3
Other given reasons?								
J = top management commitment?							60	60
K consultant's recommendation?								
L = rival firms use?								
Other reasons?								
M = Prior to introduction of BSC no formal measurement apart from financials. Recognition of the need for broader scope performance data. (BN's comment)			40	20	20			80
N = BSC facilitates cross-functional understanding – team building.	40				30			70
O = Get everybody focused on strategy.	50				50			100
P = Means of evolving into a progressive company.	10							10

Discussion

At the end of each interview, participants were provided with a questionnaire to be completed in their own spare time. The researchers allowed a reasonably appropriate time of one week following its distribution for its completion. Participants were briefly explained the intention of this project and the purpose for conducting such a research. Those explanations then led to the next stage of the research process, the questionnaire data collection.

On completing the interview process and after being handed the questionnaire to be completed on a later date, the researchers explained briefly about the structure and content of this questionnaire. The provision of performance information may involve two different types of trade-offs being made: (1) cost versus benefit and (2) objectivity versus subjectivity.

Cost versus benefit

One set of trade-offs involves costs and benefits. The generation, organizing, reporting and use of a performance measure consumes scarce economic resources in terms of the out-of-pocket costs of collecting, processing, and reporting the information, and the managerial time devoted to using the information. A performance measure may provide benefits in various forms such as a better understanding of organizational objectives, information about a manager's leading actions, creating an incentive for improvement and/or improving decision making. A specific performance measure, inter alia, should only be provided where the benefits exceed the costs.

Respondents were requested to rate each of the measures previously and currently reported from a five point scale in respect to the cost versus benefit trade-off. The five point scale note:

- 1 = significantly more costly than beneficial
- 2 = moderately more costly than beneficial
- 3 = benefit equal to cost
- 4 = moderately more beneficial than costly
- 5 = significantly more beneficial than costly

Results clearly indicate that the performance information or performance measures found in the BSC of Chrystal & Co. are either significantly more beneficial than costly or they are moderately more beneficial than costly. The responses generally fall between the highly more beneficial than costly and the significantly more beneficial than costly.

This finding indicates that a performance measure will be included in the BSC where the benefit exceeds cost. It is consistent with the argument that a specific measure should only be provided if the benefits exceed the costs.

Results also unquestionably indicate that the measures found in Chrystal & Co.'s BSC are considered to be more objective than subjective. Again the responses fall into a small range of highly objective and moderately more objective. This convincing result supports the belief that a performance measure will be included in the BSC where the measure is more objective than subjective. This is an indication that Chrystal & Co.'s BSC are considerably reliable.

Overall results about **Control Action is to Amend Inputs (Action Set A)** clearly point out that the measures found in Chrystal & Co.'s BSC are either highly useful or extremely useful. A few measures (only three based on the mean of the responses) considered the measures to be moderately useful. Surprisingly, there is not even one measure (based on mean results) that is considered as just slightly useful. The high usefulness of the measures as a Control Action Set A, could only suggest that measures found within the company's BSC are useful in amending inputs. Thus, the findings indicate that *the BSC is effective in providing information about the level of inputs required (i.e., first order control)*.

Results about **Control Action is to Revise Objectives (Action Set B)** are generally between the scale range of highly useful and moderately useful. Nevertheless, this finding still strongly suggests that *the BSC is effective in providing information about the achievable objectives (i.e., second order control)*.

Similarly, results about **Control Action is to Obtain Better Understanding (Action Set C)** indicates the same level of support that *the BSC is effective in providing understanding of the*

transformation process (i.e., internal learning). Interestingly, the financial measures do not score as highly as in Action Set A and Action Set B. That is probably because internal learning is achieved over time rather than at one particular instance; it is more of a recurring activities.

Finally, findings about **Control Action is to Improve Performance (Action Set D)** shows that overall results support the relevancy of the performance information to control action (to improve performance). It is once again an indication that the BSC and its measures are effective in providing information that allows the transformation process to be changed (i.e., systematic learning). By changing the system itself, inputs, outputs and the associated predictive model will also change. This is a change action to the nature of the process itself. These findings further indicate that *the BSC is effective in providing information that allows the transformation process to be changed (i.e., systematic learning)*.

The BSC is believed to be a more effective performance measurement system and management control model in providing information about the level of inputs required, compared to the prior and more traditional performance measurement system. Moreover, the BSC is a more effective performance measurement system and management control model in providing information about the attainable objectives, compared to the prior and more traditional performance measurement model.

The BSC is a more effective performance measurement system and management control model in providing understanding of the internal learning from resources to objectives, compared to the more traditional performance measurement model. Finally, the BSC is a more effective performance measurement system and management control model in providing information that allows the transformation process to be changed, compared to prior and more traditional performance measurement model.

The above statements are strongly supported by empirical results as presented in this study. These findings reinforce and enhance some of the results found in previous studies and articles (i.e., Kaplan & Norton, 1992, 1993, 1996a, 1996b; Chow, Haddad & Williamson, 1997; Silk, 1998, Malina & Selto, 2001; Malina & Selto, 2003a).

Limitations and Implications

Admittedly, the analysis of the results presented in this research seems to be oversimplified. An in-depth analysis of the problem is not comprehensively provided. One possible explanation as to why the analysis seems to be oversimplified is because of the nature of the case study method that is highly unstructured for both process and output. An unavoidable situation is that it allows the probability of encountering numerous possibilities of explanations.

Another shortcoming is the impression that the results seem to be too easily predicted. This is probably the result of prediction bias, where the subjects or respondents seem to be correctly anticipating the researcher's expectation from their responses. A more rigorous similar kind of research could potentially be beneficial in conforming to the findings in this study.

Another limitation for such field work (case study) is that because of the uniqueness of each field study, there is no design or template that will work every time. As a result there is no standardized way of analysing data, so the use of creative insight must be employed. Finally, there is no report format for writing field work research such as this. The science report generally does not work well in this situation.

The lack of 'representativeness' is also considered as the weakness of this research. That is so because a single site or local issues are seen to predominate.

Another shortcoming is that the process and results of this study may contain some researcher bias. The trustworthiness of the account and the trustworthiness of the researcher could be questioned.

A final limitation of this study is probably because it takes a long time to generate any data or output, thus making it a costly method. Future research might replicate this study in similar (or

different) type of organizations. A study of a larger organization could be a very promising idea, especially if the organization is of diverse nature and culture.

Future studies focusing on the cybernetic control model could explore whether a cybernetic control model explains the emergence of the BSC. This study, regrettably, do not clearly and soundly answer that research question presented as research aim. Future research could explore ~~on~~ this direction.

Future research questions could be: Why have organizations changed their control systems to incorporate some new techniques such as the BSC? What was the prior circumstances that caused them to make that or those change(s)? What have been the consequences of such changes?

Conclusion

In consideration of the richness and complexity of the framework tested in this study, it is overly simple to conclude that the BSC is a more effective performance measurement system and management control model compared to a prior and more traditional model. To some extent, it is quite surprising to find positive results all the way through and thus confirming or consistent with the hypotheses.

It is somewhat alarming that results are somewhat too easily predicted. This is probably the result of prediction bias, where the subjects or respondents seem to be correctly anticipating the researcher's expectation from their responses. A more rigorous similar kind of research could potentially be beneficial in confirming the findings in this study.

Notwithstanding the above arguments, the BSC is believed to be a more effective performance measurement system and management control model in providing information about the level of inputs required, compared to the prior and more traditional performance measurement system. Moreover, the BSC is a more effective performance measurement system and management control model in providing information about the attainable objectives, compared to the prior and more traditional performance measurement model.

Furthermore, the BSC is a more effective performance measurement system and management control model in providing understanding of the transformation process (internal learning) from input (resources) to output (objectives), compared to the prior and more traditional performance measurement model. Finally, the BSC is a more effective performance measurement system and management control model in providing information that allows the transformation process to be changed (systematic learning), compared to the prior and more traditional performance measurement model.

References

- [1] Atkinson, A. A., R. Balakrishnan, P. Booth, J. M. Cote, T. Groot, T. Malmi, H. Roberts, E. Uliana, A. Wu. 1997. *Journal of Management Accounting Research* Volume 9: 79-108.
- [2] Bryant, L., D. Jones, S. K. Widener. 2002. An empirical investigation of the balanced scorecard framework. Working Paper. Rice University.
- [3] Chow, C. W., K. M. Haddad, and J. E. Williamson. 1997. Applying the balanced scorecard to small companies. *Management Accounting* (August): 21-27.
- [4] Kaplan, R. S., and D. P. Norton. 1992. The balanced scorecard---measures that drive performance. *Harvard Business Review* (January-February): 123-145.
- [5] Kaplan, R. S., and D. P. Norton. 1993. Putting the balanced scorecard to work. *Harvard Business Review* (September-October): 147-181.
- [6] Kaplan, R. S., and D. P. Norton. 1996a. Using the balanced scorecard as a strategic management system. *Harvard Business Review* (January-February): 183-211.
- [7] Kaplan, R. S., and D. P. Norton. 1996b. *The Balanced Scorecard*. (Boston, MA: Harvard Business School Press).

- [8] Malina, M. A., and F. H. Selto. 2001. Communicating and controlling strategy: An empirical study of the effectiveness of the balanced scorecard. *Journal of Management Accounting Research* Volume 13: 47-90.
- [9] Malina, M. A., and F. H. Selto. 2003. Choice and change of measures in performance measurement models. Working Paper. Naval Postgraduate School.
- [10] Malina, M. A., and F. H. Selto. 2003. Causality in performance measurement models. Working Paper. Naval Postgraduate School.
- [11] Otley, D. T. 1999. Performance management: A framework for management control systems research. *Management Accounting Research*, 10: 363-382.
- [12] Otley, D. T., and A. J. Berry. 1980. Control, organization and accounting. *Accounting, Organizations and Society* Volume 5 No.2: 231-244.
- [13] Silk, S. 1998. Automating the balanced scorecard. *Management Accounting* (May): 38-44.

Empirical Study of Inclusion of Pupils with Special Needs in the General Elementary Education Program in the Philippines

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Abstract: The main purpose of the study was to explore and determine the challenges and coping strategies of elementary teachers in including pupils with special needs in the general elementary education classroom in the Philippines. The study is a mixed method particularly the exploratory sequential design. The data were collected from 12 teacher-participants and 238 teacher-respondents from 14 inclusive schools from the main regions of the country. Purposive sampling was used to select the 12 participants and multi-stage sampling was used to select the 238 respondents. The qualitative phase of the study categorized teachers' challenges as behavioral management, instructional management, handling complaints, coping strategies as professional support and practice of accommodation. The quantitative phase of the study revealed that teachers sometimes experience physical harm and frustration in including pupils with special needs. Teachers often experience challenges in terms of behavior management and sometimes in terms of instructional management and handling complaints. Teachers often cope in terms of professional support and practice of accommodation. The study recommends conducting a special teacher-training program for general education teachers that will support them in their practice of including pupils with special needs.

Keywords: *inclusion, special needs, general education*

Introduction and Literature Review

Education is a basic right for all. UNESCO's Salamanca Statement and Framework for Action in 1994 states that every child with a disability has every right to a quality education fitted to his needs. Schools should accommodate all children regardless of their physical, intellectual, social, emotional, linguistic or other conditions, including the disabled and gifted children (UNESCO, 1994). This was refined by the Education for All Agenda of 2015, which stated that inclusion will be broadened and strengthened, providing equal opportunities in education for all children globally, including the Philippines (EFA, 2015). This goal was reestablished and extended to achieve its maximum implementation by getting more aggressive with programs by creating Sustainable Development Goals (SDG). In 2030, EFA envisions to have achieved quality education for all across cultures and nations.

In the Philippines, the government adopted policies on inclusion education after the World Conference on Special Needs Education held in Salamanca, Spain, in June 1994. In these accords, significant laws were established. These laws include the Education Act of 1982, the Magna Carta for Disabled Persons of 1992 (Republic Act 7277), the Inclusive Education for Children and Youth with Special Needs Act (2017), The Republic Act 11650, which is an act instituting a policy of inclusion and services for learners with disabilities to support inclusive education, Learning Resource Centers of learners with disabilities in all schools districts, municipalities and cities, providing for standards, appropriating funds therefore, and for other purposes.

These laws seek to make education inclusive and open to all Filipino children by setting up a structure for exceptional needs training usage across the nation. It also establishes inclusive education learning resource centers that will be the source of suitable instructional materials and equipment that educators can use in their classrooms to ensure that students with special needs are properly supported and enabled to learn alongside their peers.

However, studies conducted globally found that the preparation of general elementary education pre-service teachers was lacking. Teachers felt that they were not trained with the essential understanding to work with pupils with exceptionalities and that the difficulties might expand if a

teacher had a classroom of pupils with various unique needs (Paris, Nonis & Bailey, 2018; Tiwari et al., 2015; Dapudong, 2013).

Another study conducted in Jordan revealed that teacher education programs do not prepare teachers with the needed knowledge and pedagogical skills needed to work in inclusive set ups (Amr, 2011). In Ecuador, teachers perceived that their training does not prepare them for handling pupils with special needs (Shaffer and Thomas Brown, 2015). Another study where the participants responded that lack of training and knowledge in understanding pupils with special needs in the regular classroom supported such findings (Odongo & Davidson, 2016).

These challenges faced by teachers every day include the lack of professional training as it relates to the wide range of specialized development, understanding the social, emotional and behavioral needs of children, class size, developing the existing curriculum, difficulty in meeting the demands of various stakeholders, and the provision of resources to support the pupils in their school settings. Challenges in establishing and keeping an inclusive educational setting stem from developing individual educational plans, changing, omitting, substituting and differentiating the learning outcomes to meet the needs of the children with a range of disabilities and special learning needs (Foreman & Arthur-Kelly, 2015; Mitchell, 2014; Yasar & Cronin, 2014).

Research shows that general education teachers do not feel prepared for inclusive education (Barned, Knapp, and Neuharth-Pritchett, 2011; De Boer, Pijl, and Minnaert, 2011). In a similar study conducted by Anowoniyi and Ngwenya (2015), the major challenges in implementing inclusive education identified were the teachers' competency, attitude of teachers, teaching methods, curriculum material and financial resources- challenges which still exists in many countries even in countries where education systems are well developed (Forlin, 2012).

Studies reveal that, in the Philippines, the general elementary education curriculum only includes one course equivalent to three units on special education. Teachers thought the elementary education program does not prepare them to teach in an inclusive classroom and do not consider the subjects they have taken as training in teaching students with special needs. It was further recommended in these studies that pre-service education programs need to be strengthened and enhanced to fit in the need of the rising inclusion of students with special needs in the regular classrooms (Torres, 2016; Muega 2016).

Another local study conducted unveiled teachers' need for training, classes, and workshops. Teachers are skilled in their own personal capacity, but they lack further training specifically on the development of Individualized Education Plans. Therefore, there is a need to have a separate subject on special education and inclusive education in the teacher training courses (Ecoben, 2019).

Thus, this study aims to examine the day-to-day experiences, challenges and coping strategies of elementary teachers in including pupils with special needs in the general education classroom in the Philippines. Specifically, this study seeks to explore the experiences, challenges and coping strategies of elementary teachers in including pupils with special needs in the general elementary education classrooms. This is geared to answer the following research questions: (1) What are the challenges of the teachers in the inclusion classrooms? and (2) How do the teachers cope with the challenges they encounter in the inclusion classroom?

Methodology

A mixed method research study, specifically the exploratory sequential design approach, was used in this study. Data collection occurred in two phases, which begin from the qualitative part and end with the quantitative part. For the qualitative part of the study, the data gathering is systematic, using various data collection techniques and procedures to allow triangulation. Techniques and procedures can be in three forms, such as the face-to-face interview, on-site observation and the document analysis. For the quantitative part of the study, the data collection method was a survey questionnaire based on the themes that emerged in the qualitative data collection. The survey

questionnaire translated the important themes from the participants' data responses, which cannot be generalized due to its small sample size.

Its main purpose is to explore, investigate and generalize the first-hand experiences of general education teachers in including students with special needs in the inclusive classrooms. This study used the exploratory sequential mixed method design, which aims to explore the experiences of the general education teachers in the inclusive classrooms through qualitative data collection, and analysis then develop an instrument for quantitative data collection and analysis. The quantitative data was utilized to confirm the qualitative data, where inferences will be drawn.

The population of the study were the elementary teachers from the registered SPED and regular elementary schools offering inclusion in the major regions of the Philippines. The participants were purposively chosen and screened based on the criteria set qualifying them as the experienced individuals in the field of inclusive education. The qualitative part of the study purposively chosen 12 elementary teachers, while the quantitative part of the study recruited 238 respondents using the multi-stage random sampling.

Snowball sampling technique was used, and the participants were also carefully screened to satisfy a set of criteria such as:

- Full time elementary teacher.
- Have at least 3 or more years of teaching experience in the inclusive classroom
- General elementary education graduate or its equivalent who had attended seminar and training on inclusion
- Have experienced teaching at least one student diagnosed with special needs (ADD, ADHD, Autism/ ASD, Learning Delay, mild physical disabilities) in the regular classroom settings
- Have taught classes with 15 or more students

The instrument used in the qualitative phase of the study was a set of semi-structured interview questions based on the research problems set for this study while the quantitative phase of the study used a 47- item survey questionnaire that was self-constructed by the researcher based on the themes that emerged in the qualitative phase of the study.

Results

This study aimed to address answers to the posted research question by conducting a multi-stage study. The table below shows the summary of the generated results.

Table 1: The Qualitative and Quantitative Study Results

Qualitative Result	Quantitative Result
Research Question 1: <i>What are the challenges of the teachers in the inclusion classrooms?</i>	Research Question 1: <i>How frequent do teachers experience challenges in terms of:</i>
Behavioral Management	Often
Instructional Management	Sometimes
Handling Complaints	Sometimes
Research Question 2: <i>How do the teachers cope with the challenges they encounter in the inclusion classroom?</i>	Research Question 2: <i>How frequent do teachers cope with the challenges they encounter in including pupils with special needs in terms of:</i>
Professional Support	Often
Accommodation	Often

Discussion

Challenges of Teachers on Inclusion of Pupils with Special Needs in the General Classroom

Teachers' one-on-one interview resulted in three themes, such as behavior management, provision of learning strategies and parents' complaints. The data collected are represented below:

Behavioral management.

Among the three themes that emerged, behavior management was found to weigh most among the challenges teachers face in the general education classroom that includes students with special needs experience. These findings are congruent with Amr, Al-Natour and Al-Abdallat (2016) study who found that the primary concern of teachers falls on the management of challenging behaviors among students with special needs included in the general education classroom

Teacher participants expressed that they were challenged on how to manage and control the behavior of students with special needs that it won't cause disruptions in their classes. In one of the interviews the teacher-participants shared that:

Very disruptive, everybody complains and complains to teacher. He keeps on roaming around the class that even other classmates would want to play and do the same. He influences his classmates to be hyperactive in class as well. Sometimes other students are afraid of him because he hurts them and disrupts the class since he can't keep still, he can't sit. He wants to be up all the time, running, crawling and shouting. (She, grade schoolteacher for 3 years, one-on-one interview)

My class is manageable except when a special needs student throws tantrums or meltdowns that sometimes disturbs the class. Some will be running in and out while the class is going on but that is not the case all the time. (ML, grade schoolteacher for 3 years, one-on-one interview)

"(The challenge is)...his unusual behavior of shouting during class, that we cannot do our lessons anymore. It's hard because he's always throwing tantrums, he keeps on shouting in class. I was thinking that I can't teach a student with special needs because he is really different." (Eva, grade schoolteacher for 24 years, one-on-one interview).

I have six of them in my class. Students who cannot really control their behavior and disruptive are put in a corner until they are really to join. (Bel, grade schoolteacher for 25 years, one-on-one interview)

The challenge is how I will deal with behavior in class so that they will not be a bad influence to classmates. Also, is how will I make him understand that in class there are learning behavior to follow. (Gerald, grade schoolteacher for 3 years, one-on-one interview).

The challenges are when there are behavior conflicts in the class. I do not know how to handle them since I do not have a background on special education. So I just waited them until they stop. (Rose, grade schoolteacher for 28 years, one-on-one interview)

He is repeatedly misbehaving every day. It's a repeated problem managing him because his behavior is just the same. (Rosa, grade schoolteacher for 14 years, one-on-one interview)

"My class really is disturb, in the morning it is a bit manageable but when afternoon comes they start to be more hyperactive and throw tantrums that we can't do anything anymore. I have three in my class, one is always throwing tantrums, one is always going out and the

other one which I really have to look into has hurt so many of his classmates already.” (Bhe, grade schoolteacher for 5 years, one-on-one interview)

Table 2 below presents quantitative results on the challenges of teachers related to inclusion of pupils with special needs in the general education classrooms in terms of behavioral management. Results showed an overall mean score of 3.41 and SD of 0.75, which confirms that teachers find it challenge to manage the behavior of their pupils with special needs. Looking closely to the results, Table 2 presents that the item “Pupils with special needs display unusual behaviors (i.e. screaming, crawling, crying etc.)” gained the highest mean of 3.68 and SD of 1.031 while the item “Class lessons are delayed for attending to pupils with special need” has the lowest mean of 2.99 and SD of 1.09. These results explain that often display of pupils’ unusual behavior during classes sometimes causes the delay of lessons; thus, teachers need to attend to their special needs first.

The results imply that every teacher, including pupils with special needs in their regular classroom, experiences challenges in behavior management because of the pupil’s condition. Therefore, it is important for inclusive teachers to have knowledge and proper training to handle and understand the nature of each special pupil included in their classes.

Table 2. *Challenges in Behavioral Management Experienced by Teachers in including Pupils with Special Needs*

Challenges in Behavioral Management	N	Mean	SD	Verbal Interpretation
1. It is hard to make Individualized Educational Plan for my pupils with special needs.	238	3.68	1.031	Often
2. Pupils with special needs roam around during classes.	238	3.53	1.005	Often
3. I stop my lessons because of pupils’ disruptive behaviors.	238	3.52	1.058	Often
4. My class is noisy because of hyperactive pupils.	238	3.34	1.153	Sometimes
5. Class lessons are delayed for attending to pupils with special needs.	238	2.99	1.087	Sometimes
Behavioral Management		3.412	0.756	Often

These teacher participants are willing to have these students with special needs in the general education classes, although they cannot deny the fact that students’ difficult behavior is causing a challenge to teachers and difficulty to other others. In fact, one study conducted found out that teachers will probably be more willing to include students with intellectual disabilities than students with behavioral and emotional difficulties (Kern, 2006). A similar study conducted in Singapore and Zimbabwe revealed that teachers were challenged to manage difficult behaviors of students with developmental needs (Nonis, et al., 2016). Students with special needs, teachers experienced challenges in pedagogical management of their behavior coupled with the demands of typically developing children in their classes. (Majoko, 2018).

Thwala (2015) found that general education teachers held experiences challenges toward students with emotional and behavioral disabilities. Those students with behavior problems caused by their disability can cause a disruption in the classroom, behavioral interruptions that lead to loss of instructional time for all students, jeopardizing the safety in the classroom that may affect state testing results. How teachers describe their classes with the presence of students with special needs largely depends on their first-hand experiences in their life as teachers in schools practicing inclusion and on the severity of students with special needs included in their regular classes.

Instructional management. The second theme that describes the challenges of general education teacher in the inclusion of students with special needs in the regular classroom is the provision of learning strategies that will particularly fit the needs of these students to have them at

least cope with the lessons. In the interviews, teacher-participants shared their challenges in handling pupils with special needs. They said:

"With the new curriculum that we follow, we pass everyone even if the students failed their level they will be promoted to the next level. They are here but we teachers are not special education teachers. We do not have the trainings only few teachers are given the training. It should be for everyone because all are experiencing inclusion of students with special needs". (Pet, grade schoolteacher for 11 years, one-on-one interview)

"My challenge is... the new approaches and strategies I have to do to match their need... I experienced having a student who has a learning disability. He is supposed to be in fifth grade, but his reading level did not match. He is still on CVC reading. It was a challenged. (Gerald, grade schoolteacher for 5 years, one-on-one interview).

"My challenge is how to provide strategies for her to be successful in my class. I want to help her learn like her other classmates." (Lily, grade schoolteacher for 12 years, one-on-one interview).

"The number one is how to handle them or what strategies, materials or activities should I provide them for them not to be disruptive." (She, grade schoolteacher for 3 years, one-on-one interview).

"...another challenge is how to keep him busy. I always thinking of what to give him to keep him busy on his seat. (Eva, grade schoolteacher for 24 years, one-on-one interview).

"I even provide him with books that he can make himself busy of. If the child's parents have more resources think his progress will be faster." (My, grade schoolteacher for 13 years, one-on-one interview)

The quantitative result also implies that elementary teachers, including pupils with special needs, somewhat experience challenges in catering to their pupils' instructional needs, specifically in terms of management. This calls for the teachers to be trained and equipped with pedagogical skills that will help them improve in their instructional management considering that they are not only catering to regular pupils but also to pupils with special conditions.

Table 3. Challenges in Instructional Management Experienced by Teachers in including Pupils with Special Needs

Challenges in Instructional Management	N	Mean	SD	Verbal Interpretation
1. It is hard to make Individualized Educational Plan for my pupils with special needs.	238	3.34	1.029	Sometimes
2. It is hard for me to prepare lessons for pupils with special needs.	238	3.17	1.12	Sometimes
3. I struggle in modifying lessons to fit my pupil's ability.	238	3.14	0.999	Sometimes
4. It is difficult for me to give different instructions to pupils with special needs.	238	3.13	1.114	Sometimes
5. It is difficult for me to provide different strategies to help my pupils with special needs cope with the lessons.	238	3.12	1.001	Sometimes
Instructional Management		3.18	1.12	Sometimes

Table 3 presents the challenges of teachers related to the inclusion of pupils with special needs in the general education classrooms in instructional management. The data resulted in an overall mean of 3.18 and SD of 1.12, which has a verbal interpretation of sometimes. The item "It is hard to make Individualized Educational Plan for my pupils with special needs" has the highest mean of 3.34 and SD of 1.03 while the item "It is difficult for me to provide different strategies to help my pupils

with special needs cope with the lessons" has the lowest mean of 3.12 and SD of 1.00 which are both verbally interpreted as sometimes.

The challenges in providing and maintaining an inclusive educational setting roots from developing individualized educational plans, modifying, omitting, substituting and differentiating the learning outcomes to meet the needs of the children with a range of disabilities and special learning needs (Foreman and Arthur-Kelly, 2015; Mitchell, 2014; Yasar and Cronin, 2014). Many teachers felt that they were not trained with the skills and knowledge to teach children with special needs and that the challenges would potentially be increased if a teacher had a classroom of pupils with different special needs (Paris, Nonis & Bailey, 2018). Another study (see Odongo & Davidson 2016) where the participants responded that lack of training and knowledge in understanding students with special needs in the regular classroom supported such present findings.

Handling complaints. The first two themes were directed to the challenges inside the inclusive classrooms, but four teacher participants in this study strongly expressed that their challenges are even extended outside of the classroom when they experience having parents complain about the disturbing behavior of their students with special needs. In the interviews, the teacher-participants shared:

I'm neglecting already my other duties to my students because of them, and parents are already complaining. They do not want him in class anymore. My class really is disturbed, in the morning it is a bit manageable but when afternoon comes, they start to be more hyperactive and throw tantrums that we can't do anything anymore. If I only attend to them, I can't attend to most of my class anymore. (Bhe, grade schoolteacher for 5 years, one-on-one interview).

"...at times a classmate is hurt I have to really explain to the parents of the other child. I have to appease them because not all parents can understand. Of course, parents are protective of their children, they do not want their children to be hurt by anyone. (Lea, grade schoolteacher for 22 years, one-on-one interview).

"Many do not understand. So, I just tell my class that they are our class babies so they should just understand. I have to tell that, because if my student is hurt my problem will be the parents. They will complain, then I will explain again why I protected the other child which is because of his condition." (Rose, grade schoolteacher for 28 years, one-on-one interview).

"All of them are challenging but because I have established my authority, they already know what to do when I'm teaching. One time, I unintentionally hurt the student because my nails are long. I right away communicated with the parents and my admin because without clear communication with parents can be very challenging. Also, denial parents are a challenge to. We can't build a partnership or collaboration to help the child when their parents themselves do not accept that their children are having special needs." (Bel, grade schoolteacher for 25 years, one-on-one interview)

Parents of typically developing children are concerned that their child might develop inappropriate behavior. Parents of typically developing children showed more positive attitudes towards inclusive education. Those parents recognized that their children might experience benefits from inclusive education, such as accepting differences in people and developing sensitivity to others. However, parents also indicated that inclusive education has potential risks for both groups of children.

Table 4 presents the challenges of teachers related to inclusion of pupils with special needs in the general education classrooms to handle parents' complaints. The results showed an overall mean score of 3.17 and SD of 1.04, which is verbally interpreted as sometimes. Among the items in this category, items "It is difficult to pacify the parent whose child was hurt by a pupil with special needs",

"It is a struggle to assure parents that their children are safe in the inclusion classroom" and, "It is a struggle to provide parents an awareness program about inclusive classroom" had the same mean score of 3.19 which were verbally interpreted as sometimes.

The quantitative result also implies that among the challenges in including pupils with special needs, handling parents understanding pupils with special needs to avoid misunderstanding and complaints is evident through the challenges teachers experience. Considering these as challenges, this calls teacher to subject them into a capability training to understand the nature of children with special needs to be more confident in their task as an inclusive teacher which will help them also practically in helping parents understand that it is possible for pupils with special needs to learn in the general education classrooms.

Table 4. Challenges in Handling Complaints Experienced by Teachers in including Pupils with Special Needs

Handling Complaints	N	Mean	SD	Verbal Interpretation
1. My colleagues give me advice on how to deal with pupils with special needs.	238	3.19	1.044	Sometimes
2. My school principal mentors me when I face challenges in teaching pupils with special needs.	238	3.19	1.066	Sometimes
3. My school sponsors me to trainings and seminars on inclusive education.	238	3.19	1.029	Sometimes
4. A "pull out teacher" is available to assist me in handling pupils with special needs.	238	3.1	1.03	Sometimes
Handling Complaints		3.752	0.639	Sometimes

Teachers' Coping Strategies in the Inclusion of Pupils with Special Needs

The result of the participants' one-on-one interview was discussed. From their answers emerged two important themes such as professional support and accommodation which, according to them, are strategies on how they cope with the challenges they encounter in the inclusion of students with special needs in the general education classroom.

Receiving professional support. Professional support predicts efficient development of teachers' expertise and, importantly, is needed to help teachers confront challenges in students with special needs. According to research, the best support to inclusive teachers is helping them learn about strategies, providing them an assisting staff in classrooms, interacting with colleagues in the learning work community and the opportunity to see colleagues' professional development (Alila, 2014). This research finding was also true to the six teacher participants who expressed that receiving professional support from co-teachers and principals helped them cope with the challenges while dealing with students with special needs. The interviews revealed the following responses:

"I was able to cope because of the strong support I receive from my administrators. They are instruments for me to develop into an inclusive teacher. In cases that I can't manage student's behavior anymore, I also ask help from the intervention teacher, that way I can continue with my class smoothly. It really helps that my administrator provides all the training that we need. (ML, grade schoolteacher for 3 years, one-on-one interview).

"I'm working in a school under an administration that is very supportive when it comes to teacher training. My principal always sees to it that we attend seminars to learn the newest trends in teaching students with special needs. This way we can cope with whatever challenges we have. When students cannot sustain attention in the class, they are provided with intervention classes. Students also are provided with an Individualized Educational Plan (IEP), behavior modification programs. Students who are disruptive can be pulled out from

the class and the intervention teacher will handle them, which are a great help for the regular teachers. (Gerald, grade schoolteacher for 5 years, one-on-one interview).

Coping to these challenges is a process but sharing with our co-teachers really helps. It is good that they provide us with good training it helps us verify if we are still doing it correctly. (Bel, grade schoolteacher for 25 years, one-on-one interview).

I asked from the Sped teacher and my daughter (professional therapist) on strategies on how to handle students with special needs. I collaborated with them to better understand their behavior. (Rose, grade schoolteacher for 28 years, one-on-one interview).

Asking for help as well if I do not know what to do. I ask help from my co teachers and Sped coordinators. It is helpful for me to cope. (Lily, grade schoolteacher for 12 years, one-on-one interview).

I'm glad the intervention program supports us by providing us the worksheet materials. It lessens our work to prepare materials for them since we will just get from the sped teacher, less stress, less work (Mhy, grade schoolteacher for 13 years, one-on-one interview).

Table 5. Professional Support as Coping Strategy of Teachers in including Pupils with Special Needs

Professional Support	N	Mean	SD	Verbal Interpretation
1. My school has intervention program to help me deal with pupils with special needs.	238	4.26	0.786	Often
2. My colleagues give me advice on how to deal with pupils with special needs.	238	4.04	0.745	Often
3. My school principal mentors me when I face challenges in teaching pupils with special needs.	238	3.78	0.969	Often
4. My school sponsors me to trainings and seminars on inclusive education.	238	3.45	1.108	Often
5. A "pull out teacher" is available to assist me in handling pupils with special needs.	238	3.23	1.23	Often
Coping through Support		3.752	0.639	Often

Principals and school leaders can help teachers by providing professional development that builds awareness and understanding of students with special needs, providing teachers with support in managing students with challenging behaviors, as well as providing time to meet, plan and collaborate with co teachers (Rief, 2016).

The responses confirmed from the principal that all novice teachers are provided with a series of trainings to raise their awareness and to equip their teachers with inclusive practices. Two more teacher participants from the same school confirmed through their answers that it really provided them with a strong professional support in terms of teacher training, intervention program, and collaborating with co-teachers. The above coping mechanisms are related to how other teachers cope with challenges they encounter in the inclusion of students with special needs. To some, professional support can be worked out through collaborating with other professionals to better understand students with special needs.

The quantitative result also implies that elementary teachers may cope successfully in including pupils with special needs when they receive professional support from their administrators and colleagues. This cries for an opportunity for them to be provided with the necessary to support such as trainings and mentorship that will allow them to grow professionally.

Table 5 shows the coping strategies of teachers related to the inclusion of pupils with special needs in the general education classrooms in terms of professional support. The results showed an overall mean score of 3.752 and SD of 0.639, which has a verbal interpretation of often. Looking into the content of the questions, it tells that the item with a statement "My school has intervention program to help me deal with pupils with special needs" has the highest mean of 4.26 and SD of 0.79,

which general education teacher including pupils with special needs often coped with the challenges they encounter every day because they are provided with an intervention program. The item with the lowest mean of 3.23 and SD of 1.23 is the item with the statement "A pull out teacher is available to assist me in handling pupils with special needs" yet it is still verbally interpreted as often. This explains that providing a pull-out system is important for teachers to cope with the challenges they face in the inclusive classrooms.

These teachers look at professional support in terms of provision of trainings, intervention program and collaboration with other teachers as important factors that help them cope with the challenges of managing students with special needs in their general education classes. During the on-site observation, two Sped coordinators who also serve as the intervention program coordinators from different schools who were part of the study were also informally asked about how they work with the regular teachers. They shared that they do regular monitoring to identify the needs and challenges of teachers. One of the Sped coordinators showed the monitor evaluation that she used for that particular quarter.

As such, Kratochwill and Pittman (2002) noted that special education teachers and regular education teacher can collaboratively work together. The special education teacher can provide the regular teacher hands-on experiences on how an intervention program works. Having the administrative support, the support of peers and the collaborative effort of both teachers, the likelihood of more acceptance and a positive attitude is achievable.

Accommodation. Accommodation is the intentional, purposeful, practiced alternative strategy or tool to accomplish the same goals as all other students. It is a strategy teacher in inclusive schools used to help students with special needs cope with the standards expected of them. In the same manner, teacher-participants in this study expressed that providing accommodation helps them cope with the challenges they face as teachers of these students with special needs. They said:

For our students with LD, we provide remedial lessons, and we vary our strategies. I make sure also that my class is structured that even students with special needs can follow. I modify the lessons in a way that they can cope as well. When students cannot sustain attention in the class, they are provided with intervention classes. Students also are provided with an Individualized Education and Plan and behavior modification programs. (Gerald, grade schoolteacher for 5 years, one-on-one interview).

"I take time to provide them supplementary materials fitted to their level like phonics reading exercises. I also provide remedial lessons for them. (Pet, grade schoolteacher for 11 years, one-on-one interview).

"I give him special lesson too hoping he will progress. He is very happy when I give him special attention..." (Eva, grade schoolteacher for 13 years, one-on-one interview).

I myself provided her with activities that she can work on. I also receive materials from the sped teacher to supplement her learning needs. I'm very happy that she has improved a lot. (Lily, grade schoolteacher for 12 years, one-on-one interview).

I tried activities to make him busy like drawing and I give time to play." (She, grade schoolteacher for 3 years, one-on-one interview).

I found a more comfortable place for him in the class. I even provided him with books that he can make himself busy of. (Mhy, grade schoolteacher for 13 years, one-on-one interview).

"I have to strategically arrange their seats; he has to be always near me. I have to keep things in the classroom in order." (Lea, grade schoolteacher for 22 years, one-on-one interview).

The Ontario Human Rights Commission explained that an accommodation solution that meets one student's requirements may not meet the needs of another. Each student's needs are unique and must be considered afresh when an accommodation request is made. At all times, the emphasis must be on the individual student and not on the category of disability. Teachers must learn to identify and apply the appropriate accommodation for pupils with special needs and all students. Learning strategies are important for pupils with and without special needs. They can also be useful and beneficial to teachers. One of the most challenging areas that new special educators face is identifying the appropriate accommodations for their pupils (Verbeke, 2012).

However, for teachers who are including students with hyperactivity, accommodation may come in another form. This may mean provision of more activities to keep them busy and strategically placing those in seats that will make them peacefully learn. Teachers expressed earlier that among their challenges is the provision of strategies to meet the needs of their students with special needs. Looking at their responses, it seems that they themselves discovered the solution to their challenges. They now expressed that to cope; they have to accommodate their students by providing them with what they really need in forms of various strategies.

Teachers provide accommodation in different forms, which can be environmental, academic, instructional or behavioral. Accommodation may also refer to a change in an environment like rearranging the space in the classroom, providing one-to-one aid to keep a child from running away (Cook, Richardson-Gibbs & Dotson, 2018; Rief, 2016). Vygotsky's theory of social constructivism supports the use of human mediators to alter the environment. It supports the use of activity mediators to provide a way in which people can interact with nature to gain specific knowledge.

The quantitative result implies that teachers, in their inclusion of pupils with special needs they successfully cope when they themselves practice accommodation strategies that will help their own pupils cope in the general education classroom. This indicates that when teachers practice accommodation they cope, meaning helping teachers accommodation strategies through trainings is a coping strategy for teachers.

Table 6 presents the coping strategies of teachers related to the inclusion of pupils with special needs in the general education classrooms in terms of accommodation. The analysis showed an overall mean score of 4.09 and SD of 0.51. All the items resulted in verbal interpretation *often*, which implies that general education teachers who included pupils with special needs often practice accommodation as their way coping with the challenges, they encounter every day. Looking closer at the data, it implies that the item *"I make my lessons simple for pupils with special needs"* has the highest mean of 4.33 and SD of 0.68. This item was followed by the statement *"I give extra time for pupils with special needs to finish their schoolwork"* which has a mean of 4.13 and SD of 0.69. This result explains that teachers often make a way for their pupils with special needs be accommodated in the classes by making their lessons simple to fit the level of their pupils and by providing more time to allow their pupils finish a certain learning task.

Table 6. *Accommodation as Coping Strategy of Teachers in including Pupils with Special Needs*

Accommodation	N	Mean	SD	Verbal Interpretation
1. I make my lessons simple for pupils with special needs.	238	4.33	0.677	Often
2. I apply differentiated instructions to meet the needs of my pupils.	238	4.20	0.693	Often
3. I give extra time for pupils with special needs to finish their school work.	238	4.13	0.69	Often
4. I give remedial lessons for pupils with learning delay.	238	4.08	0.781	Often
5. I conduct behavior modification strategies to help pupils with special needs focus in class.	238	3.72	0.842	Often
Coping through Accommodation		4.092	0.505	Often

The teacher-participants sense achievement on their part when they see progress after trying to provide accommodation for their students with special needs. This feeling somewhat helps them cope with the challenges they encounter in the inclusion of students with special needs. According to Yeo et al. (2016), teachers will support inclusion when they have opportunities to experience success. Positive attitudes arose when they had experiences of teaching pupils with special needs and in the process gained a variety of strategies they could use to beneficial effect in the inclusive classroom.

Inclusive teachers perceive that all children are important and deserve the best possible education and care. They show respect to all children and model inclusive values of welcoming diversity, accepting individuality and celebrating big and small achievements. Last, they provide learners with opportunities to shape their learning experiences and they positively connect with their learners (Glazzard, et.al., 2015).

Limitations and Implications

This study was limited to the general education classrooms in established inclusive schools in the Philippines where general education teachers are facilitating students with special needs. The results generated implications that the following are needed to improve the present situation of implementing inclusion.

1. Conduct a special Teacher-Training Program that will provide support for teachers, including pupils with special needs.
2. Facilitate in-house training on enhancing teachers' knowledge and pedagogical skills that will help in their journey as inclusive education teachers.
3. Conduct a similar study that will focus on best practices of inclusive schools in the Philippines in terms of curriculum and pedagogical skills of teachers and a local study comparing the experiences, challenges and coping strategies of teachers from public and private schools as well as teachers teaching in the rural and urban schools.

Conclusion

Based on the *qualitative* and *quantitative* findings of the study, the following conclusions were made: General education teachers experience challenges in terms of behavioral management, instructional management and handling complaints. Teachers often experience challenges in behavioral management and sometimes experience instructional management and handling of complaints. Despite the challenges teachers experience in the facilitation of inclusive education, teachers often practice strategies to cope with their life as inclusive teachers. Teachers were often coping through the support they received from their principals and colleagues while inside the classroom. They often practice accommodation strategies to somewhat help their pupil's progress, and in the same manner, their own way of coping as well.

These findings can be explained by Lev Vygotsky's Theory of Social Constructivism, which supports how teachers adapted and survived challenges in the inclusive classroom. When teachers interact with co-professionals and talk about shared task or challenges, knowledge is constructed. Teachers' role in the inclusion classroom is human mediator. This study concludes that teachers believe that all children can be part of the regular settings and all children can take part in the general education curriculum regardless of the diversity of needs. General education teachers in the inclusive classroom, despite their experiences and challenges, believe that inclusion is a part of the normalization process of the pupils to experience natural settings through provisions of accommodations and behavior modification strategies to help pupils with the curricula.

References

- [1] Alila, S. (2014). Supervision helps you to find our strengths and... to create the work culture. Supervision as the support for inclusive teacherhood]. (PhD Diss., University of Lapland, Rovaniemi, Finland.)

- [2] Amr, M., Al-Natour, M., Al-Abdallat, B., & Alkhamra, H. (January 01, 2016). Primary School Teachers' Knowledge, Attitudes and Views on Barriers to Inclusion in Jordan. *International Journal of Special Education*, 31, 1, 67-77.
- [3] Awoniyi, S. A., & Karen, N. (May 30, 2015). Challenges in the implementation of inclusive education at elulakeni cluster primary schools in Shiselweni district of Swaziland. *European Scientific Journal*, 11, 13.
- [4] Cook, R. E., Richardson-Gibbs, A. M., & Dotson, L. N. (2018). *Strategies for including children*
- [5] Foreman, P. & Kelly, A. (2015). *Inclusion in action* (5th ed.). Melbourne: Cengage.
- [6] Ecoben, M.E. (June, 2019). Readiness of Public Schoolteachers in Handling Inclusive Education. *Ioer International Multidisciplinary Research Journal*, Vol. 1, No. 2.
- [7] Majoko, T. (January 01, 2018). Inclusion of Children with Autism Spectrum Disorders in Mainstream Primary School Classrooms: Zimbabwean Teachers' Experiences. *International Journal of Special Education*, 33, 3, 630-656.
- [8] Muega, M.A & Echavia D. (2011). Inclusion of exceptional students in regular classrooms: school readiness and teachers' knowledge and willingness. (Unpublished article)
- [9] Mitchell, D. (2015). Education that fits: Review of international trends in education of students with special educational needs (2nd edn). Canterbury, NZ: University of Canterbury
- [10] Nonis, K., Chong, W. H., Moore, D. W., Tang, H. N., & Koh, P. (October 01, 2016). Pre-School Teacher's Attitudes towards Inclusion of Children with Developmental Needs in Kindergartens in Singapore. *International Journal of Special Education*, 31, 3.
- [11] Odongo, G., & Davidson, R. (January 01, 2016). Examining the Attitudes and Concerns of the Kenyan Teachers toward the Inclusion of Children with Disabilities in the General Education Classroom: A Mixed Methods Study. *International Journal of Special Education*, 31, 2
- [12] Rief, S. F. (2016). *How to reach & teach children & teens with ADD/ADHD: Practical techniques, strategies, and interventions*.
- [13] Thwala, S. (2015). Challenges encountered by teachers in managing inclusive classrooms in Swaziland. *Mediterranean Journal of Social Sciences*, 6, 1, 495-500.
- [14] Torres, F. (2016) The perceptions of pre-service special- and general-education teachers on the inclusion of children with special needs in the regular classroom. Unpublished
- [15] UNESCO. <https://learningportal.iiep.unesco.org/en/issue-briefs/improve-learning/pre-service-teacher-preparation>

Psychological Resources as Determinants of Innovative Behavior: A Guide for Policy Makers and Administrators

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Abstract: The reality of a hyper-competitive world has brought challenges to the education sector. Teachers are tasked with preparing students to face the continuously growing demands of their future jobs. With this, teachers are encouraged to be innovative and create ideas to enhance students' knowledge and skills. This descriptive-correlational research aimed to determine psychological resources that enhance teachers' behavior to innovation. Three-hundred twenty-three responses of teachers from nine sectarian higher education institutions who were purposively sampled and agreed to take part in the study were included in the analysis. Descriptive analysis shows that teachers experience a high extent of general autonomy and an extremely high level of curriculum autonomy. Results also showed that teachers are highly supported by their administrators and colleagues. Further, teachers experience a high level of job satisfaction in their relationships with colleagues, students, and even parents. Descriptive statistics also present that the innovative behavior of teachers is high, yet numerical values are not extreme, thus, enrichment can still be done, especially in the aspect of promoting and sustaining innovations. Among the psychological resources, job satisfaction indicated the highest association with innovative behavior. Curriculum autonomy, satisfaction with parents and students, and support from colleagues are the highest predictors of innovative behavior. The results provide supplementary evidence that autonomy, social support, and job satisfaction are remarkable determinants of innovative behavior. Practical implications and recommendations include allowing appropriate autonomy for teachers in deciding for teaching and encouraging connections among administrators, teachers, students, and parents.

Keywords: *psychological resources, teaching autonomy, job satisfaction, social support, innovative behavior*

Introduction

The education sector of the 21st century is confronted with many challenges. According to Liisi (2022), education concentrates on learning through memorization of information rather than preparing students to deal with the real world by acquiring the necessary skills to conquer uncertainties.

Because of these demands from society and with the developments in technology, it is a must to enhance the behavior of teachers to create innovative ideas to boost the education system. Globally, it was claimed that a lot of education systems give little attention to teachers' knowledge and behavior (The World Bank, 2019). Umamah et al. (2021) concluded from their analysis that there is a need for more appropriate teacher training to meet the 21st-century challenges in education.

Poor quality of teachers is one factor in deteriorating quality of education in the Philippines. According to Mateo (2019), the Department of Education (DepEd) recognized that teaching innovatively has been seen to improve the quality of education. Thus, the education sector is committed to provide programs for teachers that will increase their quality of teaching.

Klaeijnsen et al. (2017) emphasized that the innovative behavior of teachers is a significant factor in achieving high-quality education. Trapitsin (2018) innovation in education is characterized by innovative activities of teachers, which are determined by their attitudes toward innovations and their eagerness and skills in producing new educational processes, outputs, and technologies. Moreover, the researcher claimed that the innovative behavior of teachers is influenced by both internal and external factors. Yet, despite its importance, he also claimed that studies on innovative behavior are

centered on its intellectual and operational elements. Thus, more studies are suggested to identify factors that will enhance the behavior to perform innovations.

Teaching quality and student learning is not only influenced by teachers' attributes, it is also a product of the work environment. When teachers are placed in a caring and rewarding work environment, they tend to be more engaged in activities that improve students' learning (Addimando, 2019).

Hobfoll's Conservation of Resources Theory and Self-Determination Theory

Self-determination theory (SDT) presented a unified theoretical framework to identify the factors behind certain behavior. This theory determined the need for competence, social relatedness, and autonomy as the three general psychological domains that influence external behaviors (Deci et al., 1989).

Hobfoll (2002) illustrates psychological resources as quantities that individuals place value according to their own (e.g., sense of control over their life). He also asserts that resources precede the continuation of experience. Specifically, Addimando (2019) suggests job satisfaction, social support, and autonomy as psychological resources that are associated with the working environment that were significantly linked to teachers' classroom practices and behavior.

This study aimed to determine psychological resources that may contribute to increase and support the innovative behavior of teachers. Specifically, it considered teaching autonomy, social support, and job satisfaction as indicators of innovative behavior.

Teacher's Autonomy

Lennert Da Silva and Mølsted (2020) claimed that a teacher's autonomy, which refers to the freedom of making decisions in designing teaching content and practices, is positively correlated with motivation and engagement. When teachers' autonomy is enhanced, they will be more concerned about acquiring new skills and more reliable in surpassing challenges at work (Addimando, 2019).

Jackson (2018) defines teachers' autonomy as their self-supervision, ability, and independence in the development and evaluation of teaching materials, classroom instruction, and curricular implementation. Southern (2018) adopted the definition of Pearson and Hall (1993) of teacher autonomy. He stated that teachers' autonomy refers to the perceived control of teachers over their work environment.

Pearson and Hall (1993) claimed that autonomy in teaching comprises two main proportions: general autonomy and curriculum autonomy. General autonomy includes the freedom of teachers in developing and implementing classroom standards. Additionally, this also includes the liberty of teaching in making decisions that are related to their actual work. Curriculum autonomy is defined by teachers' independence in selecting activities and materials for teaching. It also refers to the planning and sequencing of topics for the courses she teaches. Operationally, teaching autonomy was defined using the Teaching Autonomy Scale (TAS) of Pearson and Hall (1993).

Social Support

The conclusions of Rahmawati et al. (2020) suggest that teachers need assistance, support, and feedback to innovate. Specifically, they found out that support from co-workers is considered the biggest influence of innovative behavior. But then, they also argued that administrators or principals, students, and even external agents are equally important to provide support for the enhancement of innovative behavior.

Social support refers to the emotional, physical, instrumental, and informational help that a person recognizes from his social interactions (Minghui et al., 2018). When a person feels supported, their sense of worth and belonging is enhanced, thus making them more committed to their work (Korte & Simonsen, 2018). They enumerated the four structures of social support: emotional (feels empathy, concern, trust, and love); appraisal (being affirmed and given valuable feedback);

informational (receiving advice and suggestions); and instrumental (gained as substantial items like resources in teaching).

Studies have shown that social support promotes an individual's welcoming of new practices and innovations (Minghui et al., 2018). Moreover, high perceived support contributes to teachers' self-efficacy and helps nurture and enhance their psychological state (Lu et al., 2015).

Job Satisfaction

Evans (2019) refers to job satisfaction to be the person's emotional assessment on the level as to which his job-related demands are met. Pepe et al. (2017) reasoned that job satisfaction is the degree to which individuals enjoy the elements of their work. They also discussed that determinants of job satisfaction are influenced by internal and personal factors, as well as job environment and conditions. They also assert that the job satisfaction of teachers is obtained from getting high-ranking order needs. These include positive social relationships over lower-ranking order needs like compensation. Thus, their constructs of job satisfaction include satisfaction with colleagues, students, and parents.

Toropova et al. (2020) claim that teachers' job satisfaction significantly influences the well-being of both teachers and students. Moreover, they also found that work environments, as well as teacher characteristics like exposure to professional development and self-efficacy, are predictors of job satisfaction. They also pointed out that workload, cooperation, and student discipline were the significant factors that determine job satisfaction.

Consequently, enjoyment with co-workers refers to the favorable social atmosphere experience in the workplace. The relationship between teachers with their students was also a part of the operational description of job satisfaction. A negative bond amongst students and teachers could cause burnout and dissatisfaction. There was also a strong general relation between parents' involvement and teachers' job satisfaction (Pepe et al., 2017).

Innovative Behavior

According to Bawuro et al. (2018), the fast-changing social and technological advancements in our society emphasize the importance of innovative behaviors among employees, especially teachers. Trapitsin (2018) described the innovative behavior of teachers as their willingness towards modernization and development, as well as their inclination and capability to create innovative educational products. Serdyukov (2017) innovations in education are an important instrument of positive change to achieve a viable future.

Lambriex-Schmitz et al. (2020) proposed five components of teachers' innovative behavior. Opportunity exploration refers to one's capability to recognize presented opportunities for change will trigger actions for improvement. Opportunities that were explored can be divided into categories and then communicated to form ideas; this stage refers to idea generation. Once ideas are generated, they should be promoted. This phase involves the introduction and communication of ideas to seek the approval of people in authority to implement new services or products. For innovation to take place, ideas should be implemented, and this is the idea realization stage. In this phase, the generated ideas or strategies are put into action to accomplish the set objectives. Lastly, an idea should be stabilized and sustained to strongly implement innovative ideas in their organizations to avoid waste of time and energy in incomplete innovations.

Methodology

Research Design

The descriptive-correlational design was employed to describe the association between the variables (Quaranta, 2017). Teacher's autonomy, social support and job satisfaction were taken into consideration as determinants of innovative behavior.

Population and Sampling Techniques

Teachers at the tertiary level are purposively invited to participate in the study. Three-hundred twenty-three teachers of nine sectarian higher educational institutions responded to the invitation to answer the research instrument.

Research Instrumentation

Validation of the research instrument was made through the help of thirteen experts and amateurs. Thirty-seven teachers from one of the tertiary institutions took part in the pilot study. Yet, they were excluded from the data gathering for the actual study. Demographic profiles, including age, educational attainment, years in teaching, and salary range, were collected.

Internal consistency was determined from the responses gathered during the pilot study. Teacher's autonomy scale was made of six items for general autonomy $\alpha = .700$ and four statements for curriculum autonomy $\alpha = .812$. Thus, there was 10 items for teacher's autonomy with an acceptable Cronbach's Alpha coefficient $\alpha = .770$. For the social support, four sentences were retained for the dimension of support from administrators $\alpha = .858$ and another four statements for the component of support from colleagues $\alpha = .875$ for eight items $\alpha = .836$ in scale. Calculations from the pilot study revealed that the 15-item scale for the job satisfaction yielded highly desirable, thus all these sentences were retained. Cronbach's Alpha coefficients, satisfaction with colleagues $\alpha = .920$, satisfaction with students $\alpha = .818$, satisfaction with parents $\alpha = .992$, and overall satisfaction $\alpha = .992$. Respondents rated the scales based on strongly disagree (1) to strongly agree (5).

Lastly, the scale for innovative behavior produced a good to excellent Cronbach's Alpha coefficients; five objects for opportunity exploration ($\alpha = .841$); five items for idea generation ($\alpha = .950$); five entries for idea promotion ($\alpha = .901$); eight statements for idea realization ($\alpha = .935$); and ten sentences for idea sustainability ($\alpha = .968$). The full scale resulted to an excellent reliability ($\alpha = .977$). Further, the response scale was from *not like me at all* (1) to *very much like me* (5).

Data Gathering Procedures

Request letters for institution heads were sent to ask for their approval in the participation of their teachers in the study. List of teachers was given after their approval.

The link of the Google Form for the research instrument was sent to the teacher's e-mail addresses. To facilitate timely data gathering, invitations to take part in the study were also made through the teachers' social media accounts.

Ethical Considerations

An approval of the researcher's Ethics Research Board (ERB) was also secured prior to the data gathering to ensure that the guidelines stated in RA 10173, or the Data Privacy Act of 2012 in the Philippines was upheld. An informed consent was attached to the research questionnaire, which showed that their participation was voluntary. Confidentiality of their identities and responses was taken with extreme consideration.

Data Analysis

Jamovi version 2.3.2 was used to analyze data from the respondents. Mean and standard deviation were used to measure the level of psychological resources in terms of teacher's autonomy, social support, and job satisfaction. Pearson-Moment correlation was used to determine the association between psychological resources and innovative behavior. Finally, multiple linear regression was used to determine whether the psychological resources included in the study predict innovative behavior.

Results

Degree of Psychological Resources

Teaching Autonomy

Teaching autonomy was quantified using two sub-dimensions namely: general autonomy and curriculum autonomy. Table 1 shows the cumulative degree of “high” teaching autonomy with a summative mean of 4.20 and a standard deviation of 0.41. Accordingly, they have experienced an “extremely high” curriculum autonomy ($M = 4.50$; $SD = 0.46$) yet a “high” general autonomy ($M = 3.89$, $SD = 0.52$).

Table 1. *Descriptive Statistics for Teaching Autonomy*

	M	SD	Scaled Response	Verbal Interpretation
General Autonomy	3.89	0.52	Agree	High
Curriculum Autonomy	4.50	0.46	Strongly Agree	Extremely High
Grand Mean	4.20	0.41	Agree	High

Scoring System: 1.00 – 1.49 = Strongly disagree (Extremely Low), 1.50 – 2.49 = Disagree (Low), 2.50 – 3.49 = Somewhat agree (Moderate), 3.50 – 4.49 = Agree (High), 4.50 – 5.00 Strongly agree (Extremely High).

Social Support

Collectively, the perceived social support of the respondents is considerably “high” as projected in Table 2. The grand mean is 4.03 and the standard deviation is 0.69. Support from colleagues ($M = 4.12$; $SD = 0.75$) and support from administrators ($M = 3.93$; $SD = 0.84$), are both interpreted as “high”.

Table 2. *Descriptive Statistics for Social Support*

	M	SD	Scaled Response	Verbal Interpretation
Support from administrators	3.93	0.84	Agree	High
Support from colleagues	4.12	0.75	Agree	High
Grand Mean	4.03	0.69	Agree	High

Scoring System: 1.00 – 1.49 = Strongly disagree (Extremely Low), 1.50 – 2.49 = Disagree (Low), 2.50 – 3.49 = Somewhat agree (Moderate), 3.50 – 4.49 = Agree (High), 4.50 – 5.00 Strongly agree (Extremely High).

Job Satisfaction

Table 3 summarizes the level of job satisfaction of the respondents. The grand mean is 4.20 and the standard deviation is 0.47.

Table 3. *Descriptive Statistics for Job Satisfaction*

	M	SD	Scaled Response	Verbal Interpretation
Satisfaction with colleagues	4.20	0.65	Agree	Very Satisfied
Satisfaction with students	4.19	0.52	Agree	Very Satisfied
Satisfaction with parents	4.21	0.65	Agree	Very Satisfied
Grand Mean	4.20	0.47	Agree	Very Satisfied

Scoring System: 1.00 – 1.49 = Strongly disagree (Not at all satisfied), 1.50 – 2.49 = Disagree (Slightly Satisfied), 2.50 – 3.49 = Somewhat agree (Moderately satisfied), 3.50 – 4.49 = Agree (Very Satisfied), 4.50 – 5.00 Strongly agree (Completely satisfied).

Level of Innovative Behavior

Table 4 presents a summary of the level of innovative behavior of the teachers who answered the data gathering instrument. Among the five indicators, the level of opportunity exploration is the highest ($M = 4.09$; $SD = 0.58$). The other dimensions orderly follow: idea generation ($M = 4.06$, $SD = 0.72$); idea realization ($M = 4.02$; $SD = 0.67$); idea promotion ($M = 3.92$; $SD = 0.79$) and idea sustainability ($M = 3.87$; $SD = 0.74$). These calculations established that innovative behavior is "somewhat" visible among the respondents and is rated as "high". The grand mean is 3.99 with a standard deviation of 0.62.

Table 4. *Descriptive Statistics for Innovative Behavior*

	M	SD	Scaled Response	Verbal Interpretation
Opportunity Exploration	4.09	0.58	Somewhat like me	High
Idea Generation	4.06	0.72	Somewhat like me	High
Idea Promotion	3.92	0.79	Somewhat like me	High
Idea Realization	4.02	0.67	Somewhat like me	High
Idea Sustainability	3.87	0.74	Somewhat like me	High
Grand Mean	3.99	0.62	Somewhat like me	High

Scoring System: 1.00 – 1.49 = Not like me at all (Extremely Low), 1.50 – 2.49 = Not like me (Low), 2.50 – 3.49 = A little like me (Moderate), 3.50 – 4.49 = Somewhat like me (High), 4.50 – 5.00 = Very Much Like me (Extremely High).

Relationship Between Psychological Resources and Innovative Behavior

This study investigated the correlation of psychological factors with innovative behavior. Table 5 presents that teaching autonomy, social support, job satisfaction, as well as their cumulative structure are significantly related to all the components of teachers' innovative behavior at a 99% confidence level.

Table 5. *Correlation Between Psychological Resources and Innovative Behavior*

	Exploration	Generation	Promotion	Realization	Sustainability	Innovative Behavior
Curriculum Autonomy	0.362 ***	0.375 ***	0.320 ***	0.405 ***	0.348 ***	0.409 ***
General Autonomy	0.145 **	0.123 *	0.030	0.099	0.088	0.106
Support from Administrators	0.217 ***	0.252 ***	0.259 ***	0.268 ***	0.282 ***	0.292 ***
Support from Colleagues	0.304 ***	0.361 ***	0.291 ***	0.291 ***	0.286 ***	0.348 ***
Satisfaction with Colleagues	0.295 ***	0.309 ***	0.305 ***	0.350 ***	0.317 ***	0.358 ***
Satisfaction with Students	0.384 ***	0.303 ***	0.374 ***	0.413 ***	0.377 ***	0.419 ***
Satisfaction with Parents	0.331 ***	0.291 ***	0.358 ***	0.484 ***	0.442 ***	0.433 ***

Note. * $p < .05$, ** $p < .01$, *** $p < .001$

Results show that among the specific indicators of psychological resources, amazingly, satisfaction with parents ($r = 0.433$, $p < .001$) and students ($r = 0.419$, $p < .001$) as well as curriculum autonomy ($r = 0.409$, $p < .001$) are among the highest correlates of innovative behavior. Satisfaction ($r = 0.358$, $p < .001$) and support ($r = 0.348$, $p < .001$) from colleagues and administrators ($r = 0.292$, ($r = 0.358$, $p < .001$)) are also associated with innovative behavior. On the other hand, general autonomy ($r = 0.106$) was not correlated with innovative behavior.

Determinants of Innovative Behavior

This study also identified psychological resources that determine innovative behavior. The four models generated in the regression analysis are presented in Table 6.

Table 6. Predictors of Innovative Behavior

		Unstandardized Coefficients		Standardized Coefficients			R	R ²	ΔR^2	F	p
Model		B	Std. Error	Beta	t	Sig.					
1	(Constant)	2.257	.204		11.039	.000		.187	.187	74.058	.000 ^b
	Satisfaction with parents	.413	.048	.433	8.606	.000					
2	(Constant)	.676	.309		2.187	.029					
	Satisfaction with parents	.336	.047	.352	7.198	.000		.283	.096	63.182	.000 ^c
	Curriculum Autonomy	.423	.065	.320	6.534	.000					
3	(Constant)	.439	.309		1.421	.156					
	Satisfaction with parents	.298	.047	.312	6.369	.000					
	Curriculum Autonomy	.369	.065	.278	5.673	.000		.315	.032	48.829	.000 ^d
	Support from colleagues	.156	.041	.189	3.835	.000					
4	(Constant)	.234	.319		.734	.464					
	Satisfaction with parents	.229	.055	.241	4.208	.000					
	Curriculum Autonomy	.330	.067	.249	4.954	.000		.327	.012	38.580	.000 ^e
	Support from colleagues	.147	.040	.178	3.620	.000					
	Satisfaction with students	.168	.071	.141	2.384	.018					

a. Dependent Variable: Innovative Behavior

Stepwise regression was used to determine significant predictors of innovative behavior from the psychological resources that were included in the study. There are four significant models generated in the results. The fourth model identified curriculum autonomy with the highest weight ($\beta = .249$), followed by satisfaction with parents ($\beta = .241$), support from colleagues ($\beta = .178$), and satisfaction with students ($\beta = .141$). Hence, these indicators of psychological resources are predictors of innovative behavior.

Discussion

The results determined that the teachers who responded have “strong” degree of psychological resources in terms of teaching autonomy, social support, and job satisfaction. This means that they have desirable quality of resources to draw from that affects how they assess new events and allow them to embrace changes and innovation.

Yolcu and Akar-Vural (2021) assessed the instructional autonomy practices of teachers. They concluded that teachers who have showed a “high” degree of autonomy tend to be very flexible in the enrichment of the learning process and carry out innovative practices. Additionally, they are motivated to learn ways to exert more effort towards the development of their students.

Minghui et al. (2018) argued that social support contributes to teachers' improvement of their quality of teaching. Since teachers who took part in this study have “high” levels of obtained social support, they are more encouraged to innovate for the welfare of their colleagues, students, and parents. Thus, they become more open to new experiences to sustain excellence in teaching.

Zakaria et al. (2021) emphasized that a pleasant working atmosphere and wholesome association are important to guarantee an excellent level of teacher's work. Even if the teachers who participated in the current study have already a “strong” level of psychological resources, their organizations should endeavor to maintain or even exert more effort to improve these factors that could influence desirable behaviors

The results of this study indicated that teachers have highly desirable behaviors to innovate. Trapitsin (2018) summarized the innovative behavior of the respondents as their attitude towards innovation, their willingness, and competence to develop new educational tools and practices.

Therefore, with the high level of teachers' behavior to innovate, it implies that they are ready to participate in innovative exercises: to identify possibilities to make new solutions; to create new ideas whenever they recognize opportunities; to encourage others to support innovations; to implement new creations; and to withstand innovations.

However, the scores are not so high, especially on the level of sustainability. Thus, there is a need to identify more factors that may contribute to increased innovative behavior, so that educational institutions can provide proper programs and policies to address this need.

The results confirmed that teaching autonomy influences the innovative behavior of teachers. According to Baharuddin et al. (2019), autonomy permits teachers to experiment with different methods and approaches in teaching. They added that autonomy provides a sense of control to teachers over their work that will trigger creativity arising from internal motivation. Also, it provides opportunities for teachers to discover alternative procedures and methods that can eventually create innovation in the bigger picture. Lastly, autonomy also intensifies the feeling of concern towards someone's job, and this can increase positive behavior like idea generation.

The findings of this study that relate teaching autonomy with innovative behavior are also evident in previous studies. Literature has positively linked autonomy with creativity, active collaboration of knowledge, and innovative work behavior (Runhaar et al., 2016; Werleman, 2016; Awang-Hashim et al., 2017, Messmann et al., 2021). Thus, since autonomy shows significant correlations, school leaders should give teachers appropriate discretion over how they execute their work.

Additionally, the positive relationship between social support from their administrators and colleagues to innovative behavior was also established in the results. Rahmawati et al. (2020) also argued that, to innovate teachers must be guided and supported. Likewise, he also found that colleagues' support appears to give the greatest influence. However, he also added that principals or school administrators need to offer support, such as giving creative feedback and open communication. Accordingly, happiness is a multidimensional structure that includes satisfaction and autonomy.

Most importantly, job satisfaction has been identified to be the highest correlation of innovative behavior among the three psychological resources considered in this study. Blömeke et al. (2021) also conducted a study involving school innovativeness. Their results confirmed that job

satisfaction is one of the factors that is associated with the innovativeness of teachers. Azi and Augustine (2016) also argued that job satisfaction inspires teachers to innovate by creating alternative ways of transferring knowledge to their students.

The results of this study provide additional evidence that autonomy, social support, and job satisfaction are good determinants of innovative behavior. Thus, school leaders should exert effort in providing a compassionate relationship and foster encouraging connections among their teachers, parents, and students. Furthermore, the education sector and school administrators should create policies to allow teaching autonomy for teachers in making decisions in the classroom.

Conclusion

The purpose of this study was to provide factors that will enhance teacher's innovative behavior. It considered teacher's autonomy, social support, and job satisfaction as indicators of psychological resources.

Findings revealed that the level of perceived psychological resources in terms of teaching autonomy, social support, and job satisfaction was high. Though the results also discovered that teachers have a high level of innovative behavior, numerical figures suggested that enhancement can still be done, especially in the aspect of idea sustainability. This implies that school leaders should identify ways to support and sustain the implementation of innovation.

It was concluded from this study that there was a positive correlation between psychological resources and innovative behavior. This means that teachers value having autonomy, support, and satisfaction in behaving innovatively. Therefore, the results of this study validate the claim of the Self-Determination Theory that teachers need to obtain freedom to exercise their job, affirmation of support and fulfillment in their jobs to demonstrate innovation. Additionally, the results of the regression analysis supported the Conservation of Resources Theory, which claimed that resources are important elements to excite a person to embrace innovation and sustain them.

Limitations and Implications

In this study, teachers characterized their psychological resources, which were limited in their perceived autonomy, social support, and job satisfaction. Teacher's autonomy was categorized as general autonomy and curriculum autonomy. Social support from administrators and colleagues was considered. While relationships with colleagues, parents and students were classified for job satisfaction. While results implied that these are significant predictors of innovative behavior, it is recommended that further studies should be conducted to identify more factors that enhance innovativeness because regression results revealed that only 32.7% of innovative behavior was determined by the variables included in the psychological resources.

Nevertheless, the results of this study should guide administrators to provide autonomy for teachers. Specifically, they should be given the freedom to select content, materials, goals, and teaching methods they will use in their classes.

A friendly environment that encourages support from colleagues should be fostered. Thus, institutions should continue to provide needed support for their teachers by encouraging a warm relationship with each other. Giving teachers the needed support encourages them to innovate and share their innovations with their colleagues.

Lastly, it is worth noting that satisfaction in terms of relationship with parents and students predicts innovative behavior. Thus, a sensible social environment should be encouraged. Open communication with parents, students, and teachers should be established. Teachers who are fulfilled are prepared to create and share innovative ideas.

References

- [1] Addimando, L. (2019). The Effect of Positive Working Conditions on Work Engagement and Teaching Classroom Practices: A Large Cross-Sectional Study in Switzerland. *Frontiers in Psychology*, 10. <https://doi.org/10.3389/fpsyg.2019.02129>
- [2] Awang-Hashim, R., Thaliah, R., & Kaur, A. (2017). A cultural insight into the development of teacher autonomy support scale: A self-determination theory perspective. *Journal for Multicultural Education*, 11(4), 287–305. <https://doi.org/10.1108/JME-09-2016-0050>
- [3] Azi, D. S., & Augustine, A. S. (2016). Enhancing job satisfaction for teachers: A strategy for achieving transformation of secondary education in Nigeria. *Journal of Education and Practice*, 7(13). <https://files.eric.ed.gov/fulltext/EJ1102821.pdf>
- [4] Baharuddin, M. F., Masrek, M. N., & Shuhidan, S. M. (2019). Innovative work behaviour of school teachers: A conceptual framework. *International E-Journal of Advances in Education*, 213–221. <https://doi.org/10.18768/ijaedu.593851>
- [5] Bawuro, F. A., Danjuma, I., & Wajiga, H. (2018). Factors influencing innovative behaviour of teachers in secondary schools in the North East of Nigeria. *Path of Science*, 4(3), 1007–1017. <https://doi.org/10.22178/pos.32-9>
- [6] Blömeke, S., Nilsen, T., & Scherer, R. (2021). School innovativeness is associated with enhanced teacher collaboration, innovative classroom practices, and job satisfaction. *Journal of Educational Psychology*, 113(8), 1645–1667. <https://doi.org/10.1037/edu0000668>
- [7] Deci, E. L., & Ryan, R. M. (2012). Self-determination theory. In P. A. M. Van Lange, A. W. Kruglanski, & E. T. Higgins (Eds.), *Handbook of theories of social psychology* (pp. 416–436). Sage Publications Ltd. <https://doi.org/10.4135/9781446249215.n21>
- [8] Evans, D. (2019, May 3). *Does raising teacher salaries improve performance?* Pacific Standard. <https://psmag.com/education/what-do-teacher-salaries-do-to-teacher-performance>
- [9] Hobfoll, S.E. (1989). Traumatic stress: A theory based on rapid loss of resources. *Anxiety Research*, 4(3), 187–197. doi: 10.1080/08917779108248773
- [10] Jackson, D. O. (2018). Teacher Autonomy. *The TESOL Encyclopedia of English Language Teaching*, 1–6. <https://doi.org/10.1002/9781118784235.eelt0221>
- [11] Klæijnsen, A., Vermeulen, M., & Martens, R. (2017). Teachers' Innovative Behaviour: The Importance of Basic Psychological Need Satisfaction, Intrinsic Motivation, and Occupational Self-Efficacy. *Scandinavian Journal of Educational Research*, 62(5), 769–782. <https://doi.org/10.1080/00313831.2017.1306803>
- [12] Korte, D., & Simonsen, J. (2018). Influence of Social Support on Teacher Self-Efficacy in Novice Agricultural Education Teachers. *Journal of Agricultural Education*, 59(3), 100–123. <https://doi.org/10.5032/jae.2018.03100>
- [13] Lambriex-Schmitz, P., van der Klink, M. R., Beausaert, S., Bijker, M., & Segers, M. (2020). Towards successful innovations in education: Development and validation of a multi-dimensional Innovative Work Behaviour Instrument. *Vocations and Learning*, 13(2), 313–340. <https://doi.org/10.1007/s12186-020-09242-4>
- [14] Lennert Da Silva, A. L., & Mølsted, C. E. (2020). Teacher autonomy and teacher agency: a comparative study in Brazilian and Norwegian lower secondary education. *The Curriculum Journal*, 31(1), 115–131. <https://doi.org/10.1002/curj.3>
- [15] Liisi. (2022). *The biggest challenges to education today: Teacher Finder*. Teacher Finder Blog. Retrieved June 19, 2022, from <https://blog.weareteacherfinder.com/blog/biggest-challenges-education-today/>
- [16] Lu, M., Yang G., Skora E., Wang G., Cai Y., Sun Q., et al. (2015). Self-esteem, social support, and life satisfaction in Chinese parents of children with an autism spectrum disorder. 17 70–77.

- [17]Mateo, J. (2019, July 3). *Innovative teaching seen to improve access, quality of Education*. Philstar.com. <https://www.philstar.com/other-sections/education-and-home/2019/07/04/1931942/innovative-teaching-seen-improve-access-quality-education>
- [18]Messmann, G., Evers, A., & Kreijns, K. (2021). The role of basic psychological needs satisfaction in the relationship between transformational leadership and innovative work behavior. *Human Resource Development Quarterly*. Published. <https://doi.org/10.1002/hrdq.21451>
- [19]Minghui, L., Lei, H., Xiaomeng, C., & Potmėšilc, M. (2018). Teacher Efficacy, Work Engagement, and Social Support Among Chinese Special Education School Teachers. *Frontiers in Psychology*, 9. <https://doi.org/10.3389/fpsyg.2018.00648>
- [20]Pepe, A., Addimando, L., & Veronese, G. (2017). Measuring teacher job satisfaction: Assessing invariance in the Teacher Job Satisfaction Scale (TJSS) across six countries. *Europe's Journal of Psychology*, 13(3), 396–416. <https://doi.org/10.5964/ejop.v13i3.1389>
- [21]Pearson, L. C., & Hall, B. W. (1993). Initial Construct Validation of the Teaching Autonomy Scale. *The Journal of Educational Research*, 86(3), 172–178. <https://doi.org/10.1080/00220671.1993.9941155>
- [22]Quaranta, J. (2017). Descriptive correlational research: Asthma management by school nurses. In *SAGE Research Methods Cases*. <https://www.doi.org/10.4135/9781526407696>
- [23]Rahmawati, I., Fajar Ghifariand, R., & Lestari, H. (2020). Enhancing the Effectiveness of Teacher Work and Teams. *KnE Social Sciences*. Published. <https://doi.org/10.18502/kss.v4i14.7907>
- [24]Runhaar, P., Bednall, T., Sanders, K., & Yang, H. (2016). Promoting VET teachers' innovative behaviour: exploring the roles of task interdependence, learning goal orientation, and occupational self-efficacy. *Journal of Vocational Education and Training*. <https://doi.org/10.1080/13636820.2016.1231215>
- [25]Serdyukov, P. (2017). Innovation in education: what works, what doesn't, and what to do about it? *Journal of Research in Innovative Teaching & Learning*, 10(1), 4–33. <https://doi.org/10.1108/jrit-10-2016-0007>
- [26]Southern, R.K. (2018). Teacher autonomy and centralization: Predicting school effectiveness. (Doctoral Dissertation). https://ir.ua.edu/bitstream/handle/123456789/3600/file_1.pdf?sequence=1&isAllowed=y
- [27]The World Bank. (2019). The education crisis: Being in school is not the same as learning. <https://www.worldbank.org/en/news/immersive-story/2019/01/22/pass-or-fail-how-can-the-world-do-its-homework>
- [28]Toropova, A., Myrberg, E., & Johansson, S. (2020). Teacher job satisfaction: the importance of school working conditions and teacher characteristics. *Educational Review*, 73(1), 71–97. <https://doi.org/10.1080/00131911.2019.1705247>
- [29]Trapitsin, S. (2018). Innovative Behavior of Teachers: Definition And Analysis. *The European Proceedings of Social and Behavioural Sciences*. Published. <https://doi.org/10.15405/epsbs.2018.12.02.37>
- [30]Umamah, N., Sumardi, Marjono, Surya, R. A., & Muffida, E. (2021). Teachers' ability analysis of developing innovative instructional design. *IOP Conference Series: Earth and Environmental Science*, 747(1), 012070. <https://doi.org/10.1088/1755-1315/747/1/012070>
- [31]Werleman, A. A. (2016). Master Thesis Human Resources Studies The Effect of Enriched Job Design on Innovative Work Behaviour.
- [32]Yolcu, O., & Akar-Vural, R. (2021). An Examination of Instructional Autonomy Practices of Science Teachers. *International Journal of Educational Methodology*, 7(1), 79–94. <https://doi.org/10.12973/ijem.7.1.79>
- [33]Zakaria, Z., Don, Y., & Yaakob, M. F. M. (2021). Teachers' well-being from the social psychological perspective. *International Journal of Evaluation and Research in Education (IJERE)*, 10(2), 641. <https://doi.org/10.11591/ijere.v10i2.21115>

Interpersonal and Intrapersonal Skills and Academic Achievement of Students at Middle Schools in Manado

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Abstract: This quantitative study was intended to describe intrapersonal and interpersonal skills among middle school students and how these two skills were associated with the student's English language achievement. This study also explored how the skills differed in the students based on their class levels. There were 192 respondents taken randomly from two middle schools in Manado, North Sulawesi. A reliability test was conducted prior to the distribution of the questionnaire to collect data from the respondents. The collected data underwent normality and linearity tests, fulfilling the assumption for possible correlation analysis using parametric statistics. The descriptive statistics analysis showed that the intrapersonal skill was high while the interpersonal skill was average. One-way ANOVA with multiple comparisons resulted in no significant difference in the intrapersonal and interpersonal skills of the respondent students in the three grade levels. With Pearson bivariate correlation analysis, it was found that interpersonal skill was significantly associated with English language achievement.

Keywords: *interpersonal skill, intrapersonal skill, academic achievement*

Introduction and Literature Review

English Achievement is one of the prominent indicators of educational success in Indonesia. Those with higher achievement in English learning are more likely to be able to communicate in this technologically disruptive era. It also has become a status symbol and prestige in present Indonesian society. Various factors affect English achievement, wherein some studies have explored how emotional intelligence affects academic achievement, including English learning outcomes. Interpersonal and intrapersonal skills, which come under emotional intelligence or multiple intelligences, are more beneficial in schools, in terms of academic achievement and social life, and in workplaces, in terms of human resource qualification and professional development. Research by Schawarz and Comer (2018) revealed that about 70% of successful people in life were closely related to interpersonal relationships with soft skills that resided under the affective domain rather than intellectual development within the cognitive domain and vocational acquisition within the psychomotor domain. Tolchah and Arfan Mu'ammam (2019), in their study, revealed that achievement was closely associated with the development of personality, including skills to manage emotion demonstrated in the ability to work together with other people.

In 2020, in the introduction to the 25th-anniversary edition of his book, Goleman (1998), the earliest proponent of emotional intelligence, stated that the benefits to companies were contributed by the workers with high levels of emotional intelligence who demonstrated "better productivity, higher employee satisfaction, growing market share, and fewer defections" and for employees, the benefits included "a greater sense of well-being" (p. xv). In addition, Bharwaney, Bar-On, and MacKinlay (2007) reported their research finding that when applied in workplaces, emotional intelligence contributed to the workers' performance, leadership, and productivity. Moreover, in the education world, Goleman urged the promotion of teaching the skills which now come under the name of social/emotional education for children, especially in referring to the results of the study, which involved 750,000 students who participated in social/emotional education, revealing that there was a significant reduction in anti-social behavior, like bullying and drug abuse, along with good attendance and enjoying school. In addition, he encouraged researchers to keep exploring this core skill since it has become more important due to the inevitable impact of social media in the community.

Initially, interpersonal and intrapersonal skills have been components of Multiple Intelligence (Gardner, 1983) and Emotional Intelligence (BarOn, 2000), which modified the earlier proponent of Emotional Intelligence coined by Goleman (1995). Gardner (1993) initially advocated Multiple Intelligences Theory in seven different intelligence, including: linguistic, musical, logical/mathematical, spatial, bodily/kinesthetic, and personal (consisting of interpersonal and intrapersonal). Gardner (1999) elaborated the intelligence into further expansion of nine intelligence: verbal-linguistic, logical/mathematical, musical, visual-spatial, bodily/kinesthetic, interpersonal, intrapersonal, naturalist, and existential.

Goleman (1995) first proposed emotional intelligence in four domains: self-awareness, self-management, social awareness, and relationship management. Based on Goleman's emotional intelligence, BarOn (2000) developed a measure of emotional intelligence that consisted of five composite scales: intrapersonal component, interpersonal component, stress management, adaptability, and general mood. BarOn's (2000) interpersonal component deals with self-awareness and self-expression, most likely to Goleman's domain of self-awareness and self-management, while the intrapersonal domain deals with social awareness and relationship management. Both Gardner (1995) and BarOn (2000) included interpersonal and intrapersonal intelligence or skill in their conception of multiple intelligences and emotional intelligence. Gardner has equated these two skills with emotional intelligence (Sternberg, 2012). Baron (2000) apparently developed his Emotional Quotient Inventory by combining Gardner's multiple intelligences theory with Goleman's (1998) emotional intelligence.

Interpersonal Skill and Intrapersonal Skill

As one of the nine multiple intelligences of Gardner (1995), this interpersonal skill refers to an individual ability to understand and deal with other people. It is the capacity to be aware of others' intentions, feelings, concerns, needs, motivations, and moods, temperaments, desires that result in the ability to build and maintain cooperative and constructive relationships. Theoretically, those with high interpersonal intelligence have the skill to communicate easily and effectively because they have empathy with those around them, even amid difficult situations like debates and differences. In other words, people with high interpersonal skills can build a relationship and cooperation with others, bringing about mutual benefits. They know how to identify with a social group and deal easily with those around them, either as leaders or followers.

The intrapersonal skill refers to someone's ability to be self-aware of weaknesses and strengths in emotions, including desires, fears, joys, sadness, and capacities. This skill also refers to an individual's ability to express oneself constructively to others while governing emotions independently from others. Self-awareness includes self-introspection, self-assessment, and self-reflection, including daydreaming and exploring relationships with others, which would bring about self-confidence and self-reliance. Those with high intrapersonal skills have the capacity to accept themselves as unique individuals and thus develop and grow confidently to achieve their goals in life and pursue their dreams to come true.

Many writers, including Gardner, the proponent of multiple intelligences, have equated both interpersonal and intrapersonal skills, as parts of multiple intelligences, with Goleman's emotional intelligence (Sternberg, 2012). So when emotional intelligence was discussed, it was none other than a discussion of emotional intelligence (Chan, 2008; Okwuduba et al., 2021). In addition, the definition of emotional intelligence, as advocated by Bar-On (2000), includes someone's ability to recognize, manage, and control an individual's feelings, with social intelligence, which includes respect for others, cooperation, tolerance, and communication (Zhao et al., 2020). Multiple intelligence and emotional intelligence might have appeared differently, but they have almost anything in common, with special emphasis on interpersonal and intrapersonal skills.

Related Studies

Emotional intelligence has been shown to be significantly associated with academic achievement (Thomas et al., 2017; Chan, 2008; Thomas & Allen, 2021; Yee Von et al., 2022). Nevertheless, studies on the relationship between these two variables revealed different results. Three examples of results in significant positive relationships, such as those of Maraichelvi and Rajan (2013) with 300 Indian final-year undergraduate student respondents, reported that academic achievement was significantly correlated with both interpersonal and intrapersonal components within the four components of emotional intelligence. Nasir and Masrur's (2010) study with respondents of 132 Pakistani students of International Islamic University Islamabad revealed that there was a significant relationship between academic achievement and interpersonal and intrapersonal components within emotional intelligence. Okwuduba et al. (2021), and 443 Nigerian student respondents, who enrolled in pre-university science programs, analyzed the data with the hierarchical regression analysis and revealed that student academic performance was positively predicted by perceived Interpersonal and Intrapersonal.

The insignificant correlation was found in the studies of Fallahzadeh (2011) with 223 Iranian medical science student respondents who came up with the results that there was no significant association between interpersonal scale and intrapersonal scale with Grade Point Average. Likewise, Afandi and Bakar (2019), with 100 Malaysian university student respondents, reported that there was no significant correlation between the constructs of interpersonal and intrapersonal within academic achievement. And Pérez, et al. (2014), with 480 Spanish high school student respondents, reported that academic achievement was not significantly correlated with interpersonal and intrapersonal intelligence.

Studies with mixed results were reported by firstly Zahed-Babelan, and Moenikia (2010) with 328 Iranian university student respondents reported that the components of emotional intelligence significantly predicted students' academic achievement, wherein interpersonal relationships with negative contribution and intrapersonal components with a positive contribution to academic achievement. Secondly, Koura and Al-Hebaishi (2014) had 85 female Saudi Arabian third intermediate-grade students consisting of 43 as gifted and 42 as regular. Saudi Arabian gifted student respondents reported a significant negative correlation between intrapersonal intelligence and gifted students' scores in listening—a significant positive correlation between interpersonal intelligence and gifted students' scores in speaking.

In Indonesia, a number of related studies came up with mixed results. For example, the study of Muna, et al. (2019), using 80 respondents who were taking of package C program in *Pusat Kegiatan Belajar Masyarakat* (Center of Community Learning), reported that the learning achievement was not significantly associated with interpersonal and intrapersonal with learning achievement. Anggraini (2019), with 105 students of a public middle school, reported no significant correlation between interpersonal and intrapersonal intelligence and reading comprehension. The research findings of Mimid et al. (2020), who took 205 public middle school students, showed no significant correlation between intrapersonal or interpersonal and academic achievement. On the other hand, Fadhillah and Novianti (2021), who conducted a qualitative study with 15 3rd-grade students at one of the Islamic elementary schools, Madrasah Ibtidaiyah (MI), came up with the result that academic achievement is directly proportional to the level of students' intrapersonal intelligence. Ariyani and Hadiani (2020), with 88 student college respondents, revealed a significant relationship between interpersonal skills and academic achievement. Mulbar et al. (2018) reported there was a significant relationship between intrapersonal intelligence towards students' mathematics learning achievement by observing interpersonal intelligence, but there was no significant relationship between interpersonal intelligence and students' mathematics learning achievement by observing intrapersonal intelligence.

It is important to address the current educational setting in that the concept of learning has shifted from teacher-centered to student-centered, where the student is expected to become independent. Students with high interpersonal and intrapersonal intelligence are more likely to adjust to this student-centered learning situation. It is also deemed worthy of confirming the findings of

previous studies in the local context due to the inconsistent findings and mixed results of previous studies in Asian countries. Therefore the current study intended to examine whether or not interpersonal and intrapersonal skills affect the academic achievement, namely English learning achievement, of the middle school students in Manado. The findings of the current study were expected to be relevant information for the stakeholders of the middle school, particularly the students and the teachers, so they could make any necessary changes for betterment in learning and teaching as well as personality development.

Methodology

This quantitative study utilized descriptive and inferential statistical analysis, including comparative and correlational design. It aimed to examine whether the middle school respondents' interpersonal and intrapersonal skills differed at their class levels and how each and both of these two skills were correlated to their English language achievement.

Participants

The respondents of the current study were taken randomly from two middle schools that were managed by one private foundation in Manado, North Sulawesi, Indonesia. Out of 380 students, the sample size was calculated as a minimum of 192 respondents, with a confidence level of 95% and a margin error of 5%. The student's participation is based on willingness and availability. The 192 participants comprised 64 students of grade VII, 64 of grade VIII, and 64 of grade IX who were registered in the second semester of the 2020-2021 academic year. Their age range was 12-16 years, with an average of 14.3 years.

Instrument

The instrument of the current study was a questionnaire that was picked out of the Multiple Intelligences Checklist, which Jeanne Mancour adapted from 7 Kinds of Smart by Thomas Armstrong (1993). Unlike Armstrong, with seven intelligences, the adapted Multiple Intelligences Checklist covered eight intelligences: Linguistic, Musical, Logical-Mathematical, Interpersonal, Spatial, Intrapersonal, Bodily-Kinesthetics, and naturalist. With ten items for each intelligence, the checklist had 80 items altogether to allow respondents to self-reflection on their intelligence or gifts. This adapted checklist has been used by Tribes TLC (n.d.) to discover gifts for middle school students. The checklist provided an instruction to write a check to each and any time that seemed to apply to each respondent. In the last section of the checklist, there was a tally sheet where the respondents could write circles on the number of the checked items which were arranged in eight columns representing eight intelligences. It was so that they could easily sum up the number of the circles and the top scores from the columns representing their outstanding specific intelligence or gifts.

Extracting only the interpersonal and intrapersonal intelligence, the instrument of the current study adopted the ten items in each construct, but it was modified in a 5-point Likert scale with the description as follows: 1 = strongly disagree; 2 = disagree; 3 = unsure; 4 = agree; 5 = strongly agree, so it would be better fitted for statistical analysis using a software application. The instrument with the instruction to respond was all translated into Indonesian. This instrument underwent a test of reliability, where the interpersonal skill construct resulted in Cronbach Alpha = .71, retaining all the ten items, while the intrapersonal skill construct resulted in Cronbach Alpha = .71, removing one item.

Statistical Analysis of Data

The data taken from the questionnaire were analyzed with statistic application software to answer the research questions. Firstly, descriptive statistical analysis was used to calculate the mean scores of the interpersonal, intrapersonal, and English achievement scores. The inferential statistic was employed to analyze the significant differences and correlations among the variables under study. One-way ANOVA was used to compare whether there were significant differences in grade VII, VII, and VIX levels in terms of their interpersonal skill, intrapersonal skill, and English language

achievement. Bivariate Pearson correlation and regression analyses were employed to examine the significant relationship among the variables. The correlation and determination coefficients were analyzed to find the magnitude of the variables' relationships.

One-sample Kolmogorov-Smirnov with Lilliefors correction was used to test the normality of the data, and One-way ANOVA was used to test the linearity of the correlated variables under study.

Interpretation of Data

The current study's questionnaire was designed with a 5-point Likert scale to generate data of the independent variables interpersonal and intrapersonal skills. The interpretation of the average score of the interpersonal skill and intrapersonal skill was based on the five levels of the Likert scale as follows:

1.00 – 1.49	= very low
1.50 – 2.49	= low
2.50 – 3.49	= average
3.50 – 4.49	= high
4.50 – 5.00	= very high

The data on English achievement referred to the respondents' final test percentage scores for the semester. It was interpreted as follows:

<69	= poor
70-79	= average
80-89	= above average
90-100	= excellent

Referring to analysis of difference and correlation, the significance was determined with the significance value p , whether it was greater or less than the significance level of $\alpha = .05$. If the output of Pearson correlation analysis was less than the significance level of $\alpha = .05$, it could be inferred that there was a significant difference or correlation.

Referring to the One-sample Kolmogorov-Smirnov test, the data was normally distributed if the output showed that the p -value was greater than the significance level of $\alpha = .05$. Likewise, in the test of linearity through One-way ANOVA, the relationship between the independent variable and dependent variable was linear if the output showed that significance value of Deviation from Linearity was greater than the significance level of $\alpha = .05$.

Results

Description of Interpersonal Skills, Intrapersonal Skills, and English Achievement

Descriptive statistics were used to describe the three variables under study. As displayed in Table 1, the mean scores of interpersonal and intrapersonal skills are categorized as average level; the mean score of the English achievement was also posited at the average level.

Table 1. Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
English Achievement	192	43	95	77.01	14.341
Intrapersonal Skill	192	1.17	5.33	3.2205	1.04453
Interpersonal Skill	192	1.88	5.00	3.3405	.62378
Valid N (listwise)	192				

Differences in the Interpersonal Skill, Intrapersonal Skill and English Achievement For Students of Grade VII, VIII, and IX

With one-way ANOVA, the output showed that there were no significant differences found across the three grade levels of the respondents in terms of their interpersonal skill, intrapersonal skill, and English achievement since all the three p values were less than the significance level $\alpha = .05$ (See Table 2). It could be inferred that all three grade levels were more or less equal in terms of interpersonal, intrapersonal, and English achievement levels. The inference was supported by the three mean scores, which fell into the average level of interpersonal and intrapersonal skills for all three grade levels and the average level score of English achievement.

Table 2. *Descriptives of Grade Levels with Significance Values*

		N	Mean	Std. Deviation	Sig. (2-tailed)
Interpersonal Skill	Grade VII	64	3.3887	.67484	.601
	Grade VIII	64	3.2793	.57853	
	Grade IX	64	3.3535	.61904	
	Total	192	3.3405	.62378	
Intrapersonal Skill	Grade VII	64	3.4010	1.09581	.110
	Grade VIII	64	3.0156	.95291	
	Grade IX	64	3.2448	1.05950	
	Total	192	3.2205	1.04453	
English Achievement	Grade VII	64	74.75	15.122	.241
	Grade VIII	64	79.01	13.230	
	Grade IX	64	77.25	14.509	
	Total	192	77.01	14.341	

Correlations of Interpersonal Skill, Intrapersonal Skill, and English Achievement

Correlational analysis using parametric statistics requires tests of normality and linearity. The normality test utilized One-Sample Kolmogorov-Smirnov with Lilliefors significance correction to find whether the data of the three variables were normally distributed. Linearity test was conducted with One-way ANOVA to find the linearity of the relationship between independent and dependent variables.

The output of the normality test, as shown in Table 1, revealed that all the p values of Interpersonal skill, intrapersonal skill, and English Achievement were greater than $\alpha = .05$, implying that the data of the variables under study were normally distributed and subsequently met the assumption of correlation analysis.

Table 3. *One-Sample Kolmogorov-Smirnov Test*

		Interpersonal Skill	Intrapersonal Skill	English Achievement
N		192	192	192
Normal Parameters ^{a,b}	Mean	4.1625	3.8047	3.7874
	Std. Deviation	.35852	.35965	.35912
Most Extreme Differences	Absolute	.255	.188	.192
	Positive	.255	.122	.168

	Negative	-.180	-.188	-.182
Test Statistic		.255	.188	.180
Asymp. Sig. (2-tailed)		.198 ^c	.180 ^c	.188 ^c

a. Test distribution is Normal.

b. Calculated from data.

c. Lilliefors Significance Correction.

Table 4 shows the output of ANOVA for the linearity test of the relationship between the independent variables (interpersonal skill and intrapersonal skill) and dependent variable (English achievement). Both the significance values of Deviation for Linearity were greater than the significance level $\alpha = .05$, implying a linear relationship between interpersonal skill and English achievement as well as intrapersonal skill and English achievement.

Table 4. ANOVA for Linearity Test

			F	Sig.
English achievement * Intrapersonal skill	Between Groups	(Combined)	7.865	.000
		Linearity	29.343	.000
		Deviation from Linearity	.966	.189
English achievement * Interpersonal skill	Between Groups	(Combined)	3.359	.003
		Linearity	32.224	.000
		Deviation from Linearity	1.058	.200

A bivariate Pearson correlation formula was used to determine the magnitude and significance of the relationship between independent variables (interpersonal skill and intrapersonal skill) and dependent variables (English achievement). The correlation coefficient (r) reveals the effect's magnitude and the relationship's direction, while the significance value (p) reveals the relationship's significance. Cohen (cited in Pallant, 2020) suggested the following three levels of magnitude: small ($r = .10 - .29$), medium ($r = .30 - .49$), and large ($r = .50 - 1.00$). The output in Table 5 revealed that the correlation coefficient r was positive, and the figure indicated a small effect on the relationship between interpersonal skills and English achievement. At the same time, it was a positive direction with a medium effect on the relationship between intrapersonal skill and English achievement.

Furthermore, for the relationship between interpersonal skill and English achievement, shown in Table 5 that the significance value p was greater than the significance level $\alpha = .05$. It indicated that there was no significant relationship between interpersonal skill and English achievement. However, for the relationship between intrapersonal skill and English achievement, the significance value p was less than was greater than the significance level $\alpha = .05$, indicating the significant relationship between interpersonal skill and English achievement. With the positive value of the correlation coefficient, it could be inferred that the significant relationship was positive. It meant the higher score in English achievement was significantly associated with the respondents' higher level of intrapersonal skill.

Table 5. *Pearson Correlation between Variables*

		English Achievement
Interpersonal Skill	Pearson Correlation	.175
	Sig. (2-tailed)	.318
	N	192
Intrapersonal Skill	Pearson Correlation	.413**
	Sig. (2-tailed)	.000
	N	192

Linear Regression Analysis of Joint Interpersonal Skill and Intrapersonal Skill towards English Achievement

Linear regression analysis with Enter method was carried out wherein both interpersonal and intrapersonal skills were independent variables, and English achievement was dependent. The output shown in Table 6 confirmed the significance of the relationships analyzed with Pearson correlation, wherein only the intrapersonal skill had a significant or large effect of contributing to the English achievement due to the much larger figure of standardized positive Beta coefficient intrapersonal skill ($\beta = .54$) compared to interpersonal skill ($\beta = -.09$).

Table 6. *Coefficients^a*

		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
Model		B	Std. Error	Beta		
1	(Constant)	59.977	5.213		11.506	.000
	Intrapersonal Skill	7.372	.858	.537	8.590	.000
	Interpersonal Skill	-2.010	1.437	-.087	-1.398	.164

a. Dependent Variable: English Achievement

Discussion

The results of the current study showed that the student respondents of the middle school in Manado were posited in the average level of English achievement, interpersonal skill, and intrapersonal skill, and there was no grade level better than the others. This is an indication of a mediocre situation.

The intrapersonal skill affected significantly and positively English achievement. Similar studies in India, Pakistan, and Nigeria have shown that university students' intrapersonal skill affected their academic achievement (Nasir & Masrur, 2010; Maraichelvi & Rajan, 2013; Okwuduba et al. (2021). It was obvious for students with good intrapersonal skill because they are marked with self-reliance and is confident and independent to work on their learning goals and subsequently a high score in English achievement.

Intrapersonal skill was not significantly associated with English achievement. The studies of Zahed-Babelan and Moenikia (2010) and Fallahzadeh (2011) in Iran, Afandi and Bakar (2019) in Malaysia, and Pérez, et al. (2014) in Spain had similar findings to that of the current study. Also, in Indonesia, similar results in the studies of Muna, et al. (2019), Anggraini (2019), and Mulbar, et al. (2018). Those with good interpersonal skills are known for their good social life, where they can make new friends easily and even the leaders whom those around them will come for advice or something else. Their time must be spent more on this kind of social life—no wonder interpersonal skill was not significantly associated with English achievement.

This was the situation in the local context of the middle school in Manado. It might be different from other schools in different places.

Conclusion

The primary purpose of the current study was to describe, compare, and correlate the three variables: interpersonal skill, intrapersonal skill, and academic achievement for the three grade levels of middle school students in Manado. These three variables are important factors for better job opportunities as well as successful career development. The results of the current study revealed similarities to those in some other countries in Asia, even though the current study focused on the local context within Indonesia. Interpersonal skills and intrapersonal skills might and might not be significantly associated with English achievement. This study showed that higher levels of intrapersonal skill were significantly associated with higher English achievement, while interpersonal skills did not show any significant effects on English achievement. The middle school students were in a mediocre situation regarding English achievement and interpersonal and intrapersonal skills. It all meant that the stakeholders must do something about English learning in relation to intrapersonal skill development to climb to a higher place so they can become better prepared for this inevitable competition around us.

Limitations and Implications

The study's respondents were limited to two middle schools managed by one sectarian educational foundation, so it could not come to a generalization for the whole city of Manado. The questionnaire, despite its special design for middle school students, had an origin in the United States. The number of variables was small. Further similar studies are recommended by covering more independent variables and with more comprehensive statistical analysis wherein each item of the independent variable constructs could be linked to the dependent variable. However, this study was intently set out to meet the local setting so the implications could be more specific to the students, teachers, and administrators of the middle school in the city of Manado. Whatever similarities could be implied extensively to other schools were much welcome to learn.

The mediocre situation could imply that the students, as well as the middle school, were not fully aware of the important roles of the English language and the big contribution of interpersonal and intrapersonal skills in terms of living life to face the challenges of a disruptive era due to the advance of information and communication technology. For example, the grade VIII and IX students seemingly did not make any better than grade VII students in their interpersonal and intrapersonal skills, which contributed much to success in shaping a better future career. If more efforts could be put into this to increase intrapersonal skills, be it by the respondents on their own and by their teachers and school culture, a higher score in English achievement could be assured and subsequently success in academics as well as prestige in the society. Students with high English achievement could be better able to cope with global communication challenges due to the advance of information and communication technology. In addition, despite their insignificant relationship with English achievement, interpersonal skill is also known as one of the significant contributors alongside intrapersonal skill to succeed in a career. So the stakeholders of the middle school in Manado should do something to make any betterment regarding these two skills so the students could be better prepared for their higher scores in English achievement and satisfying future job opportunities.

References

- [1] Afandi, N. S., & Bakar, A. Y. A. (2019). Emotional intelligence and academic achievement among Management and Science University's (MSU) School of Education and Social Sciences (SESS) students. *Bisma the Journal of Counseling*, 3(2), 58-65. DOI: <http://dx.doi.org/10.23887/bisma.v3i2>

- [2] Anggraini, T. R. (2019). *The correlation between interpersonal and intrapersonal intelligence and the reading comprehension of the eight grade students of SMP Negeri 13 Palembang*. Unpublished thesis, Sriwijaya University, Palembang, Indonesia.
<http://repository.unsri.ac.id/id/eprint/2605>
- [3] Ariyani, E. D., & Hadiani, D. (2020). Keterampilan komunikasi interpersonal antar mahasiswa dan hubungannya dengan capaian prestasi akademik. *Jurnal Sosial Humaniora dan Pendidikan*, 4(2), 141-149. <https://jurnal.poltekba.ac.id/index.php/jsh/article/view/849/569>
- [4] Armstrong, T. (1993). *7 kinds of smart: identifying and developing your multiple intelligences*. Plume Books.
- [5] Bar-On, R. (2000). *Emotional and social intelligence; handbook of emotional intelligence*. San ferns
- [6] Bharwaney, G., Bar-On, R. & MacKinlay, A. (2007). *EQ and the bottom line: emotional intelligence increases individual occupational performance, leadership and organisational productivity*. Ei-World. https://www.eiconsortium.org/pdf/Bharwaney_BarOn_MacKinlay_EQ_and_Bottom_Line.pdf
- [7] Chan, D. W. (2008). Emotional intelligence, self-efficacy, and coping among Chinese prospective and in-service teachers in Hong Kong. *Educational Psychology*, 28(4), 397-408. <https://doi.org/10.1080/01443410701668372>
- [8] Fadhillah, D., & Novianti, E. (2021). Bagaimana Pola Asuh Orang Tua dan Kecerdasan Intrapersonal Menjelaskan Prestasi Belajar Siswa?. *Jurnal Pendidikan Dasar Nusantara*, 7(1), 17-35. <https://doi.org/10.29407/jpdn.v7i1.15361>
- [9] Fallahzadeh, H (2011). The relationship between emotional intelligence and academic achievement in medical science students in Iran. *Procedia - Social and Behavioral Sciences*, 30, 1461-1466. <https://doi.org/10.1016/j.sbspro.2011.10.283>
- [10] Gardner, H. (1983). *Frames of mind: the theory of multiple intelligences*. Basic Books
- [11] Gardner, H. (1993). *Multiple intelligences: the theory in practice*. Basic Books.
- [12] Gardner, H. (1999). *Multiple intelligences for the 21st century*. Basic Books.
- [13] Goleman, D. (1995). *Emotional intelligence: what it can matter more than IQ*. Bantam Books.
- [14] Goleman, D. (1998). *Working with emotional intelligence*. Bantam Books.
- [15] Koura, A. A., & Al-Hebaishi, S. M. (2014). The relationship between multiple intelligences, self- efficacy and academic achievement of Saudi gifted and regular intermediate students. *Educational Research International*, 3(1), 48-79.
[http://www.erint.savap.org.pk/PDF/Vol.3\(1\)/ERInt.2014\(3.1-05\).pdf](http://www.erint.savap.org.pk/PDF/Vol.3(1)/ERInt.2014(3.1-05).pdf)
- [16] Maraichelvi, A., & Rajan, S. (2013). The relationship between emotional intelligence and the academic performance among final year under graduates. *Universal Journal of Psychology* 1(2): 41-45. DOI: 10.13189/ujp.2013.010203
- [17] Mimid, L. G., Kasmairi, & Elfrida (2020). Correlation between multiple intelligence and English academic performance of EFL learners of 11th grade students senior high school. *Journal of English Education and Teaching*, 4(1), 69-86.
<https://ejournal.unib.ac.id/index.php/JEET/article/view/9551/5211>
- [18] Mulbar, U., Arwadi, F., & Assagaf, S. F. (2018). The influences of intrapersonal intelligence and interpersonal intelligence towards students' Mathematics learning outcomes. *Advances in Social Science, Education and Humanities Research (ASSEHR)*, volume 227. 1st International Conference on Advanced Multidisciplinary Research (ICAMR 2018).
<https://www.atlantis-press.com/proceedings/icamr-18/55916893>
- [19] Muna, S. N., Siti Asmah, & Wahyuni, S. (2019). Pengaruh keterampilan intrapersonal dan interpersonal terhadap prestasi warga belajar kesetaraan Paket C di PKBM se-Kecamatan Lowokwaru Malang. *Jurnal Pendidikan Non-Formal*, 14 (1), 37-53.
<http://journal2.um.ac.id/index.php/JPN/article/view/8189/3884>
- [20] Nasir, M. & Masrur, R. (2010). An exploration of emotional intelligence of the students of IUI in relation to gender, age and academic achievement. *Bulletin of Education and*

- Research*, 32 (1), 37-51.
<https://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.468.5311&rep=rep1&type=pdf>
- [21] Okwuduba, E. N., Nwosu, K. C., Okigbo, E. C., Samuel, N. N. & Achugbu, C. (2021). Impact of intrapersonal and interpersonal emotional intelligence and self-directed learning on academic performance among pre-university science students. *Heliyon*, 7(3), 1-11
<https://doi.org/10.1016/j.heliyon.2021.e06611>
- [22] Pallant, J. (2020). *SPSS survival manual: a step by step guide to data analysis using IBM SPSS*, 7th ed. Open University Press.
- [23] Pérez, L. M. R., Nieto, M. P., Otero, I. R., Amengual, A. R., & Manzano, J. A. N. (2014). Relationships among multiple intelligences, motor performance and academic achievement in secondary school children. *International Journal of Academic Research Part B*, 6(6), 69-76.
<https://core.ac.uk/download/pdf/148673337.pdf> DOI: 10.7813/2075-4124.2014/6-6/B.10
- [24] Schawarz, M. & Comer, D.R. (2018). Morality and mortality: why the Church of England would have rejected Walzer's supreme emergency argument. *Journal of Beliefs and Values*, 39 (4), 490-501, doi: 10.1080/13617672.2018.1441350.
- [25] Sternberg, R. J. (2012). Intelligence. *Dialogues in Clinical Neuroscience*, 14, 19-27.
<https://doi.org/10.31887/DCNS.2012.14.1/rsternberg>
- [26] Thomas, C. L., Cassady, J. C., & Heller, M. L. (2017). The influence of emotional intelligence, cognitive test anxiety, and coping strategies on undergraduate academic performance. *Learning and Individual Differences*, 55, 40–48. <https://doi.org/10.1016/j.lindif.2017.03.001>
- [27] Thomas, C.L., & Allen, K., 2021. Driving engagement: investigating the influence of emotional intelligence and academic buoyancy on student engagement. *Journal of Further Higher Education*, 45(1), 107–119. <https://doi.org/10.1080/0309877X.2020.1741520>
- [28] Tolchah, M. & Mu'ammam, M. A. (2019). Islamic education in the globalization era; challenges, opportunities, and contribution of Islamic education in Indonesia. *Humanities and Social Sciences Reviews*, 7 (4), 1031-1037, doi: 10.18510/hssr.2019.74141.
- [29] Tribes TLC (n.d.). *Multiple intelligences checklist*.
https://www.wtc.ie/images/pdf/Multiple_Intelligence/mi7.pdf
- [30] Yee Von, C., Zhooriyati, S. M., & Chuan, H. M. (2022). The Relationship Between Emotional Intelligence (EI), Parental Involvement and Academic Performance among University Students in Kuala Lumpur and Selangor. *International Journal of Academic Research in Business and Social Sciences*, 12(5), 565 – 577. <http://dx.doi.org/10.6007/IJARBSS/v12-i5/13148>
- [31] Yee Von, C., Zhooriyati, S. M., & Chuan, H. M. (2022). The Relationship Between Emotional Intelligence (EI), Parental Involvement and Academic Performance among University Students in Kuala Lumpur and Selangor. *International Journal of Academic Research in Business and Social Sciences*, 12(5), 565 – 577. <http://dx.doi.org/10.6007/IJARBSS/v12-i5/13148>
- [32] Zahed-Babelan, A. & Moenikia, M. (2010). The role of emotional intelligence in predicting students' academic achievement in distance education system. *Procedia - Social and Behavioral Sciences*, 2(2), 1158-1163. <https://doi.org/10.1016/j.sbspro.2010.03.164>
- [33] Zhao, J.L., Cai, D., Yang, C.Y., Shields, J., Xu, Z.N., & Wang, Y. W. (2020). Trait Emotional Intelligence and Young Adolescents' Positive and Negative Affect: The Mediating Roles of Personal Resilience, Social Support, and Prosocial Behavior. *Child Youth Care Forum* 49, 431–448 (2020). <https://doi.org/10.1007/s10566-019-09536-2>
- [34] Zhoc, K. C. H., King, R. B., Chung, T. S. H., & Chen, J. (2020). Emotionally intelligent students are more engaged and successful: Examining the role of emotional intelligence in higher education. *European Journal of Psychology of Education*, 35(4), 839–863. doi: 10.1007/s10212-019-00458-0

Board Competency for Fiduciary Governance Responsibilities: Basis for Competency and Fiduciary Enhancement Programs

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Abstract: The challenge of good governance is paramount in higher education institutions today. The board of trustees system is one of the vital instruments in the governance of Higher Education Institutions around the world. This study aimed to explore the current practices of board competency and the duties of the board of trustees in selected schools in the Southern Asia Pacific region. One hundred fifteen respondents were purposely included in the data gathering; however, one data outlier came out from the population sampling and projected an abnormal distant observation from the other samples. Thus, only 114 responses were included in the data analyses. Descriptive results show that strategic, contextual, analytical, political, educational, and interpersonal competencies are highly exhibited among the respondents. Likewise, the fiduciary governance responsibilities were highly practiced by the respondents. Correlation results proved the competency and governance responsibilities were highly correlated. The Mann-Whitney result showed that female respondents have a higher practice of fiduciary responsibilities compared to male participants. Moreover, the regression results identified that educational competency was the strongest predictor of the practice of fiduciary governance responsibilities. The results of the analyses provided recommendations and guidelines for educational competency and fiduciary enhancement programs.

Keywords: *board competency, fiduciary governance responsibilities, board development program*

Introduction

In recent years, the challenges created by globalization and internationalization have been numerous and started to shape the educational landscape of the higher education institutions (Rios, 2013 & Eldik, 2011). The evident scarcity of financial resources, unstable enrollment, high operational & capital expenditures, evolving cost of technology, & the increasing competition between faculty & administrators were the drawbacks of the modernization. (Afriyie, 2015; Canosa, 2008). These emerging educational problems demand greater institutional efficiency and effectiveness of the professional board to structure solid management that encourages strategic innovation through teamwork and mutual respect (Tyco International Ltd., 2014).

The system of school governance by the board of trustees is the most important mechanism to guide the direction of Higher Education Institutions around the world. It is the highest organizational authority in the decision and policy-making body (Arslan, 2013). Griffin (2011) emphasized that the "board of trustees shapes the direction of schools, provides the well-being of all constituencies, and are held responsible for the overall performance of the institutions they govern. The board of trustees directs the educational institution to fulfill its goals and objectives (Wilson, 2014). They were considered "the guardians of the most important trust, values, and integrity of the organization (Barac, 2015). They are the owner in the trust of a larger group of stakeholders, such as students, parents, the community, and the whole constituency (AGB 2011; Arslan, 2013).

The board of trustees has three primary governance responsibilities, namely: (1) fiduciary governance responsibility; (2) strategic governance responsibility; and (3) generative governance responsibility. This portion of the study deals only with board competency and fiduciary governance responsibility.

The fiduciary governance responsibility refers to the stewardship of the institution's tangible assets, guiding the institution to become faithful to the mission and compliant with relevant laws and regulations. Without the fiduciary responsibility, the board of trustees would have no legitimacy in school governance. The organization could be harmed if the board failed to perform its fiduciary responsibility (Zulzman, 2014).

The fiduciary responsibilities of the Board of Trustees include appointing and supporting the president. In the appointment of the president, the board of trustees is making a conscious decision to entrust the college or the university to an individual who can change the direction of the institution for decades (Collins Jr., 2013). The board should also give the president both psychological and substantive support. The board must show concern for the health and effectiveness of the president, keeping a watchful eye on his physical and emotional well-being, keeping a watchful eye for signs of exhaustion, insisting on adequate vacations and holidays, and providing time for relaxation and reflection (Chaffee, 2014; Davidson et al., 2014; KASFAA Policy Manual, 2015; Hartley, 2014; Mersky, 2011; Shattock, 2012; Thomas, 2015; Wormell, 2013).

Fiduciary responsibilities also involve assessing the president's performance. The evaluation of the president must be taken seriously; it should be continual and not just at a time of crisis. It is the responsibility of the trusteeship to remove the president when he can no longer meet the Board expectations (Arslan, 2013; Collins Jr., 2013).

In fiduciary responsibilities, trustees are authenticators of an institution's claim of significance to the external community. They interact and explain to the public its programs and interpret the public's sentiments and feelings toward the institution (Chaffee, 2014; Davidson et al., 2014; KASFAA Policy Manual, 2015; Hartley, 2014; Mersky, 2011; Shattock, 2012; Thomas, 2015; Wormell, 2013). The Board of Trustees who have accepted their roles & responsibilities are willing to be evaluated for their performance. An assessment of institutional performance can be completed through a careful analysis of strengths and weaknesses.

In fiduciary responsibilities, every trustee is under obligation to protect, acquire and preserve the school plant, facilities, and grounds. It is the duty of the trustees to take all possible measures to promote healthful and safe surroundings for students, provide care for the campus vicinity, approve the design of the buildings and campus facilities, provide adequate space, and ensure the beauty of the buildings, site, and the grounds (Arslan, 2013; Collins Jr., 2013; Ingram, 2016).

The scrutiny of board governance has increased considerable attention in research publications. As cited by Chappell (2013), several significant issues include problems with board members that do not provide enough oversight, members with limited knowledge about their roles and responsibilities, and the increased demand for accountability (Martinelli, 2011; Zulzman, 2014). Santiago's (2008) post-graduate research study revealed the undesirable outlook for trustee members having limited knowledge of their roles and responsibilities, no initiative to raise funds to support the school's operation, no orientation for board members, and no professional training development for the new and old trustee members relative to their major responsibilities.

Since the board of trustees is perceived to be so important, and it is the individual trustee that gives life and quality to the trusteeship, it would be best understood to look into the individual trustee's preparation, perceptions, attitudes, and practices (Jaskyte & Holland, 2015, pp. 164-165). Therefore, this study aims to investigate the current practices of the participant boards and determine how the trusteeship of educational institutions perceive their competencies towards their fiduciary governance responsibilities. Consequently, the findings of this study will serve as a guide to recommending a board development program. Specifically, this study aimed to answer the following research questions:

1. What is the level of board competency of the respondents in terms of strategic, contextual, analytical, political, educational, and interpersonal?
2. What is the level of practice of fiduciary governance responsibility of the respondents?
3. Is there a significant relationship between board competency factors and the practice of fiduciary governance responsibility?
4. Is there a significant difference in the practice of fiduciary governance responsibility when gender is considered?
5. Do gender and board competency factors predict fiduciary governance responsibility?
6. Based on the findings, what development program can be recommended to enhance board competency and fiduciary governance responsibilities?

Methodology

Research Design

This research has employed the descriptive-correlational design to examine the relationship between board competency and fiduciary governance responsibilities. It is the best way to finalize the result in proving or disproving the hypothesis using the respondents' perception through a structured questionnaire.

Participants and Sampling

The respondents of the study were the board officers, board members, and school representatives of select sectarian Higher Education Institutions (HEIs) in the Asia Pacific Region. There were nine SDA higher education institutions who were targeted to compose the initial respondent population; only seven SDA colleges and universities had finally participated in the study due to the constraining factor of distance proximity and time availability of the respondents. Purposive sampling was used in the study to include a member of the board of trustees and their associates in the administration who have knowledge in the affairs of higher education institutions, the policy-making body of the school, and were exposed to governance functions.

Instrumentation

A self-constructed instrument based on the governance framework for an effective board of trustees authored by Richard Chait, Thomas Holland, and Barbara was used. The attributes of governance effectiveness were measured utilizing the six board competencies for an effective trusteeship (Griffin, 2011).

The first part aimed to classify the demographic profile of the respondent. The second part was the Board Competency Questionnaire (BCQ) with 30 questions to reflect the respondent's level of practice of six competencies for an effective trusteeship: Strategic, Contextual, Analytical, Political, Educational, and Interpersonal (Rahimi et al., 2011). The third part was the Governance Responsibilities Questionnaire (GRQ) which contains 42 questions to reflect the three major responsibilities of the board, namely: Fiduciary Responsibility, Strategic Responsibility, and Generative Responsibility (Arslan, 2013; Bernstein et al., 2015; Ingram, 2016). Fourteen items of which are classified as fiduciary governance responsibilities.

The assigned university statistician ran the data using SPSS. The questionnaire was analyzed per variable, and Cronbach's Alpha reliability was derived in the following results for six Board Competency factors: Strategic Competency = .892; Contextual Competency = .883; Analytical Competency = .909; Political Competency = .907; Educational Competency = .875; and Interpersonal Competency = .864. The Cronbach's Alpha reliability results for Governance Responsibilities showed: Fiduciary Responsibility = .947, Strategic responsibility = .960, and Generative responsibility = .945.

Data Gathering Procedure

The research questionnaire was validated by ten experts in the fields of education, business, theology, psychology, human resource development, governance, and research. After the validation process, the researcher incorporated the suggestions and drafted the revised questionnaire under the guidance of the research adviser. Permission was secured from the Assistant Vice President of Academics for Graduate Studies to conduct the pilot study and the actual study. Letters of the request were sent to different Presidents of concerned institutions, and visits were made to conduct the pilot study.

After the reliability test of the instrument, the necessary changes were made towards the finalization of the research questionnaire final copy. The researcher has identified the selected SDA Higher Education Institutions in Asia Pacific Region as the targeted respondents of the study. The names of institution heads of participant institutions were submitted to the Assistant Vice President for Academics for Graduate Studies to arrange and secure permission through letters of request to

conduct data gathering. The researcher also sent a personalized letter to the targeted institutions to facilitate the questionnaire distribution during their scheduled board meetings.

Data Analysis

There were 115 data questionnaires retrieved and tabulated in the Microsoft Excel software. The encoded data were submitted to the university statistician for statistical treatment. One data outlier came from the population sampling and projected an abnormal distant observation from the other samples. The final data population was 114.

Means and Standard Deviations were used to describe the respondents' demographic profile and the level of practices for board competency and governance responsibilities as reflected in research problems 1 and 2. A Pearson-r correlation was used to measure the significant relationship between the variables involved both in board competency and fiduciary governance responsibilities, as reflected in research problem 3. Mann Whitney U tests was used to determine the significant difference between two variables involved in demographic profile as it relates to the variables of governance responsibilities as reflected in research problem 4. Multiple regression was used to compute the value of variables found in governance responsibilities related to board competency variables and demographic profile variables, as reflected in research problem 5. Based on the results and implications of the analyses education competency program and fiduciary enhancement program were created to enrich board governance.

Ethical Considerations

The researcher assured the respondents of the utmost protection of their integrity in full adherence to the principle of confidentiality. The identity of the respondents and their institutions are not disclosed. The researcher made communication and follow-ups through phone calls. The data questionnaires were retrieved via courier and personal handling during the researcher's personal visit to different schools.

Results and Discussion

The significant findings are presented accordingly with corresponding tables and figures to facilitate a better understanding of the variables involved. The discussion on the analysis and interpretation of the results are organized in sequence based on the research questions with literature support and implications.

Level of Board Competency

Table 1 presents the respondent's level of board competency. The mean of the measures reveals that the level of board competency is high. The grand mean is 3.20 with a standard deviation of 0.52.

The results reveal that the respondents' level of practice in strategic competency is high. Chugg (2016) posited that the board with strategic competence could recognize wider opportunities and societal changes in the context of global markets. The Board of Trustees, in particular, projects a good posture of strategic governance by closely working with the Chief Executive Officer and the school administrators to articulate the vision of the school through a strategic plan with the appropriate combination of knowledge and skills of the members working together towards the realization of an action plan with periodic review of organizational strategies to accomplish long-term goals.

Table 1. *Descriptive Statistics on the Level of Board Competency*

Area	Mean	SD	Scaled Responses	Verbal Interpretation
Strategic Competency	3.21	0.53	Agree	High Competence
Contextual Competency	3.25	0.50	Agree	High Competence
Analytical Competency	3.14	0.55	Agree	High Competence
Political Competency	3.17	0.54	Agree	High Competence
Educational Competency	3.19	0.53	Agree	High Competence
Interpersonal Competency	3.25	0.48	Agree	High Competence
Grand Mean	3.20	0.52	Agree	High Competence

Legend: 3.50 – 4.00 Strongly Agree (High competence); 2.50 – 3.49 Agree (Moderate competence); 1.50 – 2.49 Disagree (Slight competence) 1.00 – 1.49 Strongly Disagree (No Competence)

The results revealed that the respondents' level of practices of contextual competency is high. The board's role in reviewing the institution's history, vision-mission, and objectives was visible to guide their decision-making as they kept track of their day-to-day course of action. Clawson (2015), in his book "Level Three Leadership," emphasized that for board leadership to become effective, it must consider the behaviors, thoughts, values, beliefs, and expectations to understand why people behave the way they do and to influence them in profound ways that move beyond monitoring and constraining behavior. Although the board was active in this manner, there is still needed to give ample time to discuss the norms, traditions, and values to adapt to the distinctive characteristics and culture of the school's environment.

From the respondent's perspective regarding the level of practices of board competency in terms of analytical competency is rated high. It has the analytical capability to postpone board decisions and seek to obtain further information (Improving Board Effectiveness, 2016). During complex issues, the board is wise to utilize the services of consultants, advisory committees, and legal entities to stay informed about the significant trends and pitfalls of an important issue and to brainstorm to generate creative solutions to a problem.

The whole data about the respondents' level of practice of political competency is rated high in practice. Various authors supported the result of this study with an emphasis on the political competence of the board to build its relationship with its immediate stakeholders. Northouse (2015) emphasized two considerations to maintain the political competence of the board's governance and leadership. First, it concerns the overall political involvement as the board influences its members and stakeholders to accomplish organizational goals through interactive exchange and dialogue (CSBA, 2014; Ingenium Communications, 2013; Mourfield, 2014). The second area of leadership applies to the ethical conduct of the board to follow the rules of governance. To maintain a healthy relationship, the board must uphold the integrity of the governance process and other stakeholders' legitimate roles and responsibilities (Griffin, 2011). It often consults and communicates directly with its key constituents (Arslan, 2013; Gentius, 2015). Furthermore, Maricle (2014) emphasized the importance of communication between the board and the community, which is recognized as the key to board effectiveness.

The result revealed that the respondents' level of practice of board competency in terms of educational competency in selected Seventh-day Adventist Higher Education Institutions is high. It was an established practice of the board to review their agenda minutes and utilize the term of reference to guide their deliberation and decision over the school affairs. It carves out opportunities for board members to reflect periodically on their work, assess their strengths and limitations, and examine the possible implications of their decision-making.

The result of the study revealed that the level of practice in terms of interpersonal competency is high. The board works in favor of team working relationships as reflected in their decision-making as transparent, ensuring open communication to resolve problems and opportunities for learning during meetings. Nevertheless, there is another need to explore and nurture the development of trustees as a group and to strengthen their relationships by organizing events for board members to become acquainted with each other.

Level of Practices of Fiduciary Governance Responsibilities

Table 2 presents the respondent's level of practices of board governance responsibilities in terms of fiduciary responsibility with a mean of 3.04 and a standard deviation of 0.51, which is interpreted as high in practice.

Table 2. *Descriptive Statistics on the Level of Fiduciary Governance Responsibilities*

Statements	Mean	SD	Scaled Responses	Verbal Interpretation
Board provides working policy for the duties & responsibilities.	3.32	0.66	Agree	High Practice
Board approves budgetary requirements for physical plant facilities.	3.25	0.68	Agree	High Practice
Board conducts presidential search in full adherence to the criteria.	3.19	0.70	Agree	High Practice
Board works with president to establish new policies, goals, and guidelines.	3.16	0.70	Agree	High Practice
Board reviews policies and guidelines on physical plant facilities.	3.04	0.70	Agree	High Practice
Board evaluates the president's performance.	3.04	0.71	Agree	High Practice
Board conducts a regular review of governance policies.	3.04	0.74	Agree	High Practice
Board reviews the progress of institution against the action plan.	3.03	0.73	Agree	High Practice
Board involves the services of the consultant on plant facility	2.96	0.72	Agree	High Practice
Board establishes measurable evaluation performance for president's accomplishments.	2.93	0.74	Agree	High Practice
Board measures its effectiveness and efficiency through governance indicators.	2.91	0.74	Agree	High Practice
Board provides clearly defined feedback after president's evaluation.	2.91	0.75	Agree	High Practice
Board evaluates the president's competency through performance appraisal checklist.	2.88	0.74	Agree	High Practice
Board physical plant committee conducts inspection.	2.83	0.72	Agree	High Practice
Grand Mean	3.04	0.51	Agree	High Practice

Legend: 3.50 – 4.00 Strongly Agree (High practice); 2.50 – 3.49 Agree (Moderate Practice); 1.50 – 2.49 Disagree (Slight Practice) 1.00 – 1.49 Strongly Disagree (Not practice)

The result of this study revealed that the level of practices of the respondent's governance responsibilities in terms of fiduciary responsibility is high. The result has reflected three major areas under fiduciary responsibility that are practiced currently: First, the board has provided the president with substantive support through a working policy that defines his duties and responsibilities in running the institution. Through this guidance, the president is perceived as the board's agent with a complete responsibility, authority, and accountability mandate. Secondly, it is the board's responsibility to keep watch on the quality and performance of the president. The board should establish a measurable evaluation performance checklist for the president's accomplishments that contains governance effectiveness and efficiency indicators.

When the Board of Trustees determines the president's responsibilities and effectiveness, the following principles must be observed in the evaluation process: The leadership of the president; the management effectiveness; the quality of academic programs and results; the president's relationship

with the community, teachers, faculty and staff, administrators, the board of trustees, parents, students, alumni, and the entire constituency. Lastly, as an agent, the president is accountable and responsible for the entire institution and the steward of the entire assets of the school. It is revealed how he manages the physical plant facilities that can influence its services to its immediate stakeholders.

Zulzman (2014) supported this study by emphasizing the board's fiduciary responsibility that constitutes the bedrock of governance for any organization to become faithful to its mission, be accountable to its performance, and comply with relevant laws and regulations. Legon (2014), with his new collaborative governance framework called "Integral Leadership," has supported this study by emphasizing the basic fiduciary principles of duties of care, loyalty, and obedience. These basic principles should frame the board's orientation program to reinforce a degree of accountability to each trustee and the entire board (AGB, 2016; Governance Handbook, 2015). The Association of Governing Boards of America (AGB: 2011) has emphasized another important role of the board to intentionally incorporate discussions of educational quality during its annual agendas of the board in its various committee meetings.

Relationship Between Board Competency and Fiduciary Governance Responsibility

Table 3 presents the results of the correlation analysis between the six board competencies and fiduciary governance responsibilities. Results show that six competencies are individually correlated to fiduciary governance responsibilities.

Table 3. *Correlation Analysis Between Board Competencies and Fiduciary Governance Responsibility*

Competency	r	p	Verbal Interpretation
Strategic Competency	.778	.000	Significant
Analytical Competency	.752	.000	Significant
Contextual Competency	.728	.000	Significant
Educational Competency	.794	.000	Significant
Political Competency	.731	.000	Significant
Interpersonal Competency	.709	.000	Significant

Correlation is significant at 0.05 level (2-tailed)

The six board competencies show a positive association with the practice of fiduciary governance responsibilities at $p = .000$. Among these, educational competency garnered the highest correlation ($r = .794$) followed by strategic competency ($r = .778$), analytical competency ($r = .752$), political competency ($r = .731$), contextual competency ($r = .728$) and interpersonal competency ($r = .709$). The result of the study implies that the higher the level of practices of board competency by the respondents, the better their practice of fiduciary governance responsibilities would be.

Several authors, like Lin (2013), have emphasized that the best predictors of outstanding on-the-job performance are the enduring personal characteristics called "competencies." The Nebraska Business and Finance Human Resources (2016) define "competency" as the combination of observable and measurable knowledge, skills, abilities, and personal attributes that contribute to a person's performance and ultimately result in organizational success.

Strategic competency contributes to forming strategies and institutional visions. A board with strategic competence can recognize wider business and societal vision in global markets (Board Source, 2015; Chugg, 2016; Keelen & Arnold, 2014; Ogbechie, 2012). In contextual competency, the board members use the culture and institutional norms to guide the institution's behaviors. In analytical competency, the members tried to examine the ambiguity and complexity of cases they faced. In political competency, the board of trustees' responsibility is to lead the institution in good relations with other constituents & organizations. In educational competency, the board members assured themselves that they understood their functions related to the governance of the institution.

In interpersonal competency, the board constitutes teams that support the improvements in the board of trustees.

Gender Differences on the Practice of Fiduciary Governance Responsibility

Table 4 presents the difference between genders concerning the practice of fiduciary governance responsibility. It shows that females' practice has significantly higher practice than the males with a projected value of $U=1067$ & $p=.023$.

Table 4. *Mann-Whitney on the Gender Differences on the Practice of Fiduciary Governance Responsibility*

Gender	N	Mean Rank	U	p	Interpretation
Male	76	52.55	1067.50	.023	Significant
Female	38	67.41			

Mean difference is significant at 0.05 level (2-tailed)

The results have implied that gender diversity increases high fidelity to sound decision-making and strategies. The female board members were typically compliant with the rules and regulations that were made (Minoletti, 2014). In general, men tend to lead with confidence and aggression. Women prefer to lead with caution and seek a holistic approach. Thus, this approach's benefit is substantially greater than the traditional men-dominated boards (GX, 2014).

Predictors of Fiduciary Responsibility

Table 5 presents the predictors of fiduciary governance responsibilities. The significant predictors accounted for 71.4% of the total variance in fiduciary responsibility ($F = 91.75$, $p < .001$).

Table 5. *Predictors of the practice of Fiduciary Governance Responsibility*

Predictors	R ² Change	Coefficients				
		B	SE	β	t	p
Constant		.295	.168		1.76	.081
Educational Competency	.631	.385	.082	.404	4.70	.000
Strategic Competency	.071	.300	.087	.312	3.44	.001
Analytical Competency	.013	.186	.083	.201	2.24	.027

$R^2 = .714$, $F = 91.75$, $p < .001$

Results presented three variables that entered the equation to predict influence on fiduciary responsibility. The first variable that entered the equation was educational competency, which projected a strong influence on fiduciary responsibility, accounting for 63.1%. Strategic and analytical competencies did not project a strong influence on fiduciary responsibility. The beta weight of educational competency had projected a higher value compared to other variables that positively influenced the fiduciary responsibility. The equation to predict fiduciary responsibility is $FR = .295 + .385EC + .300SC + .186AC$.

The result of the study has shown the strong influence of educational competency on predicting fiduciary responsibility. The result has implied the necessity of strengthening the education competency to establish a strong fiduciary responsibility performance where the board is to act as a competent steward of the organization's tangible assets.

Conclusion and Recommendation

This study reinforces the previous research done by Richard Chait, Thomas Holland, and Barbara Taylor about a governance framework in six-dimensional competencies: strategic, contextual, analytical, political, educational, and interpersonal, that were utilized to enhance governance responsibility performance. The results reveal high levels of competencies and practice of governance responsibilities. However, it also shows that these attributes can still be improved.

The study has shown a direct and positive relationship between board competency and board major responsibilities. The six competencies were appropriate variables to measure the effectiveness of board members' governance responsibility performance.

Among the six board competencies, educational competency emerged as the strongest predictor to influence fiduciary governance responsibility. It is implied that the board leadership and the school executives should commit to creating opportunities for trustee education, training, and development. This is to ensure that trustees are knowledgeable of their roles and responsibilities to define their fiduciary roles with accountability. The professional skills of strategic board is on policy making, problem solving, and strategic planning.

Based on the findings, educational competency, and fiduciary enhancement programs are recommended. The guidelines are presented, and the suggested activities are outlined.

A. Educational Competency Enhancement Program

It is a program of the board to create opportunities for trustee education, training, and development to enhance board competency performance (Korelich & Maxwell (2015). School boards are encouraged to enter a process of continuing education that will assist them in making better decisions. This initiative has led some boards to adopt self-learning activities during board retreats, summits, conventions, conferences, workshops, board forums, and board mentoring.

Board Education: The board should enter a continuing education and training process as an intentional commitment to enhancing board competency performance. Board education is an initiative of educational leaders to lead the boards to adopt self-learning activities during board retreats, summits, conventions, conferences, workshops, board forums, and board mentoring. The commitment of boards is to provide well-planned continuing-education programs that equip the board members to perform their governance functions. Exceptional boards embrace the quality of continuous learning into routine governance work and learning activities outside of the boardroom.

Suggested Activities:

- a. Formulation & approval of board training & education policy.
- b. Creation of the Board Development Committee to spearhead the program.
- c. Assessment of the current board members skills & competency.
- d. Identification of competency qualification requirement.
- e. Recommendations of the needed skills & expertise in the board.
- f. Setting of roles and responsibilities of the participants during the training process.
- g. Implementation of the program & activities by the Board Development Committee.
- h. Evaluation of the program by the Board development Committee.

Suggested Trainings:

- a. Board Orientation – a process of providing the board members with the basic information about the school, the roles & responsibilities of board members in thier governance functions.
- b. Leadership Succession Plan – is an ongoing practice of the board in defining the school's strategic vision, to identify the leadership and managerial skills necessary to

- carry out the vision, and recruiting, developing and retaining board members to become effective.
- c. Governance Training – a complete program of training in the trusteeship that includes all the facets of school governance.
- d. In-service training – is continuous training while serving the trusteeship that is structured carefully with a facilitator to lead out.
- e. Package of information – a package of information about the school that is introduced to the board members by the school executives.
- f. Policies and Legal Liability – these are policies coming from the SDA church and governmental legislation that affects the board's governance functions. These must be communicated to the board members at the start of their tenure.
- g. Board Meeting – design to improve the working relationships of board members board for unity & collaboration towards the common goal.
- h. Code of Conduct for Board Members – a kind of discipline & behavior of board members to conduct with utmost integrity, dignity, and accountability.

Desired Outcomes:

- a. The board provides a well-planned continuing-education program and activities in a form of board retreat, summit, conferences, conventions, workshops, board forum, & mentoring.
- b. An increase in understanding of legal & fiduciary responsibilities, governance functions, policies, & operating procedures among board members.
- c. High competency to engage in strategic thinking to guide the school's direction.
- d. Engage in deeper inquiry about the issues that confronts the school.
- e. Exploring root causes of the problems encountered by the management and contribute alternative course of actions & new ideas in solving problems.
- f. Development of collegiality behavior & team leadership between the board and the school management.

Responsibility:

- a. The Board Chair – oversees the planning, implementation, & the evaluation of the continuing education & training activities. Works in partnership with the Board Development Committee to make sure that the guidelines are carried out effectively.
- b. The Board Development Committee -is responsible for the overall planning, implementation, & evaluation of board education/training activities. The Chairperson of the committee is selected & approved by the board and the committee members are selected by the Committee Chair in consultation with the Board Chair and are subjected to the approval of the full board. Terms are for one year, up to a maximum of five consecutive years.
- c. The Board Governance Resource Specialists – are invited resource persons to provide a full range of training , orientation, & technical support to the board members in governance functions.

Board Orientation: This is a program provided to new board members to have a thorough knowledge of the history, culture, and values of the school; roles & responsibilities of board members; governance functions, board policies, and operating procedures. It is also a valuable strategy for the trusteeship to re-visit the distinctive characteristics of education and its role in Higher Education Institutions around the world. During the orientation process, the Board Policy Manual (BPM) provides useful information about the school's mission, board structure & operations, and other pertinent information in governance functions. Easy access to this material can promote efficiency, accountability, and effective decision-making.

Suggested Activities:

- a. Introduction of Board Policy Manual (BPM) to the new board members.
- b. Presentation of the fundamental topics during the orientation program:

General Information

- History, mission, vision, values, and distinguishing features of the school & its reputational advantages.
- Board structure & processes.
- Copy of constitution & by-laws.
- Strategic priorities, goals and objectives.
- Summary of the programs and services.
- List of board members / staff and their contact information

Roles and Responsibilities

- Review board member's roles & responsibilities.
- Review school executives & officers' roles & responsibilities.
- Review board committees and their functions.
- Discuss board expectations to new Board members.
- Discuss board policies and operating procedures.
- Discuss the financial management & budget procedures.
- Discuss the fundraising strategies.
- Presentation of current year's budget.
- Provide a copy of the current & audited financial statements.
- Provide a copy of most recent annual report.

Other Information

- Provide copy of minutes from previous board meetings.
- Have a tour of school campus & facilities.
- Provide brochures and other promotional materials.
- Signing of the Oath of Office.

Desired Outcomes:

- a. The board orients the new members about the background of the school, the member's roles & responsibilities, board policies & operating procedures, Constitution & bylaws, governance functions & policies.
 - b. Board Policy Manual is introduced during the orientation program as guide & a term of reference material.
 - c. Understanding of the school's condition in terms of strength, needs, challenges, & priorities.
- Understanding of SDA Philosophy of education and its distinct role in the academic world.
- d. Appreciation of board members skills, experience, & expertise.

Responsibility:

- a. The Board Chair oversees the orientation process in partnership with the school President, Board Development Program Committee, and Governance Committee. Leading out in the orientation process of the member's roles & responsibilities, board meeting procedures, functional committees, board ethics & accountability.
- b. The school president is responsible to orient the new board members about school affairs, programs and services, staff roles, financial management, budgeting process, core policies and procedures as well as school plant facilities.

- c. The Whole Board is responsible to welcome the new board members to serve as mentors for specific committee functions.

C. Fiduciary Responsibility Enhancement Program

It is a program of the board to evaluate the performance of the president regularly & objectively in accordance with the established guidelines & criteria (Ingram (2016). The president's performance evaluation shall cover the areas of his leadership & management effectiveness, the quality of academic programs & results, and his relationship with the school stakeholders and the board itself (Arslan, 2013; Bernstein et al., 2015).

Evaluation of the President: Evaluation of the President is one of the most important fiduciary responsibilities of the board. Initially, the board guides & directs the president with a working policy that defines his duties and responsibilities in running the school. The president is perceived to be the agent & steward of the board with the mandate of responsibility, authority, and accountability. The board shall determine the effectiveness of the president's performance through periodic evaluation that covers the areas of leadership and management effectiveness, the quality of academic programs and results, the president's relationship with the immediate stakeholders, and the board itself.

Suggested Activities:

- a. The College President prepares & submits his annual report to the board.
- b. The Board chair gathers information & feedback from the constituency representatives through the President's Evaluation Form.
- c. Formal appraisal discussion in the board with due consideration to the president's annual report & the written summary of feedback from the constituency are presented.
- d. The board chair adds his personal evaluation to the presented document in the board.
- e. Summary of appraisals are reported to the board for approval & agreement of recommendations are finalized.
- f. Post Evaluation feedback is conducted by the Board Chair with the president.

Desired Outcomes:

- a. The board shall regularly evaluate the president in accordance with the established performance guidelines & criteria. It shall cover the following areas in leadership & management effectiveness, quality of academic programs & results, relationship to the immediate stakeholders, and the board of trustees.
- b. The president is faithful to his fiduciary responsibilities: the duty of care, loyalty, and obedience.
- c. Become an agent & steward to the entire assets & resources of the school.
- d. High level of relationship between the president and board.

Responsibility:

- a. Board Chair – gathers information & feedback from the constituency representatives through the President's Evaluation Form. Adds his personal evaluation to the presented document in the board.
- b. College President – prepares & submits his annual report to the board.
- c. Governance Committee – spearhead in the preparation and submission of the needed documents to be presented to the full board meeting for formal appraisal/discussion in the board with due consideration to the president's annual report & the written summary of feedback from the constituency are presented.
- d. Committee Chairmen – submits their annual evaluation of the president to the Governance committee.

- e. Selected faculty and workers of the institution, students, alumni, and community representatives participate to evaluate the president during his term of office.

References

- [1] Afriyie, A. (2015). *Sustainable Factor of Higher Education Institutions: Why Investment Portfolio Matters Most*. Journal of Business Management and Economics, March (2015) 16 - 22. School of Business, Valley View University.
<http://innovativejournal.in/jbme/index.php/jbme>
- [2] AGB (2011): *Statement on Board Responsibility for the Oversight of Educational Quality*. Approved on March 17, 2011.
http://www.nacua.org/documents/AGB_StatementBdResponsibility.pdf
- [3] AGB (2016) *Association of Governing Boards: Student Trustees*.
<https://www.agb.org/briefs/student-trustees>
- [4] Arslan, H. (2013) *Effectiveness of Board of Trustees in University Governance*. Middle-East Journal of Scientific Research 13 (9): 1165-1171, 2013 ISSN 1990-9233 © IDOSI Publications, 2013.
- [5] Barac, Z. (2015). *Effective direction and control of higher education institutions: An empirical case study of the Croatian private business school*. University of St. Gallen, School of Management, Economics, Law, Social Sciences and International Affairs. Retrieved from [http://www1.unisg.ch/www/edis.nsf/SysLkpByIdentifier/4393/\\$FILE/dis4393.pdf](http://www1.unisg.ch/www/edis.nsf/SysLkpByIdentifier/4393/$FILE/dis4393.pdf)
- [6] Bernstein, R., Case, K. & Slatten, L. A. (2015). *Nonprofit Board Performance: Board Members' Understanding Their Roles and Responsibilities*. University of Louisiana at Lafayette. American Journal of Management Vol. 15(1) 2015 p. 26. Retrieved from www.na-businesspress.com/AJM/BernsteinR_Web15_1_.pdf
- [7] Board Source. (2015). *Leading with intent: A national index of nonprofit board practices*.
http://leadingwithintent.org/wp-content/uploads/2015/01Executive-Summary_Leading-with-Intent.pdf
- [8] Canosa, H. (2008). Seventh-day Adventist Higher Education Governing Boards: A Snapshot. The Journal of Adventist Education. Summer 2008. <https://jae.adventist.org/>. Based on his dissertation entitled "Perceptions of Governing Board Performance Held by Trustees of Four Adventist Colleges: Select Group Practices and Behaviors in Six Competencies" (La Sierra University, 2005).
https://www.andrews.edu/library/car/...Adventist_Education/.../jae200870053205.pdf
- [9] Chaffee, E. (2014). *Governance Best Practices*. Association of Governing Boards of Universities and Colleges (AGB) Leadership, Strategy, and Governance.
<https://ellenchaffee.files.wordpress.com/2014/.../university-governing-board...>
- [10] Chappell, C.D. (2013). *The Virginia Commission on Higher Education Board Appointments: The Impact of Legislative Reform on Public University Governance*. Published Dissertation. George Mason University. Fairfax, Virginia. U.S.A.
- [11] Chugg, R. (2016). Competencies of your Board Members: Transforming your business.
- [12] Copyright Excellent Outcomes 2016. Retrieved from <http://excellentoutcomes.com.au/blog/article/competencies-of-your-board-members>
- [13] Clawson, J. G. (2015). *Level three leadership: Getting below the surface* (3rd ed.). Upper Saddle River, N.J.: Pearson Prentice Hall.
- [14] Collins Jr. A. J. (2013). *The partnership between private university president's and Governing Boards in effective governance*. Unpublished Dissertation. Pepperdine University.
community.pepperdine.edu/gsep/writing.../ed_sample_5_chapter_ac.pdf
- [15] Davidson, C., Kaattari, J. & Trottier, V. (2014). *Board Governance Resource Guide for Nonprofit Organizations*. www.communityliteracyofontario.ca/.../2014/.../Board-Governance-Man...

- [16]Eldik, K. (2011). Challenges in the internationalization of higher education. The Modern University for Business & Science. Beirut.
http://heic.info/assets/templates/heic2011/papers/13-Kamal_Eldik.pdf
- [17]Gentius, P. (2015). *An examination of governing boards competencies at public institutions of higher education in Virginia*. 7th International Conference on Education and New Learning Technologies. Barcelona, Spain. July 6-8, 2015.
library.iated.org/view/GENTIUS2015ANE.
- [18]Governance Handbook (2015). *For trustees of academies and multi-academy trusts and governors of maintained schools*. United Kingdom. November 2015.
[https://www.gov.uk/government/.../Governance_handbook_November_...](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/45296/governance-handbook-november-2015.pdf)
- [19]Griffin, W. (2011). *Board of Trustees: The whole is greater than the sum of the individual parts*. Unpublished Dissertation. National Louis University. Chicago, Illinois.
<http://digitalcommons.nlu.edu/cgi/viewcontent.cgi?article=1044&context=diss>
- [20]Hartley, S. (2014). *Board of Governors: Statement of Primary Responsibilities*. April 2014. University of Portsmouth. Retrieved from
www.port.ac.uk/.../boardofgovernors/.../filetodownload,45296,en.PDF
- [21]Ingenium Communications (2013). *Best practices in board communication*.
<http://www.resultsmap.com/wp-content/uploads/2013/09/Best-Practices-Board-Communications-2013.pdf>
- [22]Ingram, R.T. (2016). *Handbook of college and university trusteeship*. The Jossey-Bass series in higher education. March 10, 2016. www.clublafeeverte.com/free-pdf-handbook-of-college-and-university-t...
- [23]Jaskyte, K. & Holland, T. (2015) *Non-profit boards: Challenges and opportunities*. Human Service Organizations: Management, Leadership & Governance. Published online: 01 Jun 2015. Copyright © Taylor & Francis Group, LLC.
<http://www.tandfonline.com/doi/pdf/10.1080/23303131.2015.1035612>
- [24]KASFAA Policy Manual. (2015). *Duties and responsibilities of the executive board*.
<https://www.kasfaa.com/pandp/Section5.pdf>
- [25]Keelin, T. & Arnold, R. (2014). *Five habits of highly strategic thinkers*. Journal of Business Strategy. The Magazine for the Corporate Strategist.docslide.us › Documents
- [26]Legon, R. (2014). *The 10 Habits of Highly Effective Boards*. Trusteeship Magazine. Association of Governing Boards(AGB). March/April 2014. <http://agb.org/trusteeship/2014/3/10-habits-highly-effective-boards>.
- [27]Lin, T. (2013). *Testing for competence rather than for intelligence*.
prattpsychology.blogspot.com/.../testing-for-competence-rather-than-for...
- [28]Maricle, C. (2014). *Governing to achieve: A synthesis of research on school governance to support student achievement*. California School Boards Association. August 7, 2014. <https://www.nsba.org/sites/default/files/reports/Governing%20To%20Achieve.pdf>
- [29]Martinelli, F. (2011), *Building an effective board of directors*.
www.createthefuture.com/board%20%20directors.htm pdf.
- [30]Mersky, D. (2011). *Is your board on board: Ten basic responsibilities of non-profit*.www.covchurch.org/.../Roles-Responsibilities-Workshop-Sept-2011.pdf
- [31]Mourfield, R. (2014). *Organizational change: A guide to bringing everyone on board*. SPEA Honors Thesis. Indiana University. https://spea.indiana.edu/doc/undergraduate/ugrd_thesis2014_mgmt_mourfield.pdf
- [32]Ogbechie, C. I. (2012). *Key determinants of effective boards of directors: Evidence from Nigeria*. Brunel business school. Brunel University.
<http://bura.brunel.ac.uk/bitstream/2438/7667/1/FulltextThesis.pdf>
- [33]Rios, P. (2013). SWOT Analysis of Globalization in Adventist Higher Education.

- International Forum Vol. 16, No. 1. April 2013 pp. 62-78FEATUREA
<http://ojs.aiias.edu/index.php/ojs/article/view/145/143>
- [34]Santiago, P. P. (2008). *An analytical study of college/university board of trustees competencies, major responsibilities and performance strategies towards effective governance*. Unpublished Post-Doctoral Research Project presented to North Philippine Union Conference. Philippines.
- [35]SGX (2014). *Gender diversity on boards: A business imperative*. SGX-Singapore Listed Companies. Retrieved from <https://www.msf.gov.sg/.20Diversity%20on%20Boards.p...>
- [36]Shattock, M. (2012). *University governance: An issue for our time perspectives: Policy And practice in higher education*. DOI:10.1080/13603108.2011.645082
- [37]*The definition of competencies and their application at NU*. Nebraska Business and Finance Human Resources. © 2016 University of Nebraska–Lincoln. Retrieved from <http://hr.unl.edu/compensation/nuvalues/corecompetencies.shtml/#one>
- [38]Thomas, L. (2015). *Effective board governance: A handbook for board members and Administrators of First Nations' Boards*. www.fnesc.ca/.../2015/.../PUB-GOV-Eff_Board_Gov_Hdbk_Cpyrt2002....
- [39]Tyco International Ltd. (2014). *Board governance principles*. Amended September 12, 2014. www.tyco.com/uploads/.../Board-Governance-Principles_9-15-14.pdf.
- [40]Wilson, K. R. (2014). *The board as chief steward of the non-profit organization*. thestewardsjourney.com/.../Board-as-Chief-Steward-of-the-NPO-secular.kent@nlegroups.org.
- [41]Wormell, P. (2013). *The purpose and function of academic boards and senates in Australian Universities*. National Conference of Chairs of Academic Boards and Senates held at the University of Sydney on November 2013.
https://www.uws.edu.au/___.../pdf.../Purpose_and_Function_of_Academi...
- [43]Zulzman, J. (2014). *Governance as leadership: Reframing the work of Non-profit boards by Richard Chait et al*. <http://avxsearch.xyz/?q=Governance%20as%20Leadership>

Personality Types and Preferred Lesson Delivery Methods Among STEM Students During E-Learning

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Abstract: Students are forced to adapt to the different online learning strategies and approaches that serve as alternatives to face-to-face learning setups because of the Covid-19 pandemic. This study determined what lesson delivery methods cater to and are most effective in satisfying the learning needs of the students if their personality types are considered. STEM students of AUPA who are attending synchronous classes and other students who are having asynchronous classes only using recorded videos or textual learning materials were purposively gathered to be the sample of this descriptive-correlational study. Results showed that the participants of the study had *average* levels of extraversion, conscientiousness, neuroticism, and openness and *high* levels of agreeableness personality traits. The three lesson delivery methods, synchronistic, recorded videos, and textual, were perceived as *very good*. Conscientiousness and openness personality traits prefer to have all three lesson delivery methods, while agreeableness prefers having synchronistic and recorded delivery methods. Extraversion and neuroticism personality traits prefer synchronistic lesson delivery methods only. Furthermore, agreeableness *predicts* a synchronistic delivery method. Female students learn better in video-recorded lessons. The study concluded that personality traits are *associated* with the effectiveness of lesson delivery methods as perceived by the students. This study recommends that future researchers consider having grades 7-12 high school students as potential participants for more generalizable results.

Keywords: *distance learning, personality type, lesson delivery method*

Introduction

One's belief about learning directs the teaching approach, and it influences and affects the experiences the teachers provide to students. The context of the teaching situation, as well as the learning situation of the students, will also help to identify the appropriate instructional mode, like teaching a face-to-face course or online learning. Students are forced to adapt to the different online learning strategies and approaches that serve as alternatives to face-to-face learning setups because of the Covid-19 pandemic.

Online learning, also known as e-learning, online education, or distance learning, is defined as synchronous or asynchronous learning experiences using devices that have internet access (Yen & Nhi, 2021). Online learning platforms like Zoom, Google Classroom, and MS Teams have seen an increase in users utilizing them since the start of the pandemic. It has approximately 2.7 billion meeting minutes daily in MS Teams service, a 200% increase from its 900 million meeting minutes reported in March 2020 (Singh & Awasthi, 2020). Utilizing effective methods of lesson delivery during online education is essential for the overall learning satisfaction of students.

Learners' personality traits play a significant role in learners' academic choices and accomplishments. A connection between students' personality type and their learning approach and absorption of information has been found in some studies. In the study of Seyal et al. (2019) reported that there is a relationship between the big five personality traits and the preferred lesson delivery methods among students.

As stated in a study by Diener & Lucas (2022), personality traits are the distinctive patterns of thoughts, feelings, and behaviors that people exhibit. Personality traits suggest consistency and

stability. Thus, trait psychology is based on the premise that people differ from one another based on where individuals stand out on a set of basic characteristic dimensions that endure across time and circumstances. Furthermore, the five-factor model is the most extensively used personality trait system (Chmielewski & Morgan, 2013).

Edwin van Thiel (2020) also stated that the "Big Five Personality" system is the most scientifically validated and reliable psychological model to test personality. It consists of five major traits: openness, conscientiousness, extraversion, agreeableness, and neuroticism. Openness is a characteristic that includes imagination and insight. It leads to having a broad range of interests and being more adventurous when it comes to decision-making. Conscientiousness is a trait that includes high levels of thoughtfulness, good impulse control, and goal-directed behaviors. A highly conscientious person will regularly plan and analyze their behavior to see how it affects others. Extraversion is a trait that many will have come across in their own lives. Extraversion, amongst other traits, includes talkativeness, assertiveness, and high amounts of emotional expressiveness, making extroverted people widely recognizable over many years of social interaction. People who exhibit high agreeableness will show signs of trust, altruism, kindness, and affection. Neuroticism is characterized by sadness, moodiness, and emotional instability. Often mistaken for anti-social behavior, or worse, a greater psychological issue, neuroticism is a physical and emotional response to stress and perceived threats in someone's daily life (McCrae & Costa, 1987; Goldberg, 1981; Smith, 1967; Norman, 1967; Fiske, 1949).

Moreover, these personality traits are important factors to consider in different lesson delivery methods, including video recordings, synchronous meetings, and textual modules that should be identified for more effective teaching-learning.

Video recordings are pre-recorded video lectures provided by the instructor, which offer video simulations with clear audio and good visualization. These videos cover a broad scope of topics, allowing the students to learn at their own pace and re-watch them if needed. On the other hand, synchronous meetings are live meetings wherein teachers meet virtually with their students at certain times in different online learning platforms like MS Teams, Google Classroom, and Zoom to discuss the lessons in their subjects. Synchronous meetings allow live interaction between the students and the instructor, which creates a learning atmosphere similar to face-to-face classes (Grover et al., 2021). Moreover, self-learning modules are online learning materials provided by schools and educators, either offline or online, to students to study at their own pace, ensuring quality learning amidst the ongoing pandemic (DepEd, 2020).

Furthermore, in their study, Choe et al. (2019) found that asynchronous online lecture videos increase learner satisfaction and even engagement. Similarly, live or synchronous meetings positively affect learners' satisfaction during online classes, which allow real-time consultation, questioning, responses, and reflections (Zeng & Wang, 2021). Apart from this, the results of their study pointed out that providing synchronous meetings for addressing queries is essential to supplement lessons taught through live meetings. Lastly, regarding textual learning, Gillan et al. (2018) reported that an e-module with more textual content scored higher than an e-module that primarily provided more video content on a user interaction satisfaction questionnaire.

The various personality traits of students and their impacts on perceptions of e-learning usability is an often overlooked topic (Vlachogianni & Tselios, 2021). In the last few years, studies have been done to analyze external factors, specifically personality types, and traits, that affect a student's learning motivation and satisfaction (Sorić et al., 2017). However, there is a need to investigate specific online learning design elements and how it influences the perception of various personality traits (Bhagat et al., 2019).

Moreover, Bhagat et al. (2019) also suggested conducting future studies regarding the impacts of personality traits to various online learning environments. Future studies were also urged to incorporate personal variables and learner attributes like sex that can affect online learning (Al-Nasa'h et al., 2021).

Thus, the purpose of this study is to determine whether the big five personality traits of students play a significant association with their preferred lesson delivery methods.

Statement of the Problem

This study aims to determine the relationship between personality types and preferred lesson delivery methods.

Specifically, this study seeks to answer the following questions:

1. What are the levels of the personality types of the participants of the study?
2. What is the perception of the respondents on the lesson delivery methods in terms of:
 - 2.1. synchronistic
 - 2.2. recorded video
 - 2.3. textual
3. Are students' personality types significantly associated to the preferred lesson delivery method?
4. Which personality traits best predict the preferred lesson delivery methods of the respondents?
5. Is there any significant difference in the preferred lesson delivery methods of the respondents when their sex is considered?

Methodology

Research Design

The descriptive-correlational design was applied in this study. Descriptive was used to describe, analyze, and interpret quantitative data that determined the participants' personality types and their preferred lesson delivery methods. Correlational was used to find the relationship between students' personality types and preferred lesson delivery methods.

Population and Sampling Technique

The study population is STEM students at Adventist University of the Philippines Academy who were enrolled during the second semester of SY 2021-2022. The purposive-quota sampling technique was applied to gather 110 AUPA STEM students to study participants. Purposive sampling was used because they are currently experiencing the three lesson delivery methods. Quota sampling was applied to gather the target number of respondents. According to Van Voorhis and Morgan (2007), a minimum of fifty participants is a generally accepted number for correlational studies, while Fraenkel et al. (2012) stated that a minimum number of 100 participants is enough for a descriptive study.

Figure 2 shows the distribution of the respondents by sex. Most (60, 55%) of the respondents are female, and the rest are males (50, 45%).

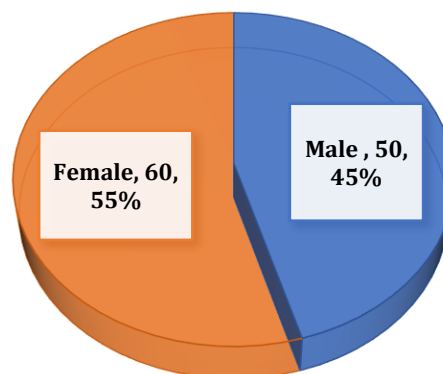


Figure 2. *Distribution of Participants of the Study by Sex*

Instrumentation

The researchers prepared a questionnaire that is divided into three parts:

1. Respondent's Profile Evaluation (**RPE**). This part of the questionnaire gathered the participants' sex which was used as the moderator variable.
2. Big Five Inventory for Personality Type (**BFIPT**). The five-factor model, also known as the "Big Five," is the most widely used and scientifically supported model for personality traits (Chmielewski & Morgan, 2013). It was constructed by Goldberg (1993) and encompassed five personality traits: extraversion, agreeableness, conscientiousness, neuroticism, and openness. This 44-item test was used to evaluate the personality traits of the participants of the study. This test was scored using a 5-point Likert scale, with five being the highest (Strongly Agree) and one being the lowest (Strongly Disagree).
3. Lesson Delivery Methods Evaluation (**LDME**). This questionnaire is a 30-item test evaluating the three lesson delivery methods. Each lesson delivery method has ten questions and is scored through a 5-point Likert scale, ranging from 5 (Always)- 1 (Never).

These instruments have gone through expert validation and reliability testing. The reliability test result of each instrument's subscale is shown in the table below.

Table 1. Reliability Test Result of Personality Traits, and Lesson Delivery Methods

Subscale	Reliability
Personality Traits	
<i>Extraversion</i>	0.803
<i>Agreeableness</i>	0.723
<i>Conscientiousness</i>	0.807
<i>Neuroticism</i>	0.720
<i>Openness</i>	0.813
Lesson Delivery Methods	
<i>Synchronistic Method</i>	0.852
<i>Recorded Video Method</i>	0.914
<i>Textual Method</i>	0.857

Negative statements were recorded before computing the overall means of every variable. Table 2 shows the rating scale used in the study for interpretation.

Table 2. Mean Interval, Response Scale and Verbal Interpretation

Mean Interval	Response Scale	Response Scale	Verbal Interpretation
4.50-5.00	Always	Strongly Agree	Very High
3.50-4.49	Often	Agree	High
2.50-3.49	Sometimes	Moderately Agree	Average
1.50-2.49	Rarely	Disagree	Low
1.00-1.49	Never	Strongly Disagree	Very Low

Data Gathering Procedures

Following the AUP ERB's approval to conduct the study, the researchers wrote a letter to the AUPA principal outlining the study's purpose, objectives, and non-disclosure of the students' responses. An email was sent to the study's intended participants containing a link to the Google Form that included the ERB approval and this study's questionnaire. Throughout the study, anonymity and confidentiality were observed.

Data Analysis

The data collected from Google Forms in an excel file was transformed to SPSS version 21.0 to apply the different statistical processes for analysis. Participants' sex was classified using descriptive statistics of frequency and percentage. Descriptive statistics of mean and standard deviation were applied to find the levels of personality traits and the preferred lesson delivery methods of the respondents. For inferential statistics, the Pearson correlation was utilized to find the relationship between the participants' personality traits and preferred lesson delivery methods. Furthermore, a t-test was used to identify if there is a significant difference in students' preferred lesson delivery methods when sex is considered.

Results and Discussion

Level of Personality Types of the Respondents

The participants of the study had an *average* level of extraversion ($M = 3.06$; $SD = 0.73$), conscientiousness ($M = 3.45$; $SD = 0.64$), neuroticism ($M = 3.41$; $SD = 0.69$), and openness ($M = 3.49$; $SD = 0.63$) and a *high* level of the agreeableness ($M = 3.77$; $SD = 0.63$) personality traits as presented in Table 3.

This study result implies that the respondents are interested in other people, are willing to assist others who need help, and enjoy helping and contributing to other people's happiness. They are moderately open to trying new things, focused on tackling new challenges, spends time preparing, finishes important task right away, enjoys being the center of attention, find it easy to make new things, and sometimes gets upset easily and struggles to bounce back after stressful events.

Table 3. Level of Personality Traits of the Participants of the Study

Personality Traits	Mean	SD	Scaled Response	Verbal Interpretation
Extraversion	3.06	0.73	Moderately Agree	Average
Agreeableness	3.77	0.63	Agree	High
Conscientiousness	3.45	0.64	Moderately Agree	Average
Neuroticism	3.41	0.69	Moderately Agree	Average
Openness	3.49	0.63	Moderately Agree	Average

1.00 -1.49 = **SD**; 1.50-2.49 = **D**; 2.50-3.49 = **MA**; 3.50-4.49 = **A**; 4.50-5.00 = **SA**

Personality traits are people's distinctive thoughts, feelings, and behavior patterns. Someone who scores highly on a particular characteristic, such as extraversion, is assumed to be socially active in various times and situations (Diener & Lucas, 2022).

Research conducted by Cohen and Baruth (2017) reported that openness and conscientiousness were significant predictors of learning satisfaction. Furthermore, the findings stated that groups with the same personality traits prefer the same method of synchronous lesson delivery.

Preferred Lesson Delivery Methods of the Respondents

Table 4 shows that the synchronistic method ($M = 3.97$; $SD = 0.57$), recorded video method ($M = 4.22$; $SD = 0.63$), and textual method ($M = 3.80$; $SD = 0.58$) were all *highly preferred* by the participants of the study.

The result of the study shows that all lesson delivery methods, such as synchronistic, recorded video, and textual, are highly preferred by the students. Furthermore, it indicates that teachers effectively prepare and deliver these three different methods during distance learning.

Table 4. Preferred Lesson Delivery Methods of the Participants of the Study

Lesson Delivery Methods	Mean	SD	Scaled Response	Verbal Interpretation
Synchronistic	3.97	0.57	Often	Highly Preferred
Recorded Video	4.22	0.63	Often	Highly Preferred
Textual	3.80	0.58	Often	Highly Preferred

1.00 -1.49 = *N*; 1.50-2.49 = *R*; 2.50-3.49 = *S*; 3.50-4.49 = *O*; 4.50-5.00 = *A*

Harris et al. (2021) findings of their study show that live lectures were preferred because they were more engaging and interactive, although they were also more stressful. Live lectures' advantages are that they will provide a much-structured learning schedule and may aid the students in managing their workload (Phanse & Chavan, 2021), and it is also more interactive.

Pre-recorded discussions are preferred because they were considered to be significantly more helpful. Moreover, their findings also suggest that students prefer pre-recorded discussions with live question-and-answer portions. Research conducted by Moradi et al. (2018) showed an increase in scores and performance for the intervention group exposed to video lectures. The study's participants also expressed that they learned at their speed.

Phanse and Chavan (2021) reported that pre-recorded discussions were more beneficial to academically motivated students than good, average, and low achievers. The reason is that pre-recorded discussions allow students to control the content by clicking stop, play, rewind, and repeatedly listening to it, which benefits students since they have better self-regulation.

Textual lessons refer to power points, documents, or any lesson materials that are written or typed. In a study by Dangle and Sumaoang (2020), learning through printed and digital modules emerged as the most preferred method for learners in rural areas where the internet is not accessible for online learning. It also showed that most students could not answer their modules independently and badly needed assistance from family members, relatives, and friends.

Lastly, a study by Dargo and Dimas (2021) showed that modular distance learning (MDL) has more negative effects than positive ones. These include the absence of socialization with other students, exposure to physical school activities, typographical errors in some self-learning modules (SLM), the additional workload to working parents, and distractions at home.

Relationship of Personality Types and Preferred Lesson Delivery Methods

Table 5 presents the present the result of the study on relationships among personality traits and preferred lesson delivery methods. Extraversion had a *weak positive* association with the synchronistic method ($r = 0.317$; $p < .001$). Agreeableness has a *moderate positive* relationship with the synchronistic method ($r = 0.481$; $p < .001$) and a *weak positive* relationship with the recorded video method ($r = 0.231$; $p < .05$). conscientiousness and openness demonstrated having positive relationships with the three lesson delivery methods. Conscientiousness has *moderate positive* relationships with the synchronistic method ($r = 0.435$ at $p < .001$) and recorded video method ($r = 0.412$ at $p < .001$) and a *weak positive* relationship toward the textual method ($r = 0.269$ at $p < .01$). On the other hand, openness had *weak positive* relationships with the synchronistic method ($r = 0.246$ at $p < .01$), recorded video method ($r = 0.376$ at $p < .001$), and textual method ($r = 0.324$ at $p < .001$). Finally, neuroticism had a *weak positive* relationship with the recorded video method ($r = 0.252$; $p < .01$).

Hence, the null hypothesis indicating that there is no significant relationship between personality traits and preferred lesson delivery methods is *rejected*.

Furthermore, the result of the study implies that students who enjoy being the center of attention, finds easy to make new friends, and feel energized when around other people prefer the synchronistic method. Students who enjoy helping and contributing to other people's happiness prefer synchronistic and recorded video lessons. Moreover, those who spend time preparing, finish important task right away, pays attention to detail, enjoys having a set schedule, are open to trying new things, are very creative, and are happy to think about abstract concepts prefer all three different

lesson delivery methods such as synchronistic, recorded video and textual. Lastly, students who perceive that they are experiencing much stress, worry about many different things, get upset easily, experience dramatic shifts in mood, and feel anxious prefer only recorded video lessons.

Table 5. *Relationship of the Big Five Personality Traits to Learning Satisfaction*

	Extraversion	Agreeableness	Conscientiousness	Neuroticism	Openness
Synchronistic	0.317***	0.481***	0.435***	0.159	0.246**
Recorded Video	0.075	0.231*	0.412***	0.252**	0.376***
Textual	0.080	0.161	0.269**	0.079	0.324***

Note: * $p < .05$, ** $p < .01$, *** $p < .001$

Patitsa et al.'s (2021) found that students with higher levels of overall satisfaction with synchronous online academic learning (SOAL) have higher degrees of extraversion, conscientiousness, openness, and agreeableness. There was a weak positive relationship between openness and conscientiousness traits with synchronous online academic learning. Extraversion, agreeableness, and neuroticism do not have any significant relationships.

This also appears to be true for individuals with a high level of agreeableness, although to a lesser degree. This supports the findings of this current study which indicated a positive relationship between agreeableness and the synchronistic method. However, unlike Audet et al.'s (2021) findings, only openness was strongly related to online engagements. These studies imply a positive relationship between the synchronistic lesson delivery method and individuals whose dominant personality traits are extraversion, agreeableness, conscientiousness, and openness.

According to Sahanidis and Tsaknis (2021), openness and conscientiousness positively influence learners' satisfaction with synchronous online classes, but neuroticism has a negative impact. Because they tend to perceive more stress in life, students with high levels of neuroticism may have the most difficulty adjusting to the ambiguous environment of online classrooms. This further explains why students with neuroticism may prefer recorded video lessons. Moreover, Audet et al. (2021) stated that students with extraversion, conscientiousness, openness, and agreeableness preferred synchronistic online delivery methods.

Cohen and Baruth (2017) discovered that it is feasible to categorize online learners into groups. Furthermore, their study found that those who preferred similar synchronous channels had similar personality traits. Borg et al. (2021) also discovered that students prefer online synchronous collaboration over asynchronous collaboration. Additionally, they found that when in-person collaboration is limited, the use of online synchronous collaboration is helpful, but that individual differences in personality traits can have varying influences on students' perceptions of and behaviors in collaboration situations. This, therefore, validates that personality traits have a relationship with online learners' preferred lesson delivery method.

Predictor of Preferred Lesson Delivery Method

The linear regression analysis indicated that agreeableness is a significant predictor ($\beta = 0.3285$, $p < .001$) of the synchronistic method. The coefficient of determination ($r^2 = 0.322$) showed that agreeableness could explain an association of 32.20% of the variation in the synchronistic method. The data further *strengthens the findings* from the Pearson correlation, which states that agreeableness has a positive relationship with the synchronistic method. This finding means that students with higher levels of the agreeableness trait also have higher learning satisfaction with the synchronistic lesson delivery method, as presented in Table 6.

Therefore, the null hypothesis stating that none of the personality traits predict learning satisfaction is *rejected*.

This result implies that students who has a great deal of interest in other people and can make friends easily, enjoys and leaning best in the synchronistic lesson delivery method.

Table 6. *Predictor of Proffered Lesson Delivery Method*

Predictor	β	t	p	r^2	F	p
Agreeableness	0.3285	3.587	<.001	0.322	9.87	<.001

Dependent Variable: *Synchronistic Lesson Delivery Method*

This result is similar to Bhagat et al.'s (2019) findings, where agreeableness was a predictor of students' perception of instructor characteristics. The agreeableness trait describes people who are optimistic, like to work with others and have a positive attitude toward new technologies. Their findings might not directly relate to learning satisfaction with the synchronistic method.

It was also found that the agreeableness trait predicts positive perceptions about group work, which includes satisfaction (Borg et al., 2021).

Difference in Preferred Lesson Delivery Method when Sex is Considered

The result of the study shows that there was a *significant difference* in the preferred lesson delivery method when students sex of the respondents was considered, particularly in the recorded video method. As illustrated in Table 7, females had a mean learning satisfaction of 4.30 (SD = 0.58), whereas males only had 3.92 (SD = 0.67). The T-value was 3.195, and the p-value was 0.002, significant at 0.05. From this, it can be concluded that females are more satisfied with the recorded video method than males, as presented in Table 7.

Therefore, the null hypothesis indicating that there is no significant difference in the learning satisfaction of students when their sex is considered is *rejected*.

Table 7. *Difference in Preferred Lesson Delivery Method when Sex is Considered*

LDM	Group	N	Mean	SD	t	p	Verbal Interpretation
Synchronistic	Male	50	3.65	0.66	-0.118	0.907	Not Significant
	Female	60	3.63	0.69			
Recorded Video	Male	50	3.92	0.67	3.195	0.002	Significant
	Female	60	4.30	0.58			
Textual	Male	50	3.40	0.72	1.267	0.208	Not Significant
	Female	60	3.58	0.74			

Note: *LDM - Lesson Delivery Method*

Males and females could be different when it comes to learning preferences. Basuony et al. (2020) reported that read and write learners could be attributed to how females prefer the recorded video method in the study. Additionally, males were found to be kinesthetic learners or prefer hands-on learning or high-energy environments. Males are kinesthetic learners, while females are aural learners or those who learn through audiovisual content. Females are also self-reflective, whereas males are more externally focused. Additionally, females have stronger self-regulation in e-learning contexts (Yu, 2021).

Lastly, Islam et al. (2020) also reported that since females are more organized and diligent, they would naturally prefer pre-recorded video lectures since they allow them to watch and study the video conscientiously. This information could suggest why females' learning satisfaction in the recorded video method is significantly higher than males.

Conclusion

This study concludes that personality traits are associated with preferred lesson delivery methods. The study's result shows that participants have high levels of agreeableness and average levels of extraversion, conscientiousness, neuroticism, and openness. The synchronistic, recorded

video and textual methods were all evaluated well. There is a significant relationship between personality traits and preferred learning methods among students. The agreeableness trait significantly predicts learning satisfaction, particularly with the synchronistic method. There is a significant difference in the learning satisfaction of males and females with the recorded video method. Females are more satisfied with the recorded video method than males.

Recommendation

Based on the conclusions, the following recommendations are proposed; classes predominantly composed of female students should consider utilizing recorded videos more instead of synchronistic classes and textual modules. Future researchers may consider having grade 7 to grade 12 high school students as potential participants so that the findings of their study could be more generalizable. Instead of the preferred lesson delivery method, future researchers may use learning satisfaction.

References

- [1] Ackerman, C. E. (2021, July 12). *Big Five Personality Traits: The OCEAN Model Explained*. Retrieved from <https://positivepsychology.com/big-five-personality-theory/>
- [2] Agarin, M. A. L. (2021). The Challenges and Status of Modular Learning: Its Effect to Students' Academic Behavior and Performance. *EPRA International Journal of Multidisciplinary Research (IJMR)*, 7(7), 321–329. https://eprajournals.com/jpanel/upload/1110pm_64.EPRA%20JOURNALS%207764.pdf
- [3] Aldhahi, M. I., Alqahtani, A. S., Baattaiah, B. A., & Al-Mohammed, H. I. (2021). Exploring the relationship between students' learning satisfaction and self-efficacy during the emergency transition to remote learning amid the coronavirus pandemic: A cross-sectional study. *Education and Information Technologies*, 27(1), 1323–1340. <https://doi.org/10.1007/s10639-021-10644-7>
- [4] Al-Nasa'h, M., Al-Tarawneh, L., Abu Awwad, F. M., & Ahmad, I. (2021). Estimating students' online learning satisfaction during COVID-19: A discriminant analysis. *Heliyon*, 7(12). <https://www.sciencedirect.com/science/article/pii/S2405844021026475>
- [5] Alqurashi, E. (2019). Predicting student satisfaction and perceived learning within online learning environments. *Distance Education*, 40(1), 133–148. <https://doi.org/10.19030/cier.v9i1.9549>
- [6] Amer, A., & Mohammed, K. (2018). Comparing the Effects of Pre-Recorded Lecture and Live Online Lecture on Learning and Sense of Community. *Educated Resources International Center*. <https://eric.ed.gov/?id=ED587670>
- [7] Audet, E. C., Levine, S. L., Metin, E., Koestner, S., & Barcan, S. (2021). Zooming their way through university: Which Big 5 traits facilitated students' adjustment to online courses during the COVID-19 pandemic. *Personality and Individual Differences*, 180. <https://www.sciencedirect.com/science/article/abs/pii/S019188692100344>
- [8] Baber, H. (2021). Social interaction and effectiveness of the online learning – A moderating role of maintaining social distance during the pandemic COVID-19. *Asian Education and Development Studies*, 11(1). <https://www.emerald.com/insight/content/doi/10.1108/AEDS-09-2020-0209/full/html>
- [9] Basith, A., Rosmayadi, Triani, S. N., & Fitri. (2020). Investigation of Online Learning Satisfaction During COVID 19: In Relation to Academic Achievement. *Journal of Educational Science and Technology*, 6(3), 265-275. <https://ojs.unm.ac.id/JEST/article/view/14803>
- [10] Bayucca, S. A. (2021). Challenges encountered and technical assistance needed by parents and learners utilizing modular distance learning: Basis for a proposed support program. *Journal of Humanities and Social Sciences*, 3(3), 128–135. <https://doi.org/10.36079/lamintang.jhass-0303.297>

- [11]Bhagat, K. K., Wu, L. Y., & Chang, C. Y. (2019). The impact of personality on students' perceptions towards online learning. *Australasian Journal of Educational Technology*, 35(4). <https://doi.org/10.14742/ajet.4162>
- [12]Borg, M. E., Butterfield, K. M., Wood, E., Zhang, H. H., & Pinto, S. (2021). Investigating the impacts of personality on the use and perceptions of online collaborative platforms in higher education. *SN Social Sciences*, 1(40). <https://doi.org/10.1007/s43545-020-00053-x>
- [13]Brysbaert, M. (2019). How many participants do we have to include in properly powered experiments? A tutorial of power analysis with reference tables. *Journal of Cognition*, 2(1), 16. <http://doi.org/10.5334/joc.72>
- [14]Carmichael, M., Reid, A., Karpicke, J. (2018). *Assessing the Impact of Educational Video on Student Engagement, Critical Thinking and Learning: The Current State of Play*. <https://us.sagepub.com/sites/default/files/hevideolearning.pdf>
- [15]Chmielewski, M. S., & Morgan, T.A. (2013). Five-Factor Model of Personality. *Encyclopedia of Behavioral Medicine*. https://doi.org/10.1007/978-1-4419-1005-9_1226
- [16]Choe, R. C., Scuric, Z., Eshkol, E., Cruser, S., Arndt, A., Cox R., Toma, S. P., Shapiro C., Levis-Fitzgerald, M., Barnes, G., & Crosbie, R. H. (2019). Student Satisfaction and Learning Outcomes in Asynchronous Online Lecture Videos. *CBE—Life Sciences Education*, 18(4), 1–14. <https://doi.org/10.1187/cbe.18-08-0171>
- [17]Cohen, A., & Baruth, O. (2017). Personality, learning, and satisfaction in fully online academic courses. *Computers in Human Behavior*, 72, 1-12. <https://doi.org/10.1016/j.chb.2017.02.030>
- [18]Dangle, Y. R. P., & Sumaoang, J. D. (2020). *The Implementation of Modular Distance Learning in the Philippine Secondary Public Schools*. <https://www.dpublication.com/wp-content/uploads/2020/11/27-427.pdf>
- [19]Dargo, J. M., & Dimas, M. (2021). Modular Distance Learning: Its Effect in the Academic Performance of Learners in the New Normal. *Jetl (Journal of Education, Teaching and Learning)*, 6(2). <http://dx.doi.org/10.26737/jetl.v6i2.2672>
- [20]Dejene, W. (2019). The practice of modularized curriculum in higher education institution: Active learning and continuous assessment in focus. *Cogent Education*, 6(1). <https://www.tandfonline.com/doi/full/10.1080/2331186X.2019.1611052#:~:text=Modular%20approach%20to%20teaching%20enables,appropriate%20for%20more%20mature%20students.>
- [21]Department of Education. (2020). DepEd prepares Self-Learning Modules for education's new normal. *Republic of the Philippines Department of Education*. https://www.deped.gov.ph/2020/07/02/deped-prepares-self-learning-modules-for-educations-new-normal/?fbclid=IwAR1xEvOOtp_9rrGiwOdSpjg8L1_sNTD1ywnayegeGeZloC6u6oT35j9Ukt0
- [22]Dickerson, L. (2021). *The Four Transactional Distances of The Apocalypse: A Critical Realist Case Study of Higher Education During Covid-19*. <https://digitalcommons.csp.edu/edd/18>
- [23]Diener, E., & Lucas, R. E. (2022). Personality traits. *Noba textbook series: Psychology*. <http://noba.to/96u8ecgw>
- [24]Elshami, W., Taha, M. H., Abuzaid M., Saravanan, C., Al Kawas, S., Abdalla, M. E., (2021). Satisfaction with online learning in the new normal: perspective of students and faculty at medical and health sciences colleges. *Medical Education Online*, 26(1). <https://www.tandfonline.com/doi/full/10.1080/10872981.2021.1920090>
- [25]Fraenkel, J. R., Wallen, N. E., & Hyun, H. H. (2012). *How to design and evaluate research in education*, 8.
- [26]Francescucci, A., & Rohani, L. (2018). Exclusively Synchronous Online (VIRI) Learning: The Impact on Student Performance and Engagement Outcomes. *Journal of Marketing Education*. <https://journals.sagepub.com/doi/full/10.1177/0273475318818864>

- [27]Furnham, A. (1992). Personality and learning style: a study of three instruments. *Personality and individual differences*, 13, 429-438.
- [28]Gillan, C., Papadakos, J., Brual, J., Harnett, N., Hogan, A., Milne, E., Giuliani, M. E. (2018). Impact of high-fidelity e-learning on knowledge acquisition and satisfaction in radiation oncology trainees. *Current Oncology*, 25(6). <https://www.mdpi.com/944350>
- [29]Goldberg, L. R. (1993). The structure of phenotypic personality traits. *American Psychologist*, 48, 26–34.
- [30]Gordon, S., & Susman, D. (2020, September 17). *What Is Agreeableness?* Retrieved from <https://www.verywellmind.com/how-agreeableness-affects-your-behavior-4843762>
- [31]Grollino, E., & Velayo, R. S. (1996). *Gender Differences in the Attribution of Internal Success among College Students*. <https://eric.ed.gov/?id=ED406931>
- [32]Grover, P., Dighe, A., Phadke, S. S. D., & Tilak, P. (2021). Efficacy of Online Pre-recorded Practical Demonstrations and Live Streamed Practical Demonstrations in Third Year Physiotherapy Students during the COVID-19 Pandemic - A Survey. *Turkish Journal of Physiotherapy and Rehabilitation*, 32(3), 6694-6699.
- [33]Gurven, M., von Rueden, C., Massenkoff, M., Kaplan, H., & Lero Vie, M. (2013). How universal is the Big Five? Testing the five-factor model of personality variation among forager-farmers in the Bolivian Amazon. *Journal of personality and social psychology*, 104(2), 354–370. <https://doi.org/10.1037/a0030841>
- [34]Harris, R., Blundell-Birtill, P., Sutherland, E., & Pownall, M. (2021). Students' perceptions of online lecture delivery: An empirical mixed-methods investigation. *Psychology Teaching Review*, 27(1), 69-78. <https://files.eric.ed.gov/fulltext/EJ1304623.pdf>
- [35]İnce, E. Y., Kabul, A., & Diler, İ. (2020). Distance Education in Higher Education in the COVID-19 Pandemic Process: A Case of Isparta Applied Sciences University. *International Journal of Technology in Education and Science*, 4(4), 343-351. <https://files.eric.ed.gov/fulltext/EJ1271262.pdf?fbclid=IwAR0efFWoW2ld8D0eFSebzzThqo74npGHwCloyLDp4BRPMpl5vUBEZh1W3BU>
- [36]Islam, M., Kim, D. A., & Kwon, M. (2020). A Comparison of Two Forms of Instruction: Pre-Recorded Video Lectures vs. Live ZOOM Lectures for Education in the Business Management Field. *Sustainability*, 12(19). <https://doi.org/10.3390/su12198149>
- [37]John, O. P., & Srivastava, S. (1999). The Big-Five trait taxonomy: History, measurement, and theoretical perspectives. *Handbook of personality: Theory and research*, 2, 102-138.
- [38]Kolegova, I. A., & Levina I.A. (2022). *The Impact of Modular Learning of English For Specific Purposes on Students' Satisfaction of Education Process*. <https://Cyberleninka.Ru/Article/N/The-Impact-Of-Modular-Learning-Of-English-for-specific-purposes-on-students-satisfaction-of-education-process>.
- [39]Köseoğlu, Y. (2016). To What Extent Can the Big Five and Learning Styles Predict Academic Achievement. *Journal of Education and Practice*, 7(30). <https://files.eric.ed.gov/fulltext/EJ1118920.pdf>
- [40]Li, N., Marsh, V., Rienties, B., & Whitelock, D. (2017). Online learning experiences of new versus continuing learners: a large scale replication study. *Assessment & Evaluation in Higher Education*, 42(4), 657-672. https://oro.open.ac.uk/46012/2/Assess_Eval_Rienties_clean.pdf
- [41]MacRae, I., & Furnham, A. (2021, March 2). What Are The Big 5 Personality Traits? *Thomas International*. Retrieved from <https://www.thomas.co/resources/type/hr-guides/what-are-big-5-personality-traits>
- [42]Moore, M. G. (1993). Theory of transactional distance. In D. Keegan, (Ed.), *Theoretical principles of distance education*. New York: Routledge.
- [43]Moradi, M., Liu, L., Luchies, C., Patterson, M. M., & Darban, B. (2018). Enhancing Teaching-Learning Effectiveness by Creating Online Interactive Instructional Modules for Fundamental Concepts of Physics and Mathematics. *Education Sciences*, 8(3). <https://doi.org/10.3390/educsci8030109>

- [44]Murphy, L., Eduljee, N. B., Croteau, K., & Parkman, S. (2020). Relationship between personality type and preferred teaching methods for undergraduate college students. *International Journal of Research in Education and Science (IJRES)*, 6(1), 100-109. https://www.researchgate.net/publication/337199851_Relationship_Between_Personality_Type_and_Preferred_Teaching_Methods_for_Undergraduate_College_Students/citations#fullTextFileContent
- [45]Nguyen, T., Netto, C. L. M., Wilkins, J. F., Bröcker, P., Vargas, E. E., Sealfon, C. D., Puthipiroj, P., Li, K. S., Bowler, J. E., Hinson, H. R., Pujar, M., & Stein, G. M. (2021). Insights Into Students' Experiences and Perceptions of Remote Learning Methods: From the COVID-19 Pandemic to Best Practice for the Future. *Frontiers in Education*. <https://doi.org/10.3389/feduc.2021.647986>
- [46]Ou, C., Joyner, D. A., & Goel, A. K. (2019). *Designing and Developing Video Lessons for Online Learning: A Seven-Principle Model*. <https://files.eric.ed.gov/fulltext/EJ1218394.pdf>
- [47]Patitsa, C., Sahinidis, A. G., Tsaknis, P. A., & Giannakouli, V. (2021). Big Five personality traits and students' satisfaction with synchronous online academic learning (SOAL). *Corporate & Business Strategy Review*, 2(2), 8-16. <https://doi.org/10.22495/cbsrv2i2art1>
- [48]Phanse, S. S., & Chavan, C. U. (2021). Comparative Study On Effectiveness Of Using Pre-Recorded Teaching Content And Online Live Lectures As Medium Of Instruction In Teacher Education. *Bi-lingual International Research Journal*, 11(41), 68-72.
- [49]Racheva, V. (2018). Social aspects of synchronous virtual learning environments. *AIP Conference Proceedings*. <https://doi.org/10.1063/1.5082050>
- [50]Robertson, B., & Flowers, M. (2020) *Determining the impact of lecture videos on student outcomes*.<https://www.berghahnjournals.com/view/journals/latiss/13/2/latiss130203.xml?ArticleBodyColorStyles=pdf-4278>
- [51]Roslan, S., Hasan, S., Zaremohzzabieh, Z., & Mohamad Arsad, N. (2021). Big Five Personality Traits as Predictors of Systems Thinking Ability of Upper Secondary School Students. *Social Sciences & Humanities*, 29(1), 251-269. <https://doi.org/10.47836/pjssh.29.s1.14>
- [52]Sahinidis, A., & Tsaknis, P. A. (2021). Exploring the Relationship of the Big Five Personality Traits with Student Satisfaction with Synchronous Online Academic Learning: The Case of Covid-19-Induced Changes. *Strategic Innovative Marketing and Tourism in the COVID-19 Era*, 87-94. https://ideas.repec.org/h/spr/prbchp/978-3-030-66154-0_10.html
- [53]Satow, L. (2021, January 31). *Reliability and Validity of the Enhanced Big Five Personality Test (B5T)*. Retrieved from <https://doi.org/10.31234/osf.io/wsugv>
- [54]Seyal, A., Siau N. Z., & Suhali, W. S. H. (2019). Evaluating Students' Personality and Learning Styles in Higher Education: Pedagogical Considerations. *International Journal of Learning, Teaching and Educational Research*, 18(7), 145-164. <http://ijlter.net/index.php/ijlter/article/view/541/545>
- [55]Singh, R., & Awasthi, S. (2020). *Updated Comparative Analysis on Video Conferencing Platforms- Zoom, Google Meet, Microsoft Teams, WebEx Teams and GoToMeetings*, 1–9. <https://www.easychair.org/publications/preprint/download/Fq7T>
- [56]Sulistyowati, Y. (2022). Pengaruh The Influence of Learning Culture and Student Personality Characteristics on Learning Satisfaction through Online Learning Readiness as a Mediation Variable for Students of the Faculty of Economics, State University of Jakarta. *Jurnal Pendidikan Ekonomi, Perkantoran, Dan Akuntansi - JPEPA*, 2(3), 379-391. <http://pub.unj.ac.id/index.php/jpepa/article/view/308>
- [57]van Thiel, E. (2020, February 11). *Big Five personality test traits*. Retrieved from <https://www.123test.com/big-five-personality-theory/>
- [58]Vlachogianni, P., & Tselios, N. (2021). Investigating the impact of personality traits on perceived usability evaluation of e-learning platforms. *Interactive Technology and Smart Education*. <https://doi.org/10.1108/itse-02-2021-0024>

- [59]Weidlich, J., & Bastiaens, T. J. (2018). Technology Matters - The Impact of Transactional Distance on Satisfaction in Online Distance Learning. *International Review of Research in Open and Distributed Learning*, 19(3).
<http://www.irrodl.org/index.php/irrodl/article/view/3417/4646>
- [60]Widiger, T. A., & Oltmanns, J. R. (2017). Neuroticism is a fundamental domain of personality with enormous public health implications. *World Psychiatry*, 16(2), 144-145.
<https://doi.org/10.1002/wps.20411>
- [61]Yen, T. V, & Nhi, N. T. U. (2021). The Practice of Online English Teaching and Learning with Microsoft Teams: From Students' View. *AsiaCALL Online Journal*, 12(2), 52-57.
<https://asiacall.info/acoj/index.php/journal/article/view/41/20>
- [62]Yu, Z. (2021). The effects of gender, educational level, and personality on online learning outcomes during the COVID-19 pandemic. *International Journal of Educational Technology in Higher Education*, 18(14). <https://doi.org/10.1186/s41239-021-00252-3>
- [63]Zeng, X., & Wang, T. (2021). College Student Satisfaction with Online Learning during COVID-19: A review and implications. *International Journal of Multidisciplinary Perspectives in Higher Education*, 6(1), 182–195.
<https://www.ojed.org/index.php/jimphe/article/view/3502/1483>

Level of Effectiveness of Preclinical Restorative Dentistry Instructional Methods, Level of Confidence, and Clinical Performance of Third Year Dental Students

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Abstract: Interaction with faculty is important in the development of the skills and techniques of the students during their clinical education. This descriptive-correlational study determined the preclinical restorative dentistry instructional method effectiveness and the correlation to the level of confidence and clinical performance of the third-year dental students at a private university. Complete enumeration technique was used. The students found the instructional methods very highly effective with an average weighted mean of 3.58. They felt highly confident in clinic requirement completion with an average weighted mean of 3.38. 84.86% of the students received a grade of 90-94 in clinical Restorative Dentistry. The instructional method effectiveness had a 'moderate correlation' with the level of confidence with r value of 0.351. There was a 'negligible' to 'low correlation' between instructional method effectiveness and clinical performance with r values of 0.052 and -0.126. There was a 'low correlation' between the level of confidence and clinical performance with r value of 0.206. The more effective the instructional methods are, the more confident students are in the completion of requirements. The very good clinical performance at the beginning of patient care is not dependent on the instructional methods used. The higher the confidence of students in the completion of requirements, the better their clinical performance. Multiple skills to treat a patient can be integrated in the course to connect preclinical to clinical setting. Critical thinking activities, visual aids, internet links and hand-outs, and peer-to-peer collaborations can be incorporated to connect classroom learning with patient care.

Keywords: *restorative dentistry, instructional methods, confidence, clinical performance, dental student*

Introduction and Literature Review

The interactions with faculty who serve as the students' coaches, mentors, and evaluators are being depended on for the development of the skills and techniques of the students during their clinical education. According to Henzi, et al. (2006), as cited by Danaei (2015), the dental students thought that the most effective instructors took their teaching responsibilities seriously, behaved in a professional manner during interactions with students and patients, and were technically competent.

The technical competency can be argued to be subjective since the clinical instructors do not come from one alma mater; therefore, they have different schools of thought. Two instructors teaching the same course, but different academic years, may have an impact on the self-confidence and the clinical performance of students when they reach third year proper.

At the University of Perpetual Help System Laguna, Restorative Dentistry is taught based on two theoretical and two practical courses during the second year proper of study. Commission on Higher Education (CHED) released the CHED Memorandum Order No. 33 Series of 2006 regarding the Policies, Standards, and Guidelines for Dental Education. In Article VI Section 9 Course Specifications, the course outline for Restorative Dentistry I and Restorative Dentistry II, both preclinical courses were listed down for the lecture but there was none specified for the laboratory exercises. Only the equipment and materials were listed for the laboratory. For Restorative Dentistry I, they are "simulators, mannequins, handpiece, amalgamator, light cure, typodont, other hand instruments" and for Restorative Dentistry II, they are "typodont, hand instruments, handpiece, burs, and restorative materials". In American Dental Association website (2018), under Types of Instruction, Laboratory/Preclinical indicates instruction in which students receive supervised experience

performing functions using study models, manikins or other simulation methods; students' performance is evaluated by faculty according to predetermined criteria.

University of Perpetual Help System Laguna is an autonomous institution, and the faculty has the freedom to revise or review the curriculum and its courses. Preclinical courses can be revised but confusion becomes apparent when they move on to clinical courses where there are different ideologies from different instructors. This study will help in designing the preclinical course curriculum, particularly Restorative Dentistry, according to the perspective of the dental students.

The goal of health professions education is to develop a program that integrates and implements the various areas of learning that set competent practice. Over time, these programs should give students the means to achieve consistent, acceptable results in learning environments that emulate actual work settings. In pursuit of this result, dental schools must continually adjust their curricula, coursework, and contents in search of the best model.

Traditional lectures for theory and direct instruction, live demonstration, and simulation for laboratory are being used as instructional methods for preclinical Restorative Dentistry. Since there are no specific guidelines for the laboratory exercises in preclinical Restorative Dentistry, different instructors had different instructions in the laboratory course. In Academic Year 2015-2016, the laboratory exercises involve the use of natural human teeth on a block and typodont teeth on articulators, initial use of low speed handpiece for preparation of teeth, use of diamond burs, and final examination was on a live patient. In Academic Year 2016-2017, the laboratory exercises include the use of typodont teeth on articulators, use of high-speed handpiece for preparation of teeth, use of carbide burs, use of rubber dam, use of sectional matrix, and all practical examinations are done on typodont on manikins. Once the instructors are rotated again and given different assigned courses, same problem will arise because there are no consistencies, no memorandum given, and no calibration was done for all instructors.

The third year dental proper first semester is vital for students to practice clinical skills and acquire self-confidence in dealing with patients and oral disease. Adequate confidence is the foundation of working as an independent dentist. Confidence levels could largely reflect imperfections in dental education. Considering this, this paper studied students' self-confidence level on completion of Clinic 1 Restorative Dentistry requirements to see where we should pay more attention and make improvements on dental education in University of Perpetual Help System Laguna, and eventually the whole country. Although self-confidence is a representative indicator, it is a subjective reflection of students' performance. This is the reason the clinical performance as measured in grades for the clinical requirements is included for a more objective assessment. (Wu, et al., 2016)

From these premises, the researcher attempts to determine the effectiveness of the preclinical Restorative dentistry instructional methods and how it correlates to the level of confidence and the clinical performance of third year dental students at UPH-College of Dentistry, AY 2017-2018. The findings from this study will provide direction and guidance for further curricular integration and other changes.

Level of Effectiveness of Instructional Methods

Aside from the effectiveness of the instructors and the curriculum, instructional methods must also be delved into to understand the effect on student learning. There are several instructional methods used in dentistry. Laboratory practice offers one of the best opportunities for active learning and the satisfactory performance of procedures, like restorative and endodontic dentistry, depend on specific knowledge regarding anatomic details of the teeth. Laboratory classes constitute one of the most difficult phases in training since numerous errors are performed by the students at this stage. This makes the search for strategic methods that improve learning skills a constant challenge for the educators

The study of Shah, et al. (2015) investigated an instructional method. They studied if a videotaped feedback method enhanced teaching and learning outcomes in a preclinical operative laboratory setting for novice learners. The control group prepared a Class II tooth preparation for

amalgam after receiving a video demonstration of the exercise. The experimental group received the same video demonstration as the control group, but they also participated in a discussion and analysis of the control groups' videotaped performance and then performed the same exercise. The group that received video demonstration and videotaped feedback showed a better performance in their procedural skills than the group that received only the video demonstration. Most students in the experimental group perceived that this technique enhanced their learning experience.

Rosa, et al. (2013) particularly studied the visual methods in dental education. According to their study, visual experiences more accurately be like the difficulty of a clinical situation than descriptive approaches to the same subject. The results showed that students that received a live demonstration were able to remove nearly twice as much carious dentine in the same amount of time as students of the other group that only had traditional lecture. This shows that the application of a visual educational method improves students' efficacy in removing carious dentine. They have concluded that use of videos and live demonstrations are practical, simple and cheap as well as easy to understand and apply in an educational setting. Visual educational methods resemble the clinical situation more than traditional lectures, which can advance students' learning and support the progress of clinical competence. It was also revealed in the study that the educational methods were equally efficient to promote confidence related to the procedure.

Oliveira, et al. (2012) have recognized also that visual demonstration of laboratory procedures is a key element in teaching pedagogy. In the study, they particularly studied the effectiveness of real time visual demonstration of endodontic cavity preparation. The study results showed that occurrence of errors and accidents during the endodontic cavity preparation carried out by the students of 3rd year were significantly lower when compared with the students of the 4th year who did not receive the video demonstration. This method validates the important role of technology in the current context of the teaching models, increasing and facilitating the levels of learning. The alternative teaching method strategy favored learning and decreased the incidence of errors. Moreover, the related methodology was considered good and interesting in the students' opinion.

The study by Park, et al (2017) studied the effectiveness of an instructional method, particularly the use of computer-assisted design/ computer-assisted manufacturing (CAD/CAM) in preclinical dentistry. They have found out that it was useful in linking a gap in learning styles and aiding the self-assessment skills of students in preclinical dentistry. The use of taper and undercut tools of the prepCheck learning system was scored highest by these students, and the study found that students' perceptions of prepCheck and their preclinical performance were related. Students who performed poorest rated the software as significantly more useful. These findings may be helpful to educators implementing similar technologies for use as a learning tool during preclinical exercises. It is particularly important to explore the use of this technology because of the importance of self-assessment and the difference of performers and learning styles.

On the other hand, Patel, et al. (2015) examined the impact of psychomotor operative video demonstrations on first-year dental students who are performing specific procedures for the first time in a preclinical setting. The operative technique videos did not improve the ability of the first-year dental students to perform Class I amalgam preparations, Class I amalgam restorations, nor Class I composite restorations for the first time in a preclinical laboratory environment. Although this study found that the psychomotor video demonstrations did not affect students' performance on selected operative procedures done for the first time in a preclinical environment, the videos were positively evaluated by students and appeared to improve accuracy of self-assessment.

Quinn, et al. (2003), as cited by Prithviraj, et al. (2014), compared the effectiveness of conventional and virtual reality (VR) simulation in the skills acquisition of junior dental students. VR-based training has been used for the repeated utilization of a standardized simulated patient with standardized treatment scenarios. Use of these simulations would be superior to conventional training, with plastic teeth, as the individual layers of the natural tooth are represented in the virtual tooth, including dentinal carious lesions. It also allows preparations to be viewed from many angles and at varying, operator-controlled magnification. VR based training provides positive feedback and

encouraging improvement in technique because individual sessions may be recorded and replayed at will. Difference in instructor evaluation was supposed by dental students as a disadvantage of traditional training in operative dentistry. Results showed that agreed scores for the retention and wall angulation criteria did not have significant differences between VR based training and conventional training groups. Outline form, smoothness and cavity depth resulted in statistical significance for agreed scores. The VR based training group had worse qualitative scores. The results showed that VR-based skills acquisition is not suitable for use as the only method of feedback and evaluation for beginner students.

Level of Confidence

Curricula in a dental program should support the development of a confident and well-rounded dentist, prepared to treat a variety of patients in traditional and nontraditional settings.

The confidence of a clinician is a psychological characteristic that mirrors one's trust in his or her ability to successfully complete an activity. In general, self-confidence is not equal to competence. It was noted that self-confidence comes from achievements and successful experience. A high confidence level means a student has successfully worked with a certain number of clinical cases and gained approval from instructors, which reflects competence to some extent. It is also reported that dental schools should monitor the confidence of their students in completing clinical tasks. This will give them the chance to address these shortfalls in confidence before graduation. (Wu, et al., 2016)

According to Fugill (2014), a recurring remark from students and teachers is that the early stages of clinical patient contact can be stressful, and that simulation is one of the factors in improving student confidence. Studies report increased student confidence because of simulation. Lasater (2007), as cited by Battista (2017), relates simulation to clinical confidence and clinical judgement. Student confidence is an important simulation outcome, because some degree of confidence is important to clinical operation. On the other hand, overconfidence is potentially dangerous. Simulation provides the student with a window into the relevant clinical task and reduces fear of the unknown. It might be supposed that the relationship between confidence and performance transfers from the pre-clinical to the clinical settings. But as would be mentioned later, there are some evidences for a lack of correlation between pre-clinical and clinical performance in dentistry. This lack of correlation may be due to factors other than student confidence, such as teamwork, patient interaction and patient variation, which are not available to the student in the pre-clinical setting but are of huge importance in the clinical one.

In the study of Baidas, et al. (2017), competence was defined as "what students must be able to do on their own when they begin practice" and as "bridge between education and practice." Increased confidence has been associated with increased clinical competence. Student self-assessments have been commonly used in the evaluation of dental school curriculum, for effectiveness of specific courses within the dental school curriculum and, assessing teaching strategies. Student self-assessment survey of dental procedures provides information on the strengths and weakness of the curriculum. However, it is not indicative of competency. The results of the study showed that students were more confident in simple procedures than complex procedures. Male students were found to be more confident in some clinical procedures which required more technical skills. Students' GPA was not a true indicator nor was an individual element for the students' confidence level in performing variety of dental procedures.

Gilmour, et al. (2016) mentions that performing a procedure several times increases not only expertise, but also confidence is common. Confidence is not measured directly, and self-perceived confidence is used as a substitution for preparedness. Level of confidence has implications for practice. Under-confidence could make a student over-reliant on trainers and so slow development. Conversely, over-confident individuals may risk patient safety by attempting tasks beyond their competence. The study resulted high scores for restorative procedures, which may be linked to the amount of time spent in restorative clinics as an undergraduate.

Predictors of Student Clinical Performance

Over the years, several dental educators noticed dental students struggling to perform at the start of their practical training. Several studies used several tests to inspect the inborn abilities of dental applicants to predict future clinical performance, but these tests may not be applicable as predictors because practice appears to significantly improve the manual ability of students. There is no strong evidence that predictive tests have any practical predictive capacity and it would be unsuitable to discriminate between students based on these scores.

Suksudaj, et al. (2012) have studied if innate ability and motivation matter in acquiring psychomotor skills in operative dentistry. They have determined that the acquisition of psychomotor skills is a key competence required in dentistry. The significant factors that can influence skill acquisition include student-related factors, e.g. level of innate ability and motivation, and non-student-related factors, e.g. the learning environment. The results of the study revealed weak positive associations between the characteristics of psychomotor ability and motivation with performance of dental students on cavity preparation exercises. Student-related factors provide limited information to explain differences in performance or be useful to predict future performance in a dental program. Future studies should focus on non-student-related factors, e.g. the learning environment, including the type and sequence of learning activities. Motivational determinants have been stated to influence ability–performance interactions, with low motivation resulting in low levels of performance among both low- and high-ability individuals. In contrast, with high motivation, variability in ability tends to dictate performance.

The study of Curtis, et al. (2007), as cited by Arigbede (2016), revealed that a knowledge-based objective structured examination (OSCE) scores and scores on a manual skills exercise completed on a typodont were not statistically significant predictors of performance in a competency casting exam on a patient. There was a suggestion in the study that overlearning or practicing a skill beyond the point of initial correct performance, may be helpful to transfer skills from preclinical to clinical contexts. This study focused on the correlation of preclinical and clinical performances.

Another study that showed same results is the one conducted by Nunez, et al. (2012). Results showed that score on the typodont exam was often larger than the patient composite score, especially for poorer performing students. According to the authors, students' clinical performance on typodonts is a poor predictor of their clinical performance on patients since the students performed much worse on the clinical patient examination than on the typodont examination.

Both Curtis, et al.'s and Nunez, et al.'s studies found that preclinical training on a typodont was not an accurate predictor of clinical success on live patients. On the other hand, the study by Velayo, et al. (2014) concluded otherwise. The study did not challenge their conclusions since those studies used third- and fourth-year students who had successfully completed the preclinical curriculum and compared their performance on fixed prosthodontics examinations on a typodont and live patient. Rather than attempting to test the accuracy and reliability of the typodont in simulating a live patient, Velayo, et al.'s (2014) study attempted to assess the overall effectiveness of the preclinical dental curriculum. Mainly, they were interested in how the hands-on dental training on typodonts translates in the clinic for third- and fourth-year students. The results of their study suggest that preclinical training in the classroom and on the typodont was associated with performance in the clinic. However, the study did not identify the discrete factors that influence preclinical and clinical performance.

Polyzois, et al. (2011) examined the effectiveness of conventional preclinical training in dentistry and determined if evaluation of a dental procedure at the beginning of dental training can be a predictor for future performance. Results from this study showed that there was a significant improvement in the performance of the students after the end of conventional training. According to the authors, studying dentistry leads to an improvement in manual skills. Students who scored low initially markedly improved by the end of training but those that scored high initially improved little or not at all.

Imber, et al. (2003), as cited by Perry, et al. (2017), tested the ability of a virtual reality dental simulator in predicting the performance of students in a traditional operative dentistry manikin course. Students were pre-tested on the simulator prior to the course. Scores achieved in the virtual simulator and the manikin course were compared. Class standing of the students in the simulator pre-test positively correlated with their grades in the manikin course. The virtual simulator was also used to predict the students who will fall into the high and low performing groups in the class. This could enable early allocation of personal tutors to students who perform poorly to improve their chances of success.

Methodology

This study utilized the descriptive-correlational design. According to Bermudo, et al., (2010), this research design allows the researcher to describe systematically, factually, accurately, and objectively a situation, problem or phenomenon as it naturally occurs. This study specifically described the variables such as level of effectiveness of instructional methods in preclinical restorative dentistry, level of confidence, and clinical performance of the third-year dental students of College of Dentistry in University of Perpetual Help System Laguna. Further, the study probed the significance of relationships, through correlation, between the level of effectiveness of preclinical Restorative Dentistry instructional methods and the level of confidence; between the level of effectiveness of preclinical Restorative Dentistry instructional methods and clinical performance; and between the level of confidence and their clinical performance in their Clinic 1 Restorative Dentistry requirements

Sources of Data

The study had two sources of data namely; primary and secondary sources. The primary sources of the data were the third-year dental students of College of Dentistry enrolled during Academic Year 2017-2018. Secondary sources of the data were the clinical final grades, books, thesis, internet, journals, periodicals, magazine, and other reference materials deemed necessary to gather the needed information of the study.

Population of the Study

The study aimed at determining the level of effectiveness of instructional methods in preclinical restorative dentistry, level of confidence, and clinical performance of third year dental students in University of Perpetual Help System Laguna. The respondents of the study were composed of all the 33 third year proper dental students in University of Perpetual Help System Laguna who were enrolled in Clinical Dentistry 1 (ClinDen1) during the first semester of AY 2017-2018. Complete enumeration technique was used in the study.

Instrumentation and Validation

The researchers used non-standardized questionnaire consisting of three parts. Part I focused on the level of effectiveness of preclinical Restorative Dentistry instructional methods; Part II was on the students' level of confidence in completion of Clinic 1 Restorative Dentistry; and Part III three was the consent for retrieval of clinical performance in Clinic 1 Restorative Dentistry.

The questionnaire was designed based on relevant articles found in a literature review focused on effective instructional methods and dental students' confidence in their restorative clinical skills. Since the questionnaire was non-standardized, it was subjected to the face and content validity. It was presented to the panel of experts; one in dentistry, in research, and in statistics for their comments and suggestions. The questionnaire also underwent reliability testing. This was done on 26 fourth year dental students; they answered the questionnaire to be tested. The standard Cronbach coefficient alpha values were 0.620 (moderately good) for the level of effectiveness of instructional methods, and 0.770 (good) for level of confidence of dental students, indicating good internal consistency and reliability of the construct. After some modifications, it was presented to the adviser for final approval and it was distributed to the target respondents.

Evaluation and Scoring

The instructional methods that were evaluated by the students were the traditional lectures for theory and direct instruction, live demonstration, and simulation for laboratory.

To determine the level of effectiveness of instructional methods in preclinical Restorative Dentistry and the students' level of confidence in completion of Clinic 1 Restorative Dentistry requirements' the following measures were used:

Assigned Points	Numerical Ranges	Categorical Response	Verbal Interpretation
4	3.51-4.00	Strongly Agree (SA)	Very High
3	2.51-3.50	Agree (A)	High
2	1.51-2.50	Disagree (D)	Low
1	1.00-1.50	Strongly Disagree (SD)	Very Low

To determine the students' clinical performance in Clinic 1 Restorative Dentistry at University of Perpetual Help System Laguna, the following measures were used:

Numerical Ranges	Verbal Interpretation
95-99	Excellent
90-94	Very Good
85-89	Good
80-84	Satisfactory

Data Gathering Procedure

First, the researcher asked the College of Dentistry office for permission to conduct the study and to provide them the list of third year dental students enrolled in this department. After having the list, the researcher assigned a staff to conduct the data gathering and he/she was oriented and given proper instructions for the implementation. The staff then introduced oneself to the dental students. The staff then explained to the respondents the purpose of the study and procedures of answering questionnaire. Confidentiality was guaranteed. Students were issued with a cover sheet outlining the purpose of this study and explaining that participation was voluntary and anonymous. Consent was implied by responding to the questionnaire. The questionnaires were collected right after they were answered.

A retrospective audit of final grades in clinical Restorative Dentistry was conducted. All the final grades used as data for evaluating clinical performance was obtained from the Executive Director's office through the Clinical Head's student files. Grades of entire class of 33 dental students in third clinical year in first semester 2017-2018 were reviewed. The data obtained were made anonymous, and all standard ethical principles pertaining to data protection were strictly followed. Only the staff assigned to the project in the Executive Director's Office had access to the key connecting randomized identification numbers to student identities. The grades included were only for the three required Class I amalgam restorations and one Class III composite restoration. These requirements were graded by the Restorative Dentistry clinical instructors. The gathered data were tallied, tabulated, analyzed, and interpreted.

Statistical Treatment of Data

The following statistical tools were used to the gathered data:

1. Weighted mean was used to determine the (a) level of effectiveness of instructional methods in preclinical Restorative Dentistry, (b) level of confidence in completion of Clinic 1 Restorative Dentistry requirements, and (c) clinical performance of third year dental students in Clinic 1 Restorative Dentistry.

2. Pearson r was used to determine if there is a relationship in the (a) level of effectiveness of instructional methods in preclinical Restorative Dentistry and level of confidence in completion of Clinic 1 Restorative Dentistry requirements, (b) level of effectiveness of instructional methods in preclinical Restorative Dentistry and clinical performance in Clinic 1 Restorative Dentistry and (c) level of confidence in completion of Clinic 1 Restorative Dentistry requirements and clinical performance in Clinic 1 Restorative Dentistry.

Findings/Results

Level of Effectiveness of Preclinical Restorative Dentistry Instructional Methods

Table 1. *Level of Effectiveness of Preclinical Restorative Dentistry Instructional Methods: Diagnosis and Treatment Planning*

Indicators	Topic	Weighted Mean	Verbal Interpretation	Rank
1. The information presented to me during restorative courses was helpful when performing the intra- and extraoral examination of your patient/case.	Oral exam	3.76	Very High	2
2. The preclinical courses were helpful in providing sufficient information to recognize complex cases requiring specialty referral or consultation	Complexity recognition	3.67	Very High	4
3. Preclinical laboratory and lecture introduced me to the clinical procedures and requirements that are located in the clinicians' handbook.	Requirements introduction	3.55	Very High	5.5
4. Preclinical restorative courses provided sufficient information to properly diagnose carious lesions.	Diagnosis	3.73	Very High	3
5. Preclinical courses prepared me well in selecting the appropriate dental restorative material and complete successfully permanent restoration procedures.	Material selection	3.79	Very High	1
6. Preclinical courses provided me with sufficient information on how to repair and remove old and defective restorations.	Repair and removal	3.42	High	7
7. Preclinical restorative courses assisted me in establishing recall appointments and maintenance care for my patients.	Recall and maintenance	3.55	Very High	5.5
Average		3.64	Very High	

The study revealed that the respondents found the preclinical Restorative Dentistry instructional methods used in diagnosis and treatment planning very highly effective with average weighted mean of 3.64 (Table 1). Instructional methods used were lecture-discussion, live demonstration, use of simulation, individual laboratory exercises, and direct instruction. This implies

that the students found out that the instructional methods used by the instructor in delivering the lessons very valuable.

Table 2. *Level of Effectiveness of Preclinical Restorative Dentistry Instructional Methods: Technical Skills on Execution of Treatment*

Indicators	Topic	Weighted Mean	Verbal Interpretation	Rank
1. The tooth preparation sequence taught in preclinical is followed in clinic and supported by the faculty	Preparation sequence	3.27	High	8
2. The tooth preparation design taught in preclinical helped me to conservatively prepare in clinical patients.	Preparation design	3.64	Very High	3
3. The speed of handpiece used in the beginning of the preclinical course helped me to improve my dexterity.	Handpiece	3.55	Very High	6
4. The type of material (typodont, stone casts, or natural teeth) used in the beginning of the preclinical laboratory course aided me to transition properly to preparing teeth of patients in clinic.	Exercise material	3.70	Very High	2
5. The type of bur (diamond or carbide) in the preclinical laboratory course is effective in use in patient's teeth with regard to cutting efficiency and surface roughness	Bur	3.58	Very High	5
6. Preclinical restorative courses trained me well to place a rubber dam and manage soft tissue successfully	Rubber dam	3.48	High	7
7. The use of sectional matrix, as taught in preclinical courses, is helpful in restoring Class II preparations with composite in clinic patients.	Sectional matrix	3.76	Very High	1
8. Preclinical restorative courses provided adequate instruction for me to provide permanent restorations with minimal faculty chairside assistance.	Permanent restorations	3.61	Very High	4
Average		3.57	Very High	

The respondents found the preclinical Restorative Dentistry instructional methods used in teaching technical skills on execution of treatment very highly effective with an average weighted mean of 3.57 (Table 2). The instructional methods used by the instructor were useful and efficient.

The topic on preparation sequence (indicator 1), which obtained a weighted mean of 3.27 and interpreted "high", was ranked number 8. Being ranked the least effective among the indicators in this category only validates that there are inconsistencies, and different ideologies from different instructors.

Table 3. *Level of Effectiveness of Preclinical Restorative Dentistry Instructional Methods: Laboratory Procedures and Problem-solving Techniques*

Indicators	Topic	Weighted Mean	Verbal Interpretation	Rank
1. Type of practical examination (live patient or typodont) had a bearing on management of my first patients in clinic.	Practical examination	3.58	Very High	2
2. Information taught on color and shade selection in preclinical courses is helpful in selecting shade for my patient.	Color and shade	3.55	Very High	3
3. The preclinical restorative dentistry courses prepared me well in performing definitive restorations in Restorative Dentistry clinic.	Definitive restorations	3.76	Very High	1
4. The complexity of the restorative needs of my patients is congruent with the preclinical restorative laboratory.	Complexity of exercises	3.27	High	4
Average		3.54	Very High	

The finding indicated that the respondents found the preclinical Restorative Dentistry instructional methods used in teaching laboratory procedures and problem-solving techniques very highly effective with an average weighted mean of 3.54 (Table 3). The instructional methods were found to be adequate and effectual.

Table 4. *Summary Table for the Level of Effectiveness of Preclinical Restorative Dentistry Instructional Methods*

Indicators	Weighted Mean	Verbal Interpretation	Rank
1. Diagnosis and Treatment Planning	3.64	Very High	1
2. Technical Skills on Execution of Treatment	3.57	Very High	2
3. Laboratory Procedures and Problem-Solving Techniques	3.54	Very High	3
Overall Average	3.58	Very High	

Overall, the third-year dental proper students found that the instructional methods in preclinical Restorative Dentistry are very highly effective with an overall average mean of 3.58. The instructional methods were found to be helpful and sufficient. The instructional methods used in diagnosis and treatment planning were ranked 1 as the most effective of the three in preparing them for clinic.

Respondents' Level of Confidence**Table 5.** *Level of Confidence of Third Year Students in the Completion of Clinic 1 Restorative Dentistry Requirements: General Overview of Confidence*

Indicators	Weighted Mean	Verbal Interpretation	Rank
1. I understood the various clinical procedures at the point where I began to treat patients.	3.45	High	1
2. Preclinical course has a role in reducing my anxiety about beginning patient care.	3.42	High	2.5
3. I felt prepared for the clinical work presented at the beginning of Clinic 1.	3.06	High	4
4. I did not have a patient complain about my attitude/treatment.	3.42	High	2.5
5. I did not rely heavily on supervisor for help.	2.82	High	5
Average	3.24	High	

As revealed, the respondents had high level of confidence generally in the completion of Clinic 1 Restorative Dentistry requirements with an average weighted mean of 3.24 (Table 5). The students felt they were prepared at the beginning of patient care in Clinic 1.

Table 6. *The Level of Confidence of Third Year Students in the Completion of Clinic 1 Restorative Dentistry Requirements: General Feelings of Preparedness*

Indicators	Weighted Mean	Verbal Interpretation	Rank
1. I can communicate to a patient and respond to their needs	3.76	Very High	1
2. I can outline and explain a treatment plan to a patient	3.64	Very High	2
3. I can carry out treatment safely and effectively without supervision.	2.88	High	3
Average	3.42	High	

The respondents had high level of feeling of preparedness in the completion of Clinic 1 Restorative Dentistry requirements with an average weighted mean of 3.42 (Table 6). The students felt they were self-efficacious in the completion of their requirements.

Table 7. *Level of Confidence of Third Year Students in the Completion of Clinic 1 Restorative Dentistry Requirements: Procedures*

Indicators	Weighted Mean	Verbal Interpretation	Rank
1. Examination and diagnosis	3.39	High	8
2. Treatment planning	3.55	Very High	5
3. Rubber dam application	3.09	High	13
4. Shade selection	3.33	High	11
5. Preparing ideal and conservative cavities	3.45	High	6
6. Removal of caries	3.39	High	8
7. Placement of matrix band and matrix band retainer	3.18	High	12
8. Placement of wedge	3.36	High	10
9. Use of amalgam	3.67	Very High	3.5
10. Use of composite	3.67	Very High	3.5

11. Placement of varnish, liners, and bases	3.39	High	8
12. Polishing of amalgam	3.85	Very High	1
13. Patient recall and post-operative instructions	3.73	Very High	2
Average	3.47	High	

The level of confidence of third year dental students in the procedures involved in completing Clinic 1 Restorative Dentistry requirements was high with an average weighted mean of 3.47 (Table 7). The students were self-assured in doing the procedures involved in completion of Clinic 1 Restorative Dentistry requirements.

Table 8. Summary Table for the Level of Confidence of Third Year Students in the Completion of Clinic 1 Restorative Dentistry Requirements

Indicators	Weighted Mean	Verbal Interpretation	Rank
1. General overview of confidence	3.24	High	3
2. General feelings of preparedness	3.42	High	2
3. Procedures	3.47	High	1
Overall Average	3.38	High	

Overall, the third-year dental proper students felt highly confident in the completion of Clinic 1 Restorative Dentistry requirements with an overall average mean of 3.38. The students were self-reliant in the completion of requirements. Procedures involved in completing the Clinic 1 Restorative Dentistry requirements was ranked 1 as the highest level of confidence they have experienced on.

Respondents' Clinical Performance

Table 9. Clinical Performance of the Third Year Students in their Clinic 1 Restorative Dentistry Requirements

Clinical Performance	Verbal Interpretation	Frequency	Percentage
95 – 99	Excellent	3	9.09
90 – 94	Very Good	28	84.85
85 – 89	Good	2	6.06
Total		33	100.00

Table 9 shows the clinical performance of the third-year students in their Clinic 1 Restorative Dentistry requirements. The students who achieved a grade of 90-94 made up 84.85% of the total population and 9.09% of the class achieved a grade of 95-99 in the completion of the Clinic 1 Restorative Dentistry requirements. The remaining 6.06% of the population received a grade of 85-89 in the completion of the Clinic 1 Restorative Dentistry requirements. This indicates that most of the students had very good clinical performance in the beginning of patient care.

Relationship between Level of Effectiveness of Preclinical Restorative Instructional Methods and Respondents' Level of Confidence

Table 10. *Relationship between the Level of Effectiveness of Preclinical Restorative Dentistry Instructional Methods and the Level of Confidence of Third Year Students in the Completion of Clinic 1 Restorative Dentistry Requirements*

Level of Effectiveness of Preclinical Restorative Dentistry Instructional Methods	Level of confidence in the Completion of Clinic 1 Restorative Dentistry Requirements		
	General overview of confidence	General feelings of preparedness	Procedures
Diagnosis and treatment planning	r=0.613 moderate correlation	r=0.588 moderate correlation	r=0.596 moderate correlation
Technical skills on execution of treatment	r=0.560 moderate correlation	r=0.459 moderate correlation	r=0.351 low correlation
Laboratory procedures and problem-solving techniques	r=0.591 moderate correlation	r=0.503 moderate correlation	r=0.523 moderate correlation

As revealed, the level of effectiveness of the instructional methods used in diagnosis and treatment planning and the level of general confidence of students in completion had a 'moderate correlation' with r value of 0.613 (Table 10). That means that an increase in one variable significantly relates to an increase in the second variable. The more effective are the instructional methods used in diagnosis and treatment planning, the more confident are the students generally in completion of the requirements.

The level of effectiveness of instructional methods used in diagnosis and treatment planning and level of general feeling of preparedness in completion of Clinic 1 Restorative Dentistry requirements had a 'moderate correlation' with r value of 0.588. The more valuable are the instructional methods used in diagnosis and treatment planning, the greater is the preparedness of the students in completion of requirements.

The level of effectiveness of instructional methods used in diagnosis and treatment planning and level of confidence in procedures involved in completion of Clinic 1 Restorative Dentistry requirements had 'moderate correlation' with r value of 0.596. The more useful are the instructional methods used in diagnosis and treatment planning, the greater is the self-confidence of students in the procedures involved in completion of requirements.

The level of effectiveness of instructional methods used in technical skills on execution of treatment and the level of general confidence of students in completion had a 'moderate correlation' with r value of 0.613. The more efficient are the instructional methods used in technical skills on execution of treatment, the higher is the confidence of students in completion of requirements.

The level of effectiveness of instructional methods used in technical skills on execution of treatment and level of general feeling of preparedness in completion of Clinic 1 Restorative Dentistry requirements had a 'moderate correlation' with r value of 0.459. The more successful are the instructional methods used in teaching technical skills on execution of treatment, the higher is the self-perceived confidence of students in accomplishing the requirements.

The level of effectiveness of instructional methods used in technical skills on execution of treatment and level of confidence in procedures involved in completion of Clinic 1 Restorative Dentistry requirements had a 'low correlation' with r value of 0.351. The more efficient are the instructional methods used in teaching technical skills on execution of treatments, the greater is the self-efficacy of students in completing their requirements.

The level of effectiveness of instructional methods used in laboratory procedures and problem-solving techniques and the level of general confidence of students in completion of requirements had a 'moderate correlation' with r value of 0.591. The more helpful are the instructional methods in laboratory procedures and problem-solving techniques, the greater is the self-assurance of students are in finishing their requirements.

The level of effectiveness of instructional methods used in laboratory procedures and problem-solving techniques and level of general feeling of preparedness in completion of Clinic 1 Restorative Dentistry requirements had a 'moderate correlation' with r value of 0.503. The better are the instructional methods used in laboratory procedures and problem-solving techniques, the higher is feeling of preparedness the students have in accomplishing the requirements.

The level of effectiveness of instructional methods used in laboratory procedures and problem-solving techniques and level of confidence in procedures involved in completion of Clinic 1 Restorative Dentistry requirements had a 'moderate correlation' with r value of 0.523. The better are the instructional methods used in laboratory procedures and problem-solving techniques, the more confident are the students feel in carrying out their clinical requirements.

Relationship Between Level of Effectiveness of Preclinical Restorative Dentistry Instructional Methods and Respondents' Clinical Performance

Table 11. *Relationship between the Level of Effectiveness of Preclinical Restorative Dentistry Instructional Methods and the Clinical Performance of the Third Year Students in their Clinic 1 Restorative Dentistry Requirements*

Indicators	Pearson r	Interpretation
Diagnosis and treatment planning	-0.126	Low correlation
Technical skills on execution of treatment	0.052	Negligible correlation
Laboratory procedures and problem-solving techniques	-0.083	Negligible correlation

There was a 'low correlation' between level of effectiveness of instructional methods used in diagnosis and treatment planning and clinical performance with r value of -0.126 (Table 11). That means that an increase in one variable relates to a decrease in the second variable. The very good clinical performance of the third year dental students was not dependent of the very high level of effectiveness of instructional methods used along diagnosis and treatment planning.

There was a 'negligible correlation' between the level of effectiveness of instructional methods used in technical skills on execution of treatment and clinical performance of the students with r value of 0.052. The clinical performance of the student was not associated with the effectiveness of the instructional methods used in technical skills on execution of treatment.

There was a 'negligible correlation' between the level of effectiveness of instructional methods used in laboratory procedures and problem-solving techniques and clinical performance of the students with r value of -0.083. The clinical performance of the student was not linked with the effectiveness of the instructional methods used in laboratory procedures and problem-solving techniques.

Relationship Between Respondents' Level of Confidence and Clinical Performance

Table 12. *Relationship between the Level of Confidence of Third Year Students in the Completion of Clinic 1 Restorative Dentistry Requirements and the Clinical Performance of the Third Year Students in their Clinic 1 Restorative Dentistry Requirements*

Indicators	Pearson r	Interpretation
General overview of confidence	0.206	Low correlation
General feelings of preparedness	0.193	Low correlation
Procedures	0.124	Low correlation

The computed Pearson r for the correlation of level of confidence and clinical performance of third year students is shown in Table 12. There was a 'low correlation' between the general confidence in completion of requirements and the clinical performance with r value of 0.206. That means an increase in one variable relate to an increase in the second variable. The higher is the general confidence of the third-year students in completion of the requirements, the better is their clinical performance.

There was a 'low correlation' between the level of general feelings of preparedness in completion of requirements and the clinical performance with r value of 0.193. The greater is the general feeling of preparedness of the third-year students in completion of the requirements, the more improved is their clinical performance.

There was a 'low correlation' between the level of confidence in procedures and the clinical performance with r value of 0.206. The higher is the level of confidence in procedures of the third-year students, the more improved is their clinical performance, quality-wise.

Discussion

The high percentage of positive responses to the questions regarding level of effectiveness of instructional methods (Table 1) could be related to the fact that, during the last few years, restorative dentistry course instructor has emphasized proper oral examination, diagnosis and treatment planning throughout the preclinical courses. The findings of this study support the research of Barrera et al. (2015) in which they both found the survey items were rated effective in preparing them for clinical activities.

The findings in Table 3 were not consistent to the study of Barrera et al (2015). Given that the three lowest items in all three domains were less related to lab-oriented or administrative in nature and were more in technical skill (repair and removal, preparation sequence, complexity of exercises), the results indicate that these processes may have been oversimplified during preclinical instruction. Once in clinic, there could be a host of other factors that complicated an otherwise simple process.

Some of the findings in Table 4 were incongruent with the study by Barrero et al. (2015) wherein their respondents perceived the domain of diagnosis and treatment planning as the less effective in preparing them for clinic than the information presented in the other two domains. The possible reason for this is that the third-year students has not had a lot of exposure and experience in the clinics that is why the domain of technical skills on execution of treatment and laboratory procedures and problem-solving techniques are less effective than the domain of diagnosis and treatment planning. The respondents might have had lower comfort level in performing in the clinics because they have just started.

On the other hand, some of the results of this study is similar to the research of Barrera et al (2015) in that both have revealed high levels of effectiveness in all domains (diagnosis and treatment planning, technical skills on execution of treatment, and laboratory procedures and problem-solving techniques). This result indicates that the students felt that the preclinical course provides the means to help them develop the skills necessary to successfully treat their patients in clinic.

It was clear from the results (Table 5) that some students relied on supervisors. The transition from supervised to unsupervised practice is a difficult but important one, which is essential

for independent practice. The evidence here suggests that students find this transition more difficult, so may require more encouragement to make this step gradually. (Gilmour, 2016)

The results in Table 6 were similar to the data presented by Gilmour, et al. (2016) in that high percentages were reported by both respondents with regard to being able to "communicate to a patient and respond to their needs".

Results in Table 7 were similar to the data presented in the research of Gilmour, et al. (2016), Murray and Chandler (2014), Honey, et al. (2011), and Baidas, et al. (2017). Simpler tasks such as polishing of amalgam and patient recall and post-operative instructions had higher ratings of confidence level. Use of amalgam and composite also had higher ratings in this study and in the study of Gilmour, et al. (2016). Less confidence in an area of little clinical experience would be expected. As the procedures became more technically challenging, such as rubber dam application and placement of matrix band and matrix band retainer, the mean confidence score became lower.

Confidence can influence decision making processes, dictating what clinical procedures the students would undertake. This is mentioned in the study of Gilmour, et al. (2016). A person will self-assess the "risk" of causing harm, and this determined their confidence as to whether to undertake a procedure. When confident, they would proceed to undertake a task even if initially unsuccessful. The suggestion is that experience improves self-assessed confidence, or vice versa, that confidence enhances experience. This might be the explanation as to why the students felt more confident in undertaking simpler tasks. They also felt less confident on procedures they have less experience on.

The results in Table 10 were similar to what was determined in the study of Fugill (2012). The use of phantom heads as an instructional method in preclinical restorative dentistry increases student confidence in general. The partial task training when using the manikin allows the student to learn procedures of tooth restoration in separation from the patient and the difficulties of the clinical environment. This in turn helps the students become prepared in clinic. Lasater (2007), as cited by Battista (2017), relates simulation to clinical confidence and clinical judgment. Simulation provides the student with a window into the relevant clinical task and reduces the fear of unknown. Another research that supports the results of this study is that of Rosa, et al. (2013). Visual methods, such as live demonstration, are equally efficient to promote confidence related to the procedure.

In contrast, the researches of Clancy, et al. (2002), as cited by Arigbede, et al. (2015), and Walley, et al. (2014) were not congruent to the results of the study. In their studies, the students' perceptions of their preparation for actual patient care were not dependent on the type of preclinical experience.

According to Nunez, et al. (2012), patients are more varied than manikin heads in a simulation laboratory. Limited opening, tongue habits, malocclusion, salivation, lack of anesthesia, and differing personalities and temperaments can all affect the outcome of a dental procedure. Student stress is also a factor when treating live patients versus manikin. This could be the reason why even though the preclinical instructional methods were proven effective, it does not follow that it will make the students' clinical performance better. Also, Fugill (2014), Curtis, et al. (2007), as cited by Arigbede (2016), and Nunez, et al. (2012) mentioned in their studies that success in simulated restorative dentistry is a poor predictor of clinical ability. Barrero, et al. (2015) mentioned the following reasons for a disconnect between preclinical and clinical settings: time elapsed between material presented in preclinical courses and clinical experience, lack of faculty collaboration, faculty shortages, complexity of cases presented at a dental school, and the necessity to integrate multiple skills to treat a patient. The study of Patel, et al. (2015) also emphasized that psychomotor operative video demonstrations did not improve ability of students to perform amalgam preparations.

In contrast, the results of the study do not accord to the results of the study by Velayo, et al. (2014). The study attempted to assess the overall effectiveness of the preclinical dental curriculum and the results suggested that preclinical training in the classroom and on the typodont was associated with performance in the clinic.

As mentioned in Albert Bandura's theory of self-efficacy, as cited by Feltz (1988) and Diotaiuti, et al. (2017), self-efficacy is a common cognitive mechanism for facilitating people's motivation and

behavior. In the study of Suksudaj, et al. (2012), they have studied if innate ability and motivation matter in acquiring psychomotor skills in operative dentistry. The results revealed weak positive associations between the characteristics of psychomotor ability and motivation with performance of dental students. This is in correspondence to the results of this study, given that confidence affects motivation. The results of this study also agree with the study of Baidas, et al. (2017) and Alrahabi (2017) where they mentioned that increased confidence has been associated with increased clinical competence.

Limitations/Implications

More faculty lectures and demonstrations in the laboratory can be incorporated to improve the preclinical Restorative Dentistry program. The educational experience could be improved with the addition of teaching methods such as problem-based learning, blended learning, flipped classroom learning, and/or microburst learning.

Faculty can provide additional mentoring to motivate students and help them build their confidence. Advisers can be assigned for each student to guide and mentor them.

Calibration of Restorative Dentistry faculty may be done to provide efficient transition of students from preclinical to clinical setting. Faculty meetings can be held to standardize the Rubrics, processes and procedures, and to clarify concepts in Restorative Dentistry.

Other learning methods can be proposed like hands on activities, case scenario, collaborations with faculty, and small group discussions to be conducted to address the deficiency in exposure and confidence in complex restorative procedures.

Multiple skills to treat a patient can be integrated in the course to connect preclinical to clinical setting. Critical thinking activities, visual aids, internet links and hand-outs, and peer-to-peer collaborations can be incorporated to connect classroom learning with patient care.

Increasing preclinical sessions can be suggested to build experience for the students and hence, build more confidence in patient care.

Future researchers may replicate the present study considering other important variables not mentioned in the study.

Conclusions

Based on the salient findings of the study, the following conclusions were drawn:

1. The instructional methods used by the instructor are very valuable and sufficient to the third year dental students..
2. The respondents have high level of self-efficacy in the completion of requirements.
3. Most of the respondents have very good clinical performance in the beginning of patient care.
4. The more effective are the instructional methods, the more confident are the students in completion of their requirements in Clinic 1.
5. Clinical performance is not dependent instructional methods used in diagnosis and treatment planning. Likewise, it is not associated with the effectiveness of the instructional methods used in technical skills on execution of treatment, nor it is. linked to the effectiveness of the instructional methods used in laboratory procedures and problem-solving techniques.
6. The higher is the general confidence of the third-year students in completion of the requirements; the better is their clinical performance is. The greater is the general feeling of preparedness in the completion of the requirements; their more improved is their clinical performance. The higher is the level of confidence in procedures of the third-year students, the more their clinical performance becomes better, quality-wise.

References

- [1] Alrahabi, Mothanna. (2017). The confidence of undergraduate dental students in Saudi Arabia in performing endodontic treatment. *European Journal of Dentistry*, vol. 11 no. 1, pp. 17-21.
- [2] American Dental Association (2018). Definition of Terms Used in the Standards. Retrieved February 23, 2018, from <https://www.ada.org/en/coda/policies-and-guidelines/training-resources/new-site-visitor-training/unit-2-standards/definition-of-terms-used-in-the-standards>.
- [3] Arigbede, Abiodun O. (2016). Correlation between Academic and psychomotor Skills Performances of Dental Students in Complete Denture Prosthodontics. *British Journal of Medicine and Medical Research*, vol. 14, no. 7.
- [4] Arigbede, A., et al. (2015). Use of simulators in operative dental education: experience in southern Nigeria. *Afr Health Sci*, vol. 15 no. 1, pp. 269-277.
- [5] Baidas LF., et al. (2017). Comparison of the Confidence Level of Final Year Dental Students in General Practice between two Saudi Dental Colleges in Riyadh. *EC Dental Science* vol. 8 no. 2, pp. 38-47.
- [6] Barrero, C. et al. (2015). Dental Students' perceived preparedness to treat patients in clinic after a fixed prosthodontic course: survey results of a case study. *Journal of Dental Education*, vol. 79 no. 4, pp.409-416.
- [7] Battista, A. (2017). An activity theory perspective of how scenario-based simulations support learning: a descriptive analysis. *Adv Simul (Lond)*, vol. 2 no. 23.
- [8] Bermudo, J. P. PhD., Araojo, A. E. Ed.D., Morales, M.I. Ed.D. & Yango, A.R. PhD. (2010). "Research Writing Made Simple: A Modular Approach for Collegiate and Graduate Students".
- [9] Clancy, JM., et al. (2002). A comparison of student performance in a simulation clinic and a traditional laboratory environment: three-year results. *Journal of Dental Education*, vol. 66 no. 12, pp. 1331-1337.
- [10]Curtis, Donald A., et al. (2007). The Correlation of Student Performance in Preclinical and Clinical Prosthodontic Assessments. *Journal of Dental Education*, vol. 71 no. 3, pp. 365-372.
- [11]Danaei, SM et al. (2015). Evaluating the clinical quality of departments as viewed by juniors and seniors of Shiraz dental school. *J Educ Health Promot*, vol. 30 no. 4, p. 75.
- [12]Diotaiuti P, et al. (2017). A structural model of self-efficacy in handball referees. *Front Psychol*, vol. 18 no. 8, p 811.
- [13]Feltz, D.L. (1988). Self-confidence and sports performance. *Exercise and Sports Science Reviews*, vol. 16 no. 1, pp.423-457.
- [14]Fugill, Martin. (2012). Defining the purpose of phantom head. *European Journal of Dental Education*, vol. 17 no. 1, pp. e1-e4.
- [15]Fugill, Martin John. (2014). *Simulation and Student Transition in Restorative Dentistry*. (Doctoral Dissertation). University of Birmingham, UK.
- [16]Gilmour, Alan, Welply, Angharad, Cowpe, Jonathan, Bullock, Alison Deborah and Jones, Rhiannon Jayne. (2016). The Undergraduate preparation of dentists: Confidence levels of final year dental students at the School of Dentistry in Cardiff. *British Dental Journal* 221 (6), pp. 349-354. 10.1038/sj.bdj.2016.686 file
- [17]Honey, J., et al. (2011). Ready for practice? A study of confidence levels of final year dental students at Cardiff University and University College Cork. *European Journal of Dental Education*, vo. 15, pp. 98-103.
- [18]Henzi, David, Elaine Davis, Roma Jasinevicius, William Hendricson (2006). North American Dental Students' Perspectives About Their Clinical Education. *Journal of Dental Education*, vol. 70 no. 4, pp.361-377.

- [19]Imber, S., et al. (2003). A virtual reality dental simulator predicts performance in an operative dentistry manikin course. *European Journal of Dental Education*, vol. 7 no. 4.
- [20]Lasater, K. (2007). High-fidelity simulation and the development of clinical judgement: students' experiences. *Journal of Nursing Education*, 46 (6) pp. 269-276.
- [21]Murray, Colleen and Nicholas Chandler. (2014). Undergraduate endodontic teaching in New Zealand: Students' experience, perceptions and self-confidence levels. *Australian Endodontic Journal*, vol. 40 no. 3, pp. 116-122.
- [22]Nunez, David W., et al. (2012). Typodont Versus Live Patient: Predicting Dental Students' Clinical Performance. *Journal of Dental Education*, vol. 76 no. 4, pp. 407-413.
- [23]Oliveira, A., et al. (2012). Evaluation of a strategic practice demonstration method applied to endodontic laboratory classes. *Revista Odonto Ciencia*, vol. 27 no. 2, pp. 127-131.
- [24]Park, Carly F., et al. (2017). Dental Students' Perceptions of Digital Assessment Software for Preclinical Tooth Preparation Exercises. *Journal of Dental Education*, vol. 81 no. 5, pp. 597-603.
- [25]Patel, Shalizeh A, et al. (2015). Impact of Technique-Specific Operative Videos on First-Year Dental Students' Performance of Restorative Procedures. *Journal of Dental Education*, vol. 79 no. 9, pp. 1101-1107.
- [26]Perry, S., et al. (2017). Simulation and curriculum design: a global survey in dental education. *Australian Dental Journal*, vol. 62 no. 4, pp. 453-463.
- [27]Polyzois, I, et al. (2011). Can evaluation of a dental procedure at the outset of learning predict later performance at the preclinical level? A pilot study. *European Journal of Dental Education*, vol. 15 no. 2, pp. 104-109.
- [28]Prithviraj, DR, et al. (2014). Revolutionizing restorative dentistry: an overview. *Journal of Indian Prosthodontic Society*, vol. 14 no. 4, pp. 333-343.
- [29]Puno, Carlito S. Commission on Higher Education. (2006). CHED Memorandum Order No. 33 Series of 2006. Manila, Philippines.
- [30]Quinn, F., et al. (2003). A study comparing the effectiveness of conventional training and virtual reality simulation in the skills acquisition of junior dental students. *European Journal of Dental Education*, vol. 7 no. 4, pp. 164-169.
- [31]Rosa, Q. F., et al. (2013). Do educational methods affect students' ability to remove artificial carious dentine? A randomized controlled trial. *European Journal of Dental Education*, vol. 17 no. 3, pp. 154-158.
- [32]Shah, Dipali Yogesh, et al. (2015). Videotaped Feedback Method to Enhance Learning in Preclinical Operative Dentistry: An Experimental Study. *Journal of Dental Education*, vol. 79 no. 12, pp. 1461-1466.
- [33]Suksudaj, N., et al. (2012). Acquiring psychomotor skills in operative dentistry: do innate ability and motivation matter? *European Journal of Dental Education*, vol. 16 no. 1, pp. 187-194.
- [34]Velayo, Bianca C., et al. (2014). Using Dental Students' Preclinical Performance as an Indicator of Clinical Success. *Journal of Dental Education*, vol. 78 no. 6, pp. 823-828.
- [35]Walley, S., et al. (2014). Undergraduates' self-reported clinical experience, confidence and perspectives of hospital and outreach paediatric dentistry: a three-year multi-centre evaluation. *British Dental Journal*, vol. 216 no. 5, pp. 251-256.
- [36]Wu, J., Feng X., Chen, A., et al (2016). Comparing Integrated and Disciplinary Clinical Training Patterns for Dental Interns: Advantages, Disadvantages, and Effect on Students' Self-Confidence. *Journal of Dental Education*, vol. 80 no. 3, pp. 318-327

Appendix- Questionnaire**Part I. Level of effectiveness of Preclinical Instructional Methods in Restorative Dentistry**

Directions: Below are statements about effectiveness of instructional methods employed by faculty in preclinical Restorative Dentistry. Please indicate your agreement by simply putting a check (✓) mark on the box below that corresponds to your honest answer. Use the scale below as your guide.

Options:

- | | |
|-----------------------|----|
| 4 = Strongly Agree | SA |
| 3 = Agree | A |
| 2 = Disagree | D |
| 1 = Strongly Disagree | SD |

1. INSTRUCTIONAL METHODS				
INDICATORS	4 (SA)	3 (A)	2 (D)	1 (SD)
1.1 Diagnosis and treatment planning				
1. The information presented to me during restorative courses was helpful when performing the intra- and extraoral examination of your patient/case.				
2. The preclinical courses were helpful in providing sufficient information to recognize complex cases requiring specialty referral or consultation				
3. Preclinical laboratory and lecture introduced me to the clinical procedures and requirements that are located in the clinicians' handbook.				
4. Preclinical restorative courses provided sufficient information to properly diagnose carious lesions.				
5. Preclinical courses prepared me well in selecting the appropriate dental restorative material and complete successfully permanent restoration procedures.				
INDICATORS	4 (SA)	3 (A)	2 (D)	1 (SD)
6. Preclinical courses provided me with sufficient information on how to repair and remove old and defective restorations.				

7. Preclinical restorative courses assisted me in establishing recall appointments and maintenance care for my patients.				
1.2 Technical Skills on Execution of Treatment				
1. The tooth preparation sequence taught in preclinical is followed in clinic and supported by the faculty				
2. The tooth preparation design taught in preclinical helped me to conservatively prepare in clinical patients.				
3. The speed of handpiece used in the beginning of the preclinical course helped me to improve my dexterity.				
4. The type of material (typodont, stone casts, or natural teeth) used in the beginning of the preclinical laboratory course aided me to transition properly to preparing teeth of patients in clinic.				
5. The type of bur (diamond or carbide) in the preclinical laboratory course is effective in use in patient's teeth with regard to cutting efficiency and surface roughness.				
6. Preclinical restorative courses trained me well to place a rubber dam and manage soft tissue successfully				
7. The use of sectional matrix, as taught in preclinical courses, is helpful in restoring Class II preparations with composite in clinic patients.				
8. Preclinical restorative courses provided adequate instruction for me to provide permanent restorations with minimal faculty chairside assistance.				
1.3 Laboratory procedures and problem-solving techniques				
1. Type of practical examination (live patient or typodont) had a bearing on management of my first patients in clinic.				
INDICATORS	4 (SA)	3 (A)	2 (D)	1 (SD)
2. Information taught on color and shade selection in preclinical courses is helpful in selecting shade for my patient.				

3. The preclinical restorative dentistry courses prepared me well in performing definitive restorations in Restorative Dentistry clinic.				
4. The complexity of the restorative needs of my patients is congruent with the preclinical restorative laboratory.				

Part II. Level of Confidence of Dental Students

Directions: Below are statements about the level of confidence of dental students in completion of Clinic 1 Restorative Dentistry requirements. Please indicate your agreement by simply putting a check (✓) mark on the box below that corresponds to your honest answer. Use the scale below as your guide.

Options:

4 = Strongly Agree	SA
3 = Agree	A
2 = Disagree	D
1 = Strongly Disagree	SD

2. LEVEL OF CONFIDENCE				
INDICATORS	4 (SA)	3 (A)	2 (D)	1 (DA)
2.1. General overview of confidence				
1. I understood the various clinical procedures at the point where I began to treat patients.				
2. Preclinical course has a role in reducing my anxiety about beginning patient care.				
3. I felt prepared for the clinical work presented at the beginning of Clinic 1.				
4. I did not have a patient complain about my attitude/treatment.				
5. I did not rely heavily on supervisor for help.				
INDICATORS	4 (SA)	3 (A)	2 (D)	1 (SD)
2.2. General feelings of preparedness				
1. I can communicate to a patient and respond to their needs				
2. I can outline and explain a treatment plan to a patient				
3. I can carry out treatment safely and effectively without supervision.				

2.3. In completing Clinic 1 Restorative requirements, I felt confident and prepared in performing the following procedures:				
14. Examination and diagnosis				
15. Treatment planning				
16. Rubber dam application				
17. Shade selection				
18. Preparing ideal and conservative cavities				
19. Removal of caries				
20. Placement of matrix band and matrix band retainer				
21. Placement of wedge				
22. Use of amalgam				
23. Use of composite				
24. Placement of varnish, liners, and bases				
25. Polishing of amalgam				
26. Patient recall and post-operative instructions				

Part III. Clinical Performance of Dental students

I hereby agree for the researcher to retrieve my final grade in Clinic 1 Restorative Dentistry. I understand that it will be kept confidential and will only be used for the purposes of the study.

Name and Signature

Date

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The First Embrace: The Lived Experiences of the Nursing Students in the Performance of Actual Delivery

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Abstract: Student nurses' experience in the actual delivery is an important part of clinical training. Yet, limited studies are done on this topic. Thus, this study aims to explore the live experiences of the nursing students in the performance of actual delivery. This qualitative phenomenological study, selected through purposive sampling, sixteen nursing students age 19 to 22 years old, and who have experienced firsthand clinical rotations of actual delivery room nursing during the Collegiate Year 2019 to 2020 in a particular university in Silang, Cavite. A semi-structured questionnaire was used and answered by the informants through a one-on-one interview via Zoom meetings. Colaizzi's method and NVivo research software tool was used in analyzing the data. Findings revealed that the nursing students considered their live experiences in the performance of actual delivery as considerable experience, unpleasant experience, challenging, motivated, instruments of hope, and life lessons. For future studies, live experiences of nursing students in the pediatric clinical environment can be explored.

Keywords: *nursing students, actual delivery, clinical training, lived experiences*

Introduction and Literature Review

Training in the clinical setting is particularly important for nursing students as it helps them progress from theoretical study to practical nursing skills and to get acquainted with the environment of the hospital (Truong, 2015). In a study conducted by Gemuhay et al. (2019) in Northern Tanzania, it was found out that there are factors affecting the performance of students in the clinical learning environment, and these are clinical placement, presence of barriers to effective learning, and existence of efficient monitoring and evaluation as the factor that best improved the students' practice. Labor and delivery is a complex environment where identifying healthy and successful learning opportunities to students without risking the patient can be challenging (Raines, 2010). Hospital policies and restrictions can limit the skills that students may learn during their rotation. Due to the obvious various limits imposed on the nursing student's practices during the practicum experience in labor and childbirth, the student nurse could not acquire enough knowledge. In addition, the author indicates that experience gained during a single day of clinical rotation was comparatively minor due to the restrictions of the hospital where students are only allowed to observe. In Texas, Al-Kofahy and James (2017) explored the clinical experiences of nursing students in the obstetric unit and results revealed that knowledge does not have to be acquired by actual engagement in an exercise, but can also be gained by other methods such as observing and listening to others who have had similar or different experiences. According to Suwathan and Suwannabol (2012) in a study conducted in a university in Thailand, three problems influenced nursing students' actual delivery room encounter namely: anxiety and dealing with stress during practical exercise, adjustments in regular activities, and source during practical exercise. Identifying nursing students' experiences in the clinical learning environment could improve training and improve the quality of their student planning and promotion (Jamshidi, et al. 2016). Limited studies are done related to this topic. Thus, this study aimed to explore the live experiences of the student nurses in the performance of actual delivery.

Methodology

Research Design

The study utilized qualitative phenomenological research design. A qualitative study, according to Gunaydin and McCusker (2015) has the main goal of comprehensively understanding the experience of others. Interview questionnaires containing open-ended questions were given to the informants to gather their insights about the study. Phenomenology is the study of things present in one's awareness, or the ways one experiences these things (Gill, 2020). Phenomenological studies' chief objective is to identify the common denominator of the live experiences of a certain group (Creswell, 2013). Profound and careful comprehension of a phenomenon is one of the major advantages of a phenomenological analysis (Regoli, 2017).

Population and Sampling Technique

The population of the study included third year nursing students from one of the universities in Silang, Cavite. The informants were students enrolled in the first and second semesters for the collegiate year 2019-2020, ages 19 to 22, both male and female. Only those who had experienced a clinical rotation in the delivery room in any affiliated hospital or living-in of the College of Nursing were included. Students who have had any work experiences in the hospital or any related work aside from the clinical exposure in the delivery room were not included in the study. There was no definite number of informants; nevertheless, data was gathered continuously up to the point of data saturation. The sampling technique applied in this study was purposive sampling. Purposive method also known as subjective or selective sampling is used when the informants are chosen because they belong to the group of people who are most suitable for the study (Ames et al., 2019).

Instrumentation

The instrument that was used in the study was a self-constructed, semi-structured questionnaire. The questions were formulated based on the researchers' ideas and review of literature. The interview protocols have been subjected to validation by experts in the field of research and evaluation. The interview was conducted and recorded via Zoom meetings, due to COVID-19 restrictions. The following semi-structured, and open-ended questions were used in the interview:

1. Please share the experiences on your performance of actual delivery.
2. What was your reaction to your first experience of an actual delivery?
3. How was the first performance of an actual delivery to you?
4. What were the challenges that you experienced in carrying out your duties as a student nurse in the performance of an actual delivery?
5. In what ways were you able to cope up with the challenges that you have experienced as a student nurse in the performance of actual delivery?
6. What is the impact of your experiences in your life or future career?

Data Gathering Procedure

After the proposal of the study was approved, the researchers sent letters to the College Dean and Level 3 Department Chair of the College of Nursing of the university. After gaining approval from the College Dean and Level 3 Department Chair, the researchers approached the informants through Messenger and/or other forms of electronic communications, asked for their participation in the study, informed them about the study, and gave them a consent form to formally declare their approval or decline in their participation with the study. The form also included the informant's consent to record the whole meeting/interview. After gaining permission from the informants, the researcher further explained what the study is all about, discussed its objectives, and clarified whatever questions the informants had. Additionally, before the scheduled interviews, an on-call psychologist was contacted by the researcher, in case the informants need debriefing. After that, the

researcher scheduled a one-on-one meeting with the informants via Zoom meeting. Since it was not possible to interview the informants face to face, interviews took place in a virtual setting.

Questions that were asked of the informants were from a semi-structured questionnaire to keep the conversation objective. This enabled the informants to freely express themselves and allowed the researchers to explore areas of the informants' experiences. Follow-up questions were posed as needed. All the interactions between the informants and the researchers were recorded, after the consent of the informants. The interviews were followed-up and recorded via Zoom, and after that, transcriptions of the informants' answers verbatim were provided. This method helped the researchers obtain accurate narrative data. The informants had the leeway to express and speak their feelings and emotions. More informants were interviewed until data saturation was reached. Thereafter, analysis of the data was done with the use of Nvivo software. Analysis of the data obtained was employed and it was clustered accordingly. A summarization of the information was done. Numerical coding was used to protect the informants' identities and implemented the privacy and confidentiality of the individuals. Subsequently, triangulation was done. The researchers contacted the informants again for validation of the data. The researchers read to the informants the transcribed data and confirmed, if correct.

Analysis of Data

The method that was used in analysis of data was Colaizzi's method and the use of Nvivo. In Colaizzi's method, the outcome is a straightforward and all-encompassing explanation, confirmed by the informants who provided it. The methodology relies on rich first-person accounts; these can arise from face-to-face interviews or collected in other ways (Morrow et al., 2015). NVivo is a qualitative and mixed-methods research software tool. It is used to analyze unstructured text, audio, video, and picture data, such as interviews, focus group discussions, surveys, social media platforms, and scholarly articles, among other things. QSR International is the company behind it (Yeager, 2012). NVivo includes benefits that help in increasing the quality of the study. Qualitative data analysis becomes more easier and the outcomes are more professional (Alabri & Hilal, 2013). Using Nvivo for data analysis and utilizing a computer "ensures that the user is working more" deliberately, completely, and with greater attention" (Bazely, 2007). For the use of Nvivo for data analysis, the researchers transcribed the one-on-one interviews and then submitted the transcripts to the professional who analyzed the data through the Nvivo software. After the analyzation of the data by the professional, the results were given back to the researchers.

Colaizzi's method consists of seven steps:

1. The first step is to gather the questionnaires and read the contents thoroughly. In this step, every narrative response was collected to know and understand the meaning of the informants' answers.
2. The second step is to extract important statements from the interview questionnaire. Statements that were answered by the informants and were related to the study were considered important data.
3. The third step is to formulate the meanings of each important statement of the interview questionnaire. Researchers formulated the meaning of the extracted statements properly and accurately.
4. The fourth step is to organize the formulated statements into themes or clusters. Researchers examined the data to identify common topics or themes.
5. The fifth step is to integrate the cluster of themes or topics into an exhaustive description of the phenomenon.
6. The sixth step is to formulate an exhaustive description of the phenomenon of the study. The descriptions were developed by the combination of the clusters or themes, and related interpretation was extracted from the informants by the researchers.
7. The seventh step or the last step is to return to the informants for validation. Researchers returned for further clarification and validation of the results of the informants' answers,

then the informants were questioned if there was a need for clarification, validation, or if there were changes in the results, according to their feedback to make sure everything was clear.

Findings / Results

Live Experiences of Nursing Students in the Performance of Actual Delivery

Table 1. *Live Experiences of Nursing Students in the Performance of Actual Delivery*

Themes	# of Informants
Considerable Experience	15
Worth-it	
Wanting for More	
On-hand Experience	
Memorable and Enjoyable	
Learning Experience	
Joy Amidst Uncertainty	
Happy	
Exciting and Amazing	
Excellent Experience	
Different Experience	
Blessed	
Unpleasant Experience	14
Shocked	
Scary	
Felt Unconscious	
Felt Pressured	
Felt Nervous	
Disappointing Experience	

Table 1. *Live Experiences of Nursing Students in the Performance of Actual Delivery (Continued)*

Challenging	11
Waking-up early	
Unhealthy Working Environment	
Tiredness	
Language Barrier	
Challenging to Perform	
Motivated	9
Motivation to be Competent	
Motivation from Classmates	
Help for our Future	
Dreams and Aspirations	
Instruments of Hope	9
Physicians, Midwives, Nurses as Mentors	
Helpful Cis	
Life Lessons	6
Appreciation of Life	

Table 1 shows the main themes and sub themes that emerged as live experiences of nursing students in the performance of actual delivery. The main themes were categorized as Considerable Experience, Unpleasant Experience, Challenging, Motivated, Instruments of Hope, and Life Lessons. Codes or sub themes also arose under each theme.

Table 2 . Considerable Experience

Sub themes	Statements
Worth-it	#2: <i>The best word that can describe my experience is "worth it." Even though it was hard in that hospital."</i>
Wanting for More	#1: <i>"...but actually, I want more experience"</i> <i>"I want more experience, like the rotation."</i>
On-hand Experience	#1: <i>"I think it's beautiful because I felt like I had a personal on-hand experience with a doctor and as well as the patients, like I could actually see closely how to do it. I think my experience is good, but actually I want more experience, like the rotation thing."</i>
Memorable and Enjoyable	#5: <i>"At some point, the overall experience of the actual delivery is super enjoyable and memorable. Because it was really my first time to experience that kind of different environment. I can't imagine when I think of those things. I cannot believe that I did those things successfully. It really lingers in my core memory. Those experience taught me how to be a nurse in every department right now."</i>
Learning Experience	#5: <i>"I learned many things, like the actual delivery, which, is really a once in a lifetime experience, but unfortunately, as a student nurse, that will be the first and last time to experience that actual delivery"</i>
Joy Amidst Uncertainty	#1: <i>"I think Joy. Even though it was scary I was able to feel joy after assisting, after leaving the OR. It was full of pleasure, full of joy, its unexplainable like something."</i>
Happy	#3: <i>"I was happy. Of course, I was able to deliver the baby safely and being able to see the emotions of the parents was my first achievement. That's the time when I felt happy, even though I was very tired at that time."</i>
Different Experience	#1: <i>"I was shocked at how the health worker treated the patient. Because in school there is compassion. Like somewhat, we will give our utmost care to our patients during DR rotation, especially in public hospitals. I was surprised by some doctors there who would shout at their patients for me."</i>

Table 3. Unpleasant Experience

Sub themes	Statements
Shocked	#8: <i>"It was shocking. and I was culture shocked because on second semester, it was my very first duty for delivery room and it was at a certain hospital so there were so many patients and so many mothers laboring...It was so shocking"</i>
Scary Experience	#7: <i>"I had at first were just scary because you are the one who will catch the baby. I'm scared of what I might be doing if my actions are not right"</i>
Felt Unconscious	#1: <i>I was shocked, like I was not mentally prepared and I felt unconscious because it was different in real life experience, but I overcame it and I was able to continue and have actual care and it was great.</i>
Feeling Pressured	#4: <i>And I really experienced pressure. I really tried to wear my gloves even though my hands were really wet, and after that, when I wore my gloves, the baby was out.</i>

Feeling Nervous	<i>#16: "I was nervous and excited at the same time because you get to experience and see the newborn"</i>
Disappointing Experience	<i>#3: "I think in public hospitals there are things that they didn't apply to in books, so as I see the doings of the midwife, I think it's not acceptable to the nursing practice or standards."</i>

Table 4. Challenging

Sub themes	Statements
Waking up Early	<i>#15: "it's really time management. It was a struggle for me. Because for us students, we have to leave the university by 5 am. So I have to wake up 2 hours prior to that to prepare for my duty"</i>
Unhealthy Working Environment	<i>#8: "It was tiring and a little confusing because I was not sure which patient to prioritize. In that certain hospital, there were only two delivery tables and some mothers will be giving birth outside the DR while there's also some mothers delivering inside the DR at the same time. So, I had to do the actual one patient and I had to do assist the other one...another challenge was the way the other health practitioners treat the mothers because I did not imagine that they were that harsh to the patients, so I was really shocked."</i>
Tiredness	<i>#3: "The challenge is the tiredness. So, when you are weak, when you see blood and open wounds"</i>
Language Barrier	<i>#13: "One of the major challenges for me as a foreigner was the language barrier. So we were supposed to fill up the NCP form, so we have to get as much subjective and objective data as we can"</i>
Challenging to Perform	<i>#9: "I expected that it will be an easy task but in fact, the baby was slippery and also the cord so you need to cut it right on time and as fast as possible."</i>

Table 5. Motivated

Sub themes	Statements
Motivation to be Competent	<i>#4 : "We were oriented there on what to do in the actual delivery, but the reality is that it's so far compared to the practice, in actual delivery, you're going to forget what to do, and even though you are prepared, no matter how many times you've practiced it, you'll get consumed by fear and have nothing to do."</i>
Motivation from Classmates	<i>#1: "My groupmates and my block mates also motivate me because I can see that they take this seriously. I can see that they studied before and then studied during there are no cases and rounds."</i>
Help for the Future	<i>#2: "We were lucky that we experienced that particular scenario because some students didn't experience the hardship of having many patients that were simultaneously delivering a baby. So, it's a big help in my future to have that kind of experience that I can use in the future that I experienced today as a student nurse"</i>

Dreams and Aspirations as Motivation	<i>#1: "I guess the way I cope with the challenges is by telling myself that I wanted this, so I have to keep up no matter what...I was able to cope up by mind over matter so it was my motivation that I can do this because one day I'm going to be a doctor eventually I'm going to do this every day for a year so since I'm studying medicine you have rotation so I told myself you should not be afraid because this is the start and you should get used to this"</i>
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Table 6. Instruments of Hope

Sub themes	Statements
Physicians, Midwives, and Nurses as Mentors	<i>#11: "Even though I was under a lot pressure, the nurse and the midwife were supportive...I was thankful because the nurse is very hands on in assisting me on what to do and telling me what to do" #4: "I can apply all the learning, especially when you are assisting the doctor, not just the CIs, but really the doctor that is standing next to you"</i>

Table 6. Instruments of Hope (Continued)

Helpful Clinical Instructors	<i>#1: "So I was able to learn from them as well as our clinical instructor, who is the one answering our questions. So it was a big help for us and we were able to adjust in the DR and adapt to the environment" #12: "the clinical instructors were guiding us" #2: "The CIs always gave us warnings before going to the hospital that there were things that you couldn't expect to happen, just so you know that it is not the actual normal procedure in the hospital...Although there are many challenges, they will lessen because we have been prepared by our CIs on what we will be doing in the delivery room and also what will happen. You'll recall all the words of the CIs that need to be done, so that's a big help for me to cope." #8: "Our clinical instructor explained that to us and we were able to understand."</i>
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Table 7. Life Lessons

Sub themes	Statements
Appreciation of Life	<i>#11: "...now, I was able to appreciate life more" #14: "I guess because I was able to see and witness first hand the actual delivery of newborn, it made me value how life works. That every child is precious and any other life" #16: "from the moment the baby comes out of the mother's womb, you get to witness a new life, and you also get to see the struggles of the mother."</i>

Discussion

After the results were analyzed, six main themes emerged. Fifteen (15) of sixteen (16) students admitted that they regard their experiences as considerable experiences. Sub themes under considerable experience were: Worth-it, Wanting for More, On-hand Experience, Memorable and Enjoyable, Learning Experience, Joy Amidst Uncertainty, Happy, Exciting and Amazing, Excellent Experience, Different Experience, and Blessed. Nursing students must consider the practical component of nursing education while determining whether or not to continue nursing as a profession (Chesser-Smyth, 2005). There are many emotions involved in learning to provide for and help patients. Students may feel both good and negative emotions (Shapiro, 2011). However, according to Acharya

and Dahal's (2020) research, many students were happy with their clinical learning environment. In addition, the students want more opportunities for interprofessional education and more time for guided interprofessional conversation (Kaplan et al., 2015). As mentioned in the statements above, student nurses were wanting for more experiences in the delivery room.

Fourteen (14) out of sixteen (16) students attested that they had an Unpleasant Experience. Under Unpleasant Experience were sub themes namely: Shocked, Scary Experience, Felt Unconscious, Feeling Pressured, Feeling Nervous, and Disappointing Experience. Levels of anxiety of nursing students in their firsthand experience in the delivery room were high. Students struggled to adapt on their initial exposure and were anxious during clinical duty in the delivery room (Balacut et al., 2011). Lack of self-confidence was identified as a primary source of fear and anxiety in nursing students from a study by Joolae et al. (2015). The stress that nursing students experience, when confronted with the clinical setting has an impact on their overall health and disrupts their learning processes (Edwards et al., 2010).

Eleven (11) students mentioned that the experience was challenging. The sub themes for Challenging were: Waking Up Early, Unhealthy Working Environment, Tiredness, Language Barrier, and Challenging to Perform. Nursing students encountered a variety of emotionally stressful circumstances in their undergraduate education, mostly during clinical assignments. According to the findings of the study of Weurlander et al., (2018), students witnessed unprofessional behavior of health workers towards patients and there were dilemmas regarding different views on the treatments of patients during clinical assignments. The nursing students revealed that their experiences were challenging. Providing care for patients is stressful from the standpoint of students. In coping with new experiences in the clinical learning setting, students are worried and overwhelmed (Jamshidi et al., 2016).

Nine (9) students stated that they were motivated. Generated codes for the theme: Motivated were Motivation to be Competent, Motivation from Classmates, Help for the Future, and Dreams and Aspirations. As Eller et al. (2014) identified, effective mentoring included aspects of open communication, passion in exchange of knowledge, mutual respect, trust, and role modelling.

A total of nine (9) students stated that their instruments of hope were their clinical instructors, the physicians, midwives, and nurses. The codes for instruments of hope were: Physicians, Midwives, and Nurses as Mentors, and Helpful Clinical Instructors. Effective and ineffective instructors are distinguished by their attitudes toward students rather than their professional talents (Tang et al., 2005). Other staff members, such as consultants, senior clinicians, and medical personnel, can function as leader, instructor, support, and teacher to help students learn more efficiently (O'Grady, 2018). Terms like "mentor," "preceptor," and "link teacher" have been extensively explored to describe a supervisory role, and the one-to-one relationship between student and mentor, or individualized supervision, has been found to be crucial to the process of professional growth (Abouelfettoh & Mumtin, 2014). Learning in the clinical setting is a relational endeavor, anchored on daily interactions between students, midwives, and others. Consistent support to students in the healthcare field can be offered through training, coaching, and mentoring by instructors. Often, training is provided in conjunction with clinical education through preceptorships or other structured programs that transition students to practice or enhance the skills of existing clinical practitioners (Grealish, 2000). Coaching is an interactive strategy that allows instructors in training programs to direct trainees in ways that enhance a narrowly-defined set of clinical skills (Billay & Myrick, 2008). Moreover, mentoring is a relationship-building process in which the goal is professional growth and development (Andrews & Wallis, 2000). According to Helminen et al. (2016), clinical instructors want nursing students to have a pleasant experience in the hospital setting. Most of the labor and delivery nurses have a more favorable view about students and their learning than student assessments imply (Capstick & Harley, 2004). Many students stated in a study that they had the most interactions with professors and that how an instructor treats a student affects their involvement in the clinical learning setting (Jamshidi et al., 2016).

Lastly, six (6) students concurred that they gained life lessons with their experiences. The generated sub theme for Life Lessons was Appreciation of life. Feelings of responsibility for women and babies' outcomes were some of the findings in one study. Students mentioned their feelings of sympathy to the mothers in pain while giving birth. Their empathetic nature of relationships with the mothers were also portrayed in a study about midwives witnessing traumatic births (Rice & Warland, 2013).

Limitations and Implications

Informants of this study had limited delivery room exposure in their clinical practice due to the cancellation of face-to-face classes and clinical duties as consequence of the COVID-19 pandemic during the second semester. Thus, the results of this study only related the experience of the nursing students' experience before the pandemic started. Due to a lack of clinical exposure, nursing students believed they lack the necessary skills and experiences to become future nurses, putting fear and anxiety in their hearts and affecting their confidence as nurses. It is therefore recommended, that hospital administrators should plan to hold more seminars and trainings for nursing students, so that they can gain experience and learn skills that they may have missed due to the lack of face-to-face learning opportunities. These will significantly boost their confidence as nurses and improve their nursing skills, allowing them to provide the best possible care for their clients. The researchers also recommend that nursing educators consider working with new teaching strategies and activities, such as providing more case studies or virtual simulations where students can practice their skills in real-life hospital scenarios, boosting their confidence as future nurses. The study's findings can also be utilized as a foundation for developing better policies, schedules, and course syllabi in the future to improve nursing students' learning experiences.

Another limitation of this study was the use of virtual platforms in conducting interviews. Since face-to-face interviews were not done, the observation of the gestures and facial expressions of the informants may be limited. It is therefore recommended that face-to-face interviews should be done if situation permits in the future study. More studies similar to this topic is also recommended to future researchers. The live experiences of nursing students in the pediatric clinical environment can also be explored for future studies.

Conclusion

The purpose of the research study was to explore the live experiences of student nurses in the performance of actual delivery. The research question is, "what are the live experiences of the nursing students in the performance of actual delivery." Based on the findings of the study, the researchers conclude that the live experiences of student nurses in the performance of actual delivery are Considerable Experiences, Unpleasant Experience, Challenging, Motivated, Instruments of Hope, and Life Lessons. Nursing students' exposure in the delivery room consisted of both positive and negative experiences, but generally, the students considered their experience of actual delivery in the clinical setting as a positive experience. The findings of this study should be considered by nursing educators and practitioners. Nursing schools and their clinical instructors must be concerned about resolving student issues in both education and clinical practice.

References

- [1] Abouelfettoh, A. & Mumtin, S.A. (2014). Nursing students' satisfaction with their clinical placement. *Journal of Scientific Research & Reports* 4(6): 490-500, 2015; Article no JSRR. ISSN: 2320-0227
- [2] Ames, H., Glenton, C. & Lewin, S. (2019) Purposive sampling in a qualitative evidence synthesis: a worked example from a synthesis on parental perceptions of vaccination communication. *BMC Med Res Methodol*. <https://doi.org/10.1186/s12874-019-06654>
- [3] Andrews, M., & Wallis, M. (1999). Mentorship in nursing: a literature review. *Journal of Advanced Nursing*. 29(1), 201-207. <https://doi.org/10.1046/j.1365-2648.1999.00884.x>

- [4] Balacut, J., Chaves, J., Eufre, H., Montuno, C., & Simborio, P. (2011). Level of anxiety and coping mechanisms during first exposure in the delivery room. *International Peer Reviewed Journal Vol 3*. doi: <http://dx.doi.org/10.7828/anrj.v3i1.274>
- [5] Billay, D., & Myrick, F. (2008). Preceptorship: an integrative review of the literature. *Nurse Education in Practice*, 8(4), 258–266. <https://doi.org/10.1016/j.nepr.2007.09.005>
- [6] Capstick, V.A., Harley, D. (2004). Labor and delivery nurses: A survey of attitudes toward third-year medical students and their education. *American Journal of Obstetrics and Gynecology*. Volume 191, Issue 5, 2004. <https://www.sciencedirect.com/science/article/pii/S0002937804008476>
- [7] Chesser-Smyth, P. (2005). The live experiences of general student nurses on their first clinical placement: a phenomenological study. *Nurse Education in Practice*, Vol. 5, No. 6, pp. 320–327.
- [8] Creswell, J. W. (2013). Qualitative inquiry & research design: choosing among five approaches (3rd ed.).
- [9] Dewar, B., Stulz, V., Buliak, A., Connolly, L., McLaughlin, D. K., Newport, K., Rebolledo, S., Stephenson, L., MacBride, T., Lennon, K., & Drayton, N. (2020). Exploring and developing student midwives' experiences (ESME)-an appreciative inquiry study. *Midwifery*, 91, 102844. <https://doi.org/10.1016/j.midw.2020.102844>
- [10] Eller, L. S., Lev, E. L., & Feurer, A. (2013, August 14). Key components of an effective mentoring relationship: a qualitative study. *Nurse Education Today*. <https://www.sciencedirect.com/science/article/abs/pii/S0260691713002724?via%3Dihub>
- [11] Edwards, D., Burnard, P., Bennett, K., and Hebden, U. (2010). A longitudinal study of stress and self-esteem in student nurses. *Nurse Education Today*, vol. 30, no. 1, pp. 78–84
- [12] Gemuhay, H. M., Kalolo, A., Mirisho, R., Chipwaza, B., & Nyangena, E. (2019, March 3). Factors affecting performance in clinical practice among preservice diploma nursing students in Northern Tanzania [Research Article]. *Nursing Research and Practice; Hindawi*. <https://doi.org/10.1155/2019/3453085>
- [13] Gill, M.J. (2020) Phenomenological approaches to research, in Mik-Meyer, N. and Järvinen, M (Eds.) qualitative analysis: eight approaches. *London: Sage*, pp. 73-94.
- [14] Grealish L. (2000). The skills of coach are an essential element in clinical learning. *The Journal of Nursing Education*, 39(5), 231–233. <https://doi.org/10.3928/0148-4834-20000501-09>
- [15] Helminen, K., Coco, K., Johnson, M., Turunen, H., Tossavainen, K. (2016). Summative assessment of clinical practice of student nurses: a review of the literature. *International Journal of Nursing Studies*. Volume 53, pp. 308-319, <https://doi.org/10.1016/j.ijnurstu.2015.09.014>.
- [16] Hilal, A.H., Alabri, S.S. (2013). Using Nvivo for Data Analysis in Qualitative Research. *International Interdisciplinary Journal of Education*. http://iijoe.org/v2/IJJOE_06_02_02_2013.pdf
- [17] Jamshidi, N., Molazem, Z., Sharif, F., Torabizadeh, C., & Najafi Kalyani, M. (2016, June 5). The challenges of nursing students in the clinical learning environment: a qualitative study [Research Article]. *The Scientific World Journal; Hindawi*. <https://doi.org/10.1155/2016/1846178>
- [18] Kaplan, R., Battista, J., & Scotland, N. (2016). Incorporating nurse-midwifery students into graduate medical education: lessons learned in interprofessional education. *Journal of Midwifery & Women's Health*. Volume 60, Issue 6. <https://onlinelibrary.wiley.com/doi/abs/10.1111/jmwh.12315>
- [19] Mccusker, K. & Gunaydin, S. (2014). Research using qualitative, quantitative or mixed methods and choice based on the research. *Perfusion*. 30. 10.1177/0267659114559116.
- [20] Morrow, R., Rodriguez, A., & King, N. (2015). Colaizzi's descriptive phenomenological method. *The Psychologist*, 28(8), 643-644.

- [21]O'Grady, N. (2018, October 30). The role of mentorship in trainee advanced clinical practitioner development. *Wiley Online Library*. <https://doi.org/10.1111/jan.13891>
- [22]Raines, D. (2010). Obstetrical nursing experience simulation filling the gap. *Nursing for Women's Health*, 14(2), 113-119.
- [23]Regoli, N. (2017). Eight advantages and disadvantages of phenomenological research. <https://connectusfund.org/8-advantages-and-disadvantages-of-phenomenological-research>
- [24]Rice, H., & Warland, J. (2013). Bearing witness: Midwives experiences of witnessing traumatic birth [Research Article]. *Midwifery*. Elsevier. <https://doi.org/10.1016/j.midw.2012.12.003>
- [25]Shapiro, J. (2011). Perspective: does medical education promote professional alexithymia? a call for attending to the emotions of patients and self in medical training. academic medicine. *Journal of the Association of American Medical Colleges*. <https://pubmed.ncbi.nlm.nih.gov/21248595/>
- [26]Suwannobol, N. & Suwathan, L. (2012). The practical delivery room experience of nursing students at Suranaree University of Technology. *International Journal of Medical, Medicine and Health Sciences*, Vol. 6, No. 11.
- [27]Tang, F., Chou, S., Chiang, H. (2005). Students' perceptions of effective and ineffective clinical instructors. *Journal of Nursing Education* Vol. 44. No. 4. <https://journals.healio.com/doi/abs/10.3928/01484834-20050401-09>
- [28]Truong, T. H. (2015). Vietnamese nursing students' perceptions of their clinical learning environment: A cross-sectional survey (Doctoral dissertation). *Queensland University of Technology, Australia*.
- [29]Weurlander, M., Lönn, A., Seeberger, A., Broberger, E., Hult, H., & Wernerson, A. (2018). How do medical and nursing students experience emotional challenges during clinical placements?. *International Journal of Medical Education*, 9, 74–82. <https://doi.org/10.5116/ijme.5a88.1f80>
- [30]Yeager, K. (2012). Statistical and qualitative data analysis software: about NVivo. *Kent State University*. <https://libguides.library.kent.edu/statconsulting>

Paradigm Shift: The Lived Experience of Nursing Clinical Instructors in Adapting to Online Teaching during the Covid-19 Pandemic

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Abstract: The COVID-19 Pandemic has changed educational teaching and learning activities. The traditional face-to-face setup in academic institutions shifted to online modalities. The study aimed to explore the live experience of nursing clinical instructors in adapting to online teaching during the COVID-19 pandemic. This qualitative phenomenological study was conducted among 15 nursing clinical instructors, aged 30-59, who facilitated learning in the classroom, laboratory, and clinical setting during the COVID-19 Pandemic. A self-constructed questionnaire was used and answered through a focus group discussion via online platforms. The participants were selected through purposive sampling. The result showed that the live experiences of the clinical instructors consisted of challenges encountered during the sudden shift concerning: redesigning teaching methodology, technological adjustments, evaluating teaching outcomes, balancing firmness and flexibility among students, and convenience. The coping strategies of the clinical instructors were the presence of a support system, their commitment to service, and the use of diversional activities during difficult times. Based on the results of the study, the researchers recommend emphasizing showing care and support among co-workers in this uncertain and ever-changing situation, reiterating among teachers the importance of embracing the value of commitment to service, an in-depth exploration study on encouraging teachers for ministry participation as part of diversional activities.

Keywords: *online modalities, face-to-face teaching, paradigm shift*

Introduction and Literature Review

Modern nursing education as known today started with Florence Nightingale whose work signaled the start of modern nursing (Morin, 2014). Her nursing school at St. Thomas Hospital would have an emphasis on providing nursing care at the hospital with less time being spent in the formal classroom setting. Still, this setup by Florence Nightingale would serve as an example for future nursing institutions coming after it. Nowadays, the goals of nursing education to train up future nurses to be able to meet their patient's needs, contribute to nursing research to improve patient care, and to be able to collaborate with other healthcare professionals (Institute of Medicine (US) Committee on the Robert Wood Johnson Foundation Initiative on the Future of Nursing, at the Institute of Medicine, 2011). With patient needs becoming more complex as time goes by, there was a felt need for nursing education to be placed from the hospital training schools to institutions of higher learning (Whelan, n.d.). Colleges now offered nursing education programs. Nursing education in these colleges would have an emphasis on theory, classroom, and laboratory learning in the early years and more clinical exposures in a hospital setting during the later years. Specializations in nursing started to emerge to meet the ever-diversifying needs of patients.

In December 2019, however, a new virus known as the 2019 novel coronavirus emerged which can be transmitted easily through droplets when an infected person sneezes or coughs. These particles can infect other people and can stick on to objects. Though the vulnerable population includes the elderly and young children, no one is immune to this virus, and everyone can acquire it. The symptoms of the virus include fever, dry cough, sore throat, headache, fatigue, headache, myalgia, and breathlessness. Symptoms can progressively get worse and death from complications is a possibility.

Due to the susceptibility even in school settings, school closures are enforced all over the world (Toquero, 2020). The COVID-19 pandemic has had a significant impact on all students and teachers in the United States and around the world, raising a wide range of education issues. As a

response, colleges and universities required online class distribution for a period of time as the pandemic unfolds (Sportsman, 2020).

Advances in technology such as the Internet have allowed for the emergence of online learning. The very first fully online course was offered back in 1981 (Harasim, 2000). At first, online learning was very text-heavy and there was very little interactivity between student and teacher as the student was expected to go through the reading material on their own. This would prove to be an early lesson as future attempts at online learning would improve at this. The term e-learning would emerge in the mid-1990s and would refer to both fully online classes and blended learning which involves a mix of face-to-face classes and online learning (Garrison, 2003).

With so many schools and colleges suddenly switching to online education, the current pandemic has brought about paradigm shifts not yet prevailed over by health science institutions because when they see themselves in a reality that caused changes in economic, cultural, political, and social aspects at a global sense, they had to recreate and add new methods of teaching in their work process; they had to talk about various educational viewpoints, and because they need to readjust health teaching methods, they have to use remote technologies as means to continue classes in non-face-to-face settings (Bezerra, 2020).

Leigh et al. (2020) stated that in this setup, nursing education has been more challenging. Overnight, there has been a need to change the way nursing education is delivered, with nursing instructors having the need to adopt facilitator roles, using technology as tools to provide the theoretical aspect of the nursing curricula. This shows that nursing clinical instructors needed to adapt to online learning amid the pandemic. The researchers had an interest in knowing the experiences of these nursing clinical instructors while adapting to this alternative way of teaching. This paper aims to explore their live experiences and contribute to nursing education by understanding the facilitators who are teaching and training student nurses in this challenging time.

Nurse educators are responsible for creating an environment that facilitates learning, whether in a classroom, laboratory, or clinical setting. They must ensure that the necessary cognitive, emotional, and psychomotor effects are achieved (Sharma, 2017). Clinical instructors play a crucial role in the development of the clinical skill of nursing students. They are responsible for the application of theoretical material to the clinical practice of nursing students and the development of clinical expertise and their clinical growth and excellence. In addition to carrying out instructional exercises, clinical teachers are responsible for developing a sense of autonomy, and decision-making, and increasing the imagination of students in different clinical settings (Toquero, 2020)

Education could help mankind to advance. Its purpose does not only revolve around making literate people but also in developing critical thinking, knowledge, and self-sufficiency (Ruban, 2014). Nursing is a field where one needs enough clinical knowledge and skill in order to care for patients and their family alongside handling real-life situations (Kalaivani, 2014).

Sharma (2017) stated that graduates of nursing must be ready to work as professionals in the healthcare industry, where the environment is filled with high complexity, diversity, and change. Since nursing students need to perform activities that are actually being done in the profession, the learning process in nursing is unique. Nursing is a profession where theoretical and practical training needs to be integrated. Horntvedt et al. (2018) claimed that in order to assure patient safety, evidence-based practice is important. In the context of teaching in healthcare institutions, interactive methods such as lectures, group works, journal clubs, quiz readings, presentations, and workshops are needed.

Face-to-face learning has been the pillar of nursing education. Despite the advances in online learning, face-to-face learning still persists (Gruendemann, 2011). The activities in nursing education could go from formal teaching to the impromptu teaching that happens during daily work. The places where nursing education takes place can range from universities, public and private hospitals, clinics, nursing homes, prisons, and clients' own houses. The principles in learning, when it comes to nursing education, are based on adult learning; it is mainly focused on producing nurses who are equipped to perform their roles, to add to the nursing workforce (Quinn, 2000).

In nursing education, theories must always be related to practice. Educators play a huge role in making this happen. Further, nursing education is a practice-based learning where clinical exposure is essential to students. That is why it is very important for clinical setting learning to be dynamic, where learning resources are available to aid students in allowing the gaps to meet between theoretical learning and clinical practice.

Wu et al. (2020) reported that the initial outbreak of the 2019 novel coronavirus or COVID-19 virus occurred in late December 2019 at Huanan Seafood Wholesale Market located in Wuhan, Hubei, China. People who fall victim to this new virus suffered from pneumonia-like symptoms such as fever, dry cough, and fatigue. The market was shut down but the virus had already spread throughout the city of Wuhan then the province of Hubei, then spread to several other parts of China such as Zhejiang, Guangdong, Henan, and Hunan. Major cities such as Shanghai and Beijing were also affected by the virus. Due to its high transmission rate, the COVID-19 virus has spread across the world. As with the latest situation report on the COVID-19 virus from the World Health Organization, 181 countries and 33 territories have been affected by the virus.

(*Coronavirus Disease (COVID-19) in the Philippines*, 2020) reported that in the Philippines, the first known case of Covid-19 was reported on January 30, 2020, and the first local transmission was confirmed on March 7, 2020. On March 16, 2020, strict home quarantine measures were implemented on the main island of Luzon, to prevent the further spreading of the virus (Khaliq, 2020).

With regards to the spread of the Covid-19 virus, governments around the world have put up health protocols to deal with this pandemic. Border controls were tightened, quarantine measures were put in place, and hygiene and the wearing of face masks were encouraged. One of the first health measures taken by governments all over the world is the cancellation of face-to-face classes in schools of all levels nationwide (Bayham & Fenichel, 2020).

In the context of the Covid-19 pandemic, there has been a sudden and huge transition to online learning; and while online learning has enforced distance, it could still promote connection (Mulla et al., 2020). In a study done by Crawford et al. (2020), it was revealed that universities in some countries use available tools so that the effect of the pandemic on learning would be minimized. Although many higher education organizations in countries where schools are closed initially focused on the transition to the online world, the focus is now on the online learning of the young ones. There has never been a time for a coordinated, collaborative, and collective global response to the best practice principles for online education. And in a time of global crisis, there is a global potential for mutual capital and knowledge to ensure that students' education will continue in the face of COVID-19.

Making the transition to online learning is not without its challenges. Teachers would have to spend their time adapting their lesson materials into an online format. Planning out coursework for an entire semester in an online format can take more time and effort to implement. A teacher used to the traditional setup will need to be trained so that they will be able to use the online platform with ease. Traditional approaches to teaching may not work well when simply transferred over to an online platform. Online learning will require its own approach to teaching to ensure its effectiveness. Students will also face challenges as not all of them will be tech-savvy despite often using technology for communication or social media (Jacobs, 2013).

In the field of health, nursing schools are preparing for unique challenges related to their role in training the healthcare providers' next generation (Dewart et al., 2020). Nursing faculty have always provided courses for full/partial online learning, but the question remains on how clinical experiences could still be implemented. In the United States, in places where the state board of nursing hasn't provided mitigations, the faculty members of universities are encouraged to move forward to prepare students (Sportsman, 2020). In addition to the fact that nursing faculties have been providing online courses since before, it is also understood that teaching from a distance may be out of many instructors' comfort zone. Because of the rapid change in teaching methods, instructors are likely to become overwhelmed (*Coronavirus & Remote Learning*, 2020).

Leigh et al. (2020) claimed that the immediate change to online learning has challenged them as nurse educators. It was realized that being an educator online, having limited resources and time brings many challenges. Fear of technology, hearing silence in virtual rooms, and the discomfort of facing only a screen are some of their concerns; but using the Socratic method of communication between students and teachers allows them to have more confidence in facing a number of people and developing critical thinking. They also stated that the challenge in undergraduate teaching in nursing lies in the complete transition to the online method of teaching.

This study adopted the General Systems Theory by Ludwig von Bertalanffy. This theory suggests the existence of "systems", which are described as composed of different elements. These systems are interactive with their environment and other surrounding systems. The systems can either be a group, individual, or organization. Any organism is considered a system that has parts and processes that interact with each other (Von Bertalanffy, 1967). The theory also notes that as the parts of an individual interact with each other, the individual interacts with the environment also. If a single part of the system malfunctions, the whole system is affected (Alvarez et al., 2017). The system is also said to be self-correcting or self-regulating through a mechanism called feedback to attain balance (*Systems Theory in Nursing*, 2012). The clinical instructors are also individuals capable of interacting with their surroundings and students; able to self-regulate. Thus, this paper sought to know their lived experiences while adapting to online learning, a setting different from the traditional one, in the midst of the Covid-19 pandemic.

Methodology

In conducting this study, the researchers utilized a qualitative, phenomenological research design. Pathak et al. (2013) stated that qualitative research focuses on interpreting the research query in a humanistic or idealistic approach. This type of research is used to understand people's values, perceptions, attitudes, behaviors, and interactions. It utilizes data that is non-numerical. Qualitative studies are considered to be befitting for finding the meanings that people place on the events, processes, and structures of their lives and their perceptions, presuppositions, and assumptions (Al-Busaidi, 2008). This study was conducted for the purpose of understanding the experiences of the respondents concerning the research topic. Though there is a growing number of debates on the comparison of a qualitative study to the other type of study, Al-Busaidi (2008) claimed that neither of the two types of study is superior to the other. Each has its own strength and weaknesses, and both are essential to understanding the occurrence of an event. A phenomenological approach aims to bring about a specific detail, to recognize phenomena based on the eyes of those who experienced the given situation (Lester, 1999). Phenomenology is a method commonly used in nursing and its main purpose is to understand the experiences of individuals. It seeks to bring light to an occurrence that is not fully understood and it brings an in-depth examination of a lived experience (Wilson, 2015). Information was gathered from the nursing clinical instructors as they recount their experiences in adapting to online learning. The phenomenological research design was chosen for the study as the researchers interviewed nursing clinical instructors on their lived experiences and this design and method can bring about an in-depth exploration of those experiences.

The population studied consists of nursing clinical instructors in a private institution in Silang, Cavite. The sampling technique utilized in this study is purposive sampling. Purposive sampling is a type of sampling method where particular people are selected to be part of the sample because they can provide important information that cannot be acquired from others (Taherdoost, 2016). It is commonly used in qualitative research in order to elicit information related to the given phenomenon. The participants selected are those who are familiar with and possess knowledge of the phenomenon of interest. These nursing clinical instructors are those who are aged 30-59 years old and are facilitating learning in the classroom, laboratory, and clinical setting among students from levels one to four. Each one may have their own unique experiences concerning their adapting to online learning. In this type of sampling method, the sample size is determined through data saturation and not

statistical analysis (Suen et al., 2014). Data saturation is reached when the data gathered is enough to replicate the study; when information is repeated, and no new information is attained.

Fifteen (15) clinical instructors were invited to participate in the study. They were divided into four groups. They were categorized based on the department they belong to. The researchers utilized a semi-structured interview questionnaire in gathering data from the nursing clinical instructors on their experiences in adapting to online learning. The semi-structured interview consists of two semi-structured, open-ended questions that allowed the nursing clinical instructors to recount their experiences.

The following are questions asked of the respondents:

1. What are the experiences of nursing clinical instructors in adapting to online teaching during the Covid-19 pandemic?
2. How did the clinical instructors cope with the challenges of adapting to online teaching during the Covid-19 pandemic?

All the data gathered, and its reliability depended on the responses of the sample population. The interview questions were answered in a focus group discussion.

In any type of research, applying ethical principles and considerations is essential especially when human subjects are involved. In qualitative research, ethical considerations must be thought of in a much deeper sense, especially when conducting interviews with vulnerable participants. While expressing their feelings during interviews, the participants may become stressed (Binti Mohd Arifin, 2018). Since this research applied the qualitative method of gathering and analyzing data, several ethical considerations were done by the researchers. Prior to the interview, the researchers obtained informed consent from the participants, to ensure that they understand what the research is all about and that they are aware of the questions that might be asked. The confidentiality and anonymity of the participants were kept by not naming them and assigning numbers per group. The interview was kept private by assuring that only the participants and interviewers are present and no one else could hear the words being spoken. Since the interview was recorded through a video conference, the files were kept private and were put in a computer with a security code. While transcribing, the researchers used earphones or headsets. Written documents were locked in a secured computer. If the participants would feel unwell during the interview and if they felt uncomfortable to answer the questions, they were assured that they could withdraw from participation in the study.

The researchers approached the participants who fit the criteria and gave them a letter of consent to signify their willingness to participate in the study. The researchers explained the purpose of the study and allowed the participants to ask questions for clarification and assured the participants that privacy would be kept. The researchers then conducted a focus group discussion and observation of the respondents who were grouped depending on the year level they taught. The respondents were asked the same set of questions in order to align the gathered information around the objectives of the research. It was also made clear to the participants that they could stop and discontinue the study if they did not feel comfortable to do so. Due to the limitations imposed by the current pandemic, the interviews were conducted via online conference through MS Teams and Zoom meetings with the respondents. The researchers made sure that the online conferences were private by assuring that the meeting links were only sent to the participants. Triangulation was implemented in the study to ensure the validity of data and to assure that there were no biases. First, the interview was recorded and transcribed to obtain objective data. Further, the facial expressions of the interviewees were also observed and noted to elicit subjective data from the point of view of the interviewers. Lastly, some members of the faculty, department chairs, and the dean of the clinical instructors were consulted to further validate the data. The data analysis was done using Colaizzi's phenomenological method to elicit validated results. The data were protected by the researchers through restricted permissions such as using headphones when transcribing and locking computer folders once data are documented and transcribed to ensure the privacy of the respondents.

When the data were gathered, they were analyzed by way of Colaizzi's method. Colaizzi's method was first developed in 1978 by Colaizzi and it is a descriptive phenomenological method

(Morrow, 2015). Colaizzi's method was chosen for this study as it focuses more on the participants' own experiences and the researchers' task is to interpret it to give it meaning. It is composed of seven steps and involves analyzing first-person accounts of people acquired through interviews, written narratives, blogs, and research diaries. By the end of this seven-step process, a concise description of the phenomenon experienced by all the participants will have been derived. The seven steps are as follows

1. The first step of this method involves the researchers familiarizing themselves with the first-person accounts of all the participants gathered by reading and re-reading the whole transcribed interview data.
2. The statements that are relevant to the research topic from each transcript is recorded on another piece of paper, including the page and the line number.
3. The researchers then derive meanings from these statements after analyzing them as a third step. These meanings are closely related to the phenomenon the researchers are observing.
4. The meanings formulated are grouped according to categories, clusters of themes, and themes.
5. The themes would be used by the researchers in coming up with a full description of the experiences of the nursing clinical instructors regarding the phenomenon.
6. The sixth step involves coming up with a more condensed statement of this description that includes all the vital details of the phenomenon.
7. The last step is validation. The researchers go back, with this condensed statement, to the participants who then give their feedback on this to see if the statement accurately reports their experiences. After receiving this feedback, the researchers could go back to modify their statement of the phenomenon.

Findings

The study explored the live experiences of nursing clinical instructors in adapting to online teaching during the Covid-19 pandemic, the discussion, and the literature that support the themes. The emerging themes were organized according to the research questions addressed by each finding and the lived experiences experienced by the four groups in adapting to online teaching during the Covid-19 pandemic.

The research questions were answered by the themes that emerged in the focus group discussions. The following discussions talk about the result of the study from the data gathered through the informants and the themes that emerged as the lived experiences of the nursing clinical instructors.

The themes that describe the live experiences of nursing clinical instructors in adapting to online teaching during the Covid-19 pandemic were divided into two main themes: Challenges and Convenience. Under Challenges are sub-themes namely: Redesigning Teaching Methodology, Technological Adjustments, Evaluating Outcomes, and Balance Between Firmness and Flexibility. The following themes reflect how they coped with adapting to online teaching during the Covid-19 pandemic: Presence of Support System, Diversional Activities, and Commitment to Service.

Discussion

Redesigning Teaching Methodology. It has been stated that nursing educators have been working harder in order to deliver high-quality learning to students in the new remote learning setup that emerged during the COVID-19 Pandemic (Klar, 2020). In a study done by Nowell et al. (2021), it was revealed that nurse educators needed to restructure courses and materials to facilitate online nursing education. The changes in the learning platform challenged them to think of new ways to deliver learning to students in the online setup. Four (4) out of the four informants expressed their experiences in trying to deliver learning even without the traditional way of teaching clinical skills. Although remote learning has some limitations, the desire to teach students the necessary skills remains in the clinical instructors. Two (2) informants expressed their burden to still deliver quality

learning despite the barriers of online learning. Two (2) shared their experiences in redesigning the skills checklists to fit the students' capacity, considering the limitations, and at the same time highlight the needed competencies. This coincides with the study of Levitt et al. (2020), where he stated that clinical instructors needed to simplify directions and rubrics. The study also identified that challenges for nursing faculty members include modifying courses while maintaining quality, precision, and results.

Technological Adjustments. Belin (2019) suggested that both students and instructors need to have a degree of competence and literacy with computers and the internet to participate in online learning. Three (3) informants shared that coping with technology had been a challenge to them in adapting to online teaching. One (1) expressed difficulty in troubleshooting problems with technology while Two (2) expressed their limited skills in the use of technology. Bdair (2021), acknowledged that both students and teachers had difficulties due to a lack of training in the virtual setup. In addition to that, internet connection also became a problem for nursing faculty, especially those who lived in remote areas. In relation to this Foley and Iheduru-Anderson (2021), in their study, revealed that not being "tech-savvy" contributed to the stress of nursing educators in addition to a lack of experience in online teaching and a short time to learn in the rapid progress of the pandemic. Although some faculty shared that they have had experiences as online students, they have not experienced teaching online. Two (2) informants shared that they have had a glimpse of online learning during the Taal Volcano Eruption in 2020 when classes were cancelled in the affected areas but the rapid transition to online learning during the pandemic was still a concern.

Evaluating Teaching Outcomes. It is shown that nursing educators are concerned about their students' educational experience. They specifically expressed concern about modes of learning, resources in technology that are not available for students, and disadvantages related to the lack of clinical experience of the students (Sacco & Kelly, 2021). When the researchers asked the informants to describe their experience, four (4) informants verbalized their concern over the learning of the students due to the lack of clinical and laboratory exposure. Two (2) repeatedly expressed their fear if students had really gained competence in the skills taught online. One (1) shared her concern about the students' learning if there was no proper equipment for learning. In a study done by Bdair (2021), nursing educators expressed their concern over the challenge of assessing if the students have really learned and suggested that there must be a standardized assessment tool.

Balance Between Firmness and Flexibility. It is said that during the COVID-19 pandemic, nurse educators needed to maintain professional standards and expectations while understanding students' situations (Levitt et al., 2020). Three (3) respondents revealed their experience in taking into consideration the situation of students while trying to meet their own deadlines as teachers. Levitt et al. (2020) consequently stated that nursing faculty extended deadlines, became more flexible, waived penalties for late submissions, and widened the time for completion of incomplete requirements (INCs). Faculty became more lenient. This led to interrupted and less organized grading which raised questions on the limits of this approach and the length of time it will last.

Convenience. It cannot be denied that remote learning and teaching have brought convenience in some respects. Access to online learning at one's own leisure and convenience had been brought about when the pandemic came (Hari, 2021). Despite the challenges, four (4) informants narrated the convenience of having an online class. Due to clinical duties, clinical instructors need to wake up early in the morning to prepare for duties. With the cancellation of face-to-face clinical exposures, these conveniences came up. In a study conducted by Bdair (2021), both nursing students and faculty members discussed the benefit of online learning. It is because of its flexibility that makes it convenient. It saves time and resources. Both faculty and students no longer need to acquire transportation and college resources. However, despite its convenience, they believed that it could only be suitable for theoretical learning and not for actual practice.

Coping Strategies of Nursing Clinical Instructors in Adapting to Online Teaching During the Covid-19 Pandemic

These themes developed when the clinical instructors were asked what their coping strategies were in adapting to online teaching. The themes are Presence of Support System, Diversional Activities, and Commitment to Service.

Presence of Support System. One important thing when coping with crises, including pandemics, involve working together to attain goals (Farsi et al., 2021). Four (4) informants narrated that one of the things that helped them cope is the support of other people. Two (2) informants shared about the support of co-workers in their work. Two (2) shared that having family members whom they can rely on helped them. In a study done by Foley and Iheduru-Anderson (2021) nurse educators shared that they coped through collaboration and supporting each other. Some felt that each faculty had apprehension about the importance of teamwork during the Covid-19 crisis. They established social media platforms where they can share support and resources with one another. Gazza (2022) stated that nurse educators did transition to change independently, they needed and offered help.

Three (3) informants shared that verbalizing their experiences and having someone who listens helped them. One (1) shared that it assures them they are not alone when they share their frustrations with each other. They can relate to their experiences. Iheduru-Anderson & Foley (2021) in their study revealed that nursing faculty find time to stop talking about business and start talking about life. Talking about problems and emotions also helped teachers in coping with the pandemic (Hidalgo-Andrade et al., 2021). In maintaining their well-being, nurse educators expressed the need for connection with peers and reaching out (Nowell et al., 2021).

Commitment to Service. It was shown that religious beliefs and practices can help maintain a positive attitude in difficult situations (Kowalczyk et al., 2020). Research also suggests that altruism or concern for others' well-being can help people cope with stressful and overwhelming moments (Scott, 2021). Four (4) informants emphasized that during the challenging times of adapting to online teaching during the Covid-19 pandemic, they turned to faith and prayer. Two (2) shared that trusting the Lord and praying in a difficult situation helped them. Two (2) found meaning in looking beyond their experiences and putting their hope in the Lord. Kowalczyk et al. (2020) stated that people have different coping strategies in times of crisis and faith is one of them, it gives a sense of hope and security to the one who believes. A study done by Hidalgo-Andrade et al. (2021) also revealed that prayer and reinforcing beliefs in God helped teachers to cope with adapting to online teaching. The influence of being in a faith-based sectarian institution and being in the same denomination on this matter has not been studied but the researchers suggest future studies.

Three (3) informants shared that they cope by participating in religious activities. One (1) stated that it gives a sense of relaxation. Ministering often involves interaction with other people. Irani (2018) suggests that altruism can contribute both to the giver and the benefactor, this is called positive altruism. The study also expounded that positive altruism can be a positive action because it cultivates positive emotions, behaviors, and thoughts; and it can develop strengths and well-being over time. The influence of being in a faith-based institution on this matter has not been studied but the researchers suggest future studies.

Diversional Activities. In coping with stress and transition, many faculties discussed that they set certain times of the day when they stop responding and do something else apart from sitting in front of the computer the whole day (Iheduru-Anderson & Foley, 2021). Four (4) informants mentioned that they look for something to do aside from work. A break from work and doing something not related to their job helped them cope with the challenges. It was shown in Nowell et al. (2021)'s study that nurse educators had to carefully use time away from work in order to attain balance in work and life. Hidalgo-Andrade et al. (2021) also revealed that teachers resort to leisure activities like watching movies, playing music, reading, knitting, having recreation with family, and doing hobbies. Doing hobbies, spending leisure time with loved ones, and doing activities where they can enjoy or vent out their problems helped the informants.

Conclusion

From the themes and statements derived from the focus group discussion, the researchers conclude that the live experiences of the nursing clinical instructors in adapting to online teaching during the Covid-19 pandemic were: Challenges in Redesigning Teaching Methodology, Technological Adjustments, Evaluating Outcomes, Balance Between Firmness and Flexibility, and Convenience. Their coping strategies are Presence of Support System, Diversional Activities, and Commitment to Service.

The purpose of this study was to explore the live experiences of nursing clinical instructors in adapting to online teaching amidst the Covid-19 pandemic and contribute to nursing education by understanding the facilitators who are teaching and training student nurses in this challenging time. Leigh et al. (2020) stated that in this setup, nursing education has been more challenging. Overnight, there has been a need to change the way nursing education is delivered, with nursing instructors having the need to adopt facilitator roles, using technology as tools to provide the theoretical aspect of the nursing curricula. This shows that nursing clinical instructors needed to adapt to online learning amidst the pandemic.

This study could be utilized as a baseline for other researchers to conduct further research about nurse educators' experiences in adapting to online learning. With this research as a baseline, other researchers could do a more in-depth exploration of the experiences of nursing clinical instructors. The result showed that the live experiences of the clinical instructors consisted of challenges encountered during the sudden shift concerning: redesigning teaching methodology, technological adjustments, evaluating teaching outcomes, balancing firmness and flexibility among students, and convenience. The coping strategies of the clinical instructors were the presence of a support system, their commitment to service, and the use of diversional activities during difficult times. Based on the results of the study, the researchers recommend emphasizing showing care and support among co-workers in this uncertain and ever-changing situation, reiterating among teachers the importance of embracing the value of commitment to service, an in-depth exploration study on encouraging teachers for ministry participation as part of diversional activities.

References

- [1] Al-Busaidi, Z. Q. (2008). Qualitative Research and its Uses in Health Care. *Sultan Qaboos University Medical Journal*, 8(1), 11–19.
- [2] Alvarez, I., Ong, M., & Abocejo, F. (2017). Learning Needs and Quality Care Among Family Caregivers and Elderly Patients of Guadalupe, Cebu City, Central Philippines. *European Scientific Journal*, 1313, 1857–7881. <https://doi.org/10.19044/esj.2017.v13n24p356>
- [3] Bayham, J., & Fenichel, E. P. (2020). Impact of school closures for COVID-19 on the US health-care workforce and net mortality: A modelling study. *The Lancet Public Health*, 5(5), e271–e278. [https://doi.org/10.1016/S2468-2667\(20\)30082-7](https://doi.org/10.1016/S2468-2667(20)30082-7)
- [4] Bdair, I. A. (2021). Nursing students' and faculty members' perspectives about online learning during COVID-19 pandemic: A qualitative study. *Teaching and Learning in Nursing*, 16(3), 220–226. <https://doi.org/10.1016/j.teln.2021.02.008>
- [5] Belin, A. (2019, July 5). *6 Ways To Provide Meaningful Feedback For Online Courses*. ELearning Industry. <https://elearningindustry.com/meaningful-feedback-for-online-learners-provide-courses>
- [6] Bezerra, I. M. P. (2020). State of the art of nursing education and the challenges to use remote technologies in the time of Corona Virus Pandemic. *Journal of Human Growth and Development*, 30(1), 141–147. <https://doi.org/10.7322/jhgd.v30.10087>
- [7] Binti Mohd Arifin, S. R. (2018). *Ethical Considerations in Qualitative Study*.
- [8] Choudhary, S. (2018). *Effects of online education on mental and physical health*. India Today. <https://www.indiatoday.in/education-today/featurephilia/story/effects-of-online-education-on-mental-and-physical-health-1854320-2021-09-18>

- [9] *Coronavirus & Remote Learning*. (2020). Elsevier Education.
<https://evolve.elsevier.com/education/coronavirus-remote-learning/>
- [10] *Coronavirus disease (COVID-19) in the Philippines*. (2020, May 9).
<https://www.who.int/philippines/emergencies/covid-19-in-the-philippines>
- [11] Crawford, J., Butler-Henderson, K., Rudolph, J., Malkawi, B., Matt Glowatz, Magni, P., Magni, P., & Lam, S. (2020). COVID-19: 20 countries' higher education intra-period digital pedagogy responses. *Journal of Applied Learning & Teaching*, 3(1).
<https://doi.org/10.37074/jalt.2020.3.1.7>
- [12] Dewart, G., Corcoran, L., Thirsk, L., & Petrovic, K. (2020). Nursing education in a pandemic: Academic challenges in response to COVID-19. *Nurse Education Today*, 92, 104471.
<https://doi.org/10.1016/j.nedt.2020.104471>
- [13] Farsi, Z., Sajadi, S. A., Afaghi, E., Fournier, A., Aliyari, S., Ahmadi, Y., & Hazrati, E. (2021). Explaining the experiences of nursing administrators, educators, and students about education process in the COVID-19 pandemic: A qualitative study. *BMC Nursing*, 20(1), 151.
<https://doi.org/10.1186/s12912-021-00666-4>
- [14] Garrison, D. R. (2003). *E-Learning in the 21st Century: A Framework for Research and Practice*. Routledge. <https://doi.org/10.4324/9780203166093>
- [15] Gazza, E. (2022). The Experience of Being a Full-Time Academic Nurse Educator During the COVID-19 Pandemic. *National League for Nursing*.
- [16] Gruendemann, B. J. (2011). Nursing student experiences with face-to-face learning. *The Journal of Nursing Education*, 50(12), 676–680. <https://doi.org/10.3928/01484834-20110930-02>
- [17] Hari, S. (2021). *The Benefits of Online Learning During the Pandemic | London College of Contemporary Arts—LCCA*. <https://www.lcca.org.uk/blog/student-life/the-benefits-of-online-learning-during-the-pandemic/>
- [18] Hidalgo-Andrade, P., Hermosa-Bosano, C., & Paz, C. (2021). Teachers' Mental Health and Self-Reported Coping Strategies During the COVID-19 Pandemic in Ecuador: A Mixed-Methods Study. *Psychology Research and Behavior Management*, 14, 933–944.
<https://doi.org/10.2147/PRBM.S314844>
- [19] Horntvedt, M.-E. T., Nordsteien, A., Fermann, T., & Severinsson, E. (2018). Strategies for teaching evidence-based practice in nursing education: A thematic literature review. *BMC Medical Education*, 18. <https://doi.org/10.1186/s12909-018-1278-z>
- [20] Iheduru-Anderson, K., & Foley, J. A. (2021). Transitioning to Full Online Teaching During Covid-19 Crisis: The Associate Degree Nurse Faculty Experience. *Global Qualitative Nursing Research*, 8, 23333936211057544. <https://doi.org/10.1177/23333936211057545>
- [21] Institute of Medicine (US) Committee on the Robert Wood Johnson Foundation Initiative on the Future of Nursing, at the Institute of Medicine. (2011). *The Future of Nursing: Leading Change, Advancing Health*. National Academies Press (US).
<http://www.ncbi.nlm.nih.gov/books/NBK209880/>
- [22] Irani, A. S. (2018). *Positive Altruism: Helping that Benefits Both the Recipient and Giver*. 60.
- [23] Jacobs, P. (n.d.). *The Challenges of Online Courses for the Instructor*. 20.
- [24] Kalaivani, Dr. A. (2014). Role of E-Learning in the Quality Improvement of Higher Education. *IOSR Journal of Humanities and Social Science*, 19(11), 15–17. <https://doi.org/10.9790/0837-191151517>
- [25] Khaliq, R. (2020, March 16). *COVID-19: Philippines to quarantine 57M people*.
<https://www.aa.com.tr/en/asia-pacific/covid-19-philippines-to-quarantine-57m-people/1767815>
- [26] Klar, R. T. (2020). Nurse Educators as Agents of Change in the SARS-CoV-2 Pandemic. *Nursing for Women's Health*, 24(4), 253–255. <https://doi.org/10.1016/j.nwh.2020.05.010>

- [27]Kowalczyk, O., Roszkowski, K., Montane, X., Pawliszak, W., Tylkowski, B., & Bajek, A. (2020). Religion and Faith Perception in a Pandemic of COVID-19. *Journal of Religion and Health*, 59(6), 2671–2677. <https://doi.org/10.1007/s10943-020-01088-3>
- [28]Leach, D. (2016, November 30). Why Is Nursing a Predominantly Female Occupation? *Challenge Magazine*. <https://www.challengemagazine.com/finance-career/why-is-nursing-a-predominantly-female-occupation/>
- [29]Leigh, J., Vasilica, C., Dron, R., Gawthorpe, D., Burns, E., Kennedy, S., Kennedy, R., Warburton, T., & Croughan, C. (2020). Redefining undergraduate nurse teaching during the coronavirus pandemic: Use of digital technologies. *British Journal of Nursing*, 29(10), 566–569. <https://doi.org/10.12968/bjon.2020.29.10.566>
- [30]Lester, S. (1999). *An introduction to phenomenological research*.
- [31]Levitt, C., Goulet, M., Murphy, J., Norman-Eck, R., & Bhatt, A. (2020). Nursing education during a pandemic: Perspectives of students and faculty. *Journal of Nursing Education and Practice*, 11(4), 19. <https://doi.org/10.5430/jnep.v11n4p19>
- [32]Mangis, J. (2016). Online learning and the effects on functional health: A pilot study. *EWU Masters Thesis Collection*. <https://dc.ewu.edu/theses/386>
- [33]McLeod, S. (2018). Erik Erikson | Psychosocial Stages | Simply Psychology. <https://www.simplypsychology.org/Erik-Erikson.html>
- [34]Morin, K. (2014). Nursing education: The past, present and future. *Journal of Health Specialties*, 2(4), 136. <https://doi.org/10.4103/1658-600X.142781>
- [35]Morrow, R. (2015). Colaizzi's descriptive phenomenological method. *The Psychologist*, 28(8), 5.
- [36]Mulla, Z. D., Osland-Paton, V., Rodriguez, M. A., Vazquez, E., & Plavsic, S. K. (2020). Novel coronavirus, novel faculty development programs: Rapid transition to eLearning during the pandemic. *Journal of Perinatal Medicine*, 48(5), 446–449. <https://doi.org/10.1515/jpm-2020-0197>
- [37]Nowell, L., Dhingra, S., Andrews, K., & Jackson, J. (2021). Perceptions and Nursing Demands and Experiences in the Midst of an International Crisis (PANDEMIC): A Qualitative Study of Nurse Educators' Experiences. *Quality Advancement in Nursing Education - Avancées En Formation Infirmière*, 7(2). <https://doi.org/10.17483/2368-6669.1291>
- [38]Oxford Languages and Google—English | Oxford Languages. (n.d.). <https://languages.oup.com/google-dictionary-en/>
- [39]Pathak, V., Jena, B., & Kalra, S. (2013). Qualitative research. *Perspectives in Clinical Research*, 4(3), 192. <https://doi.org/10.4103/2229-3485.115389>
- [40]Quinn, F. M. (2000). *The Principles and Practice of Nurse Education*. Nelson Thornes.
- [41]Ruban, A. (2014, July 7). A Study on Innovative Teaching Learning Practices in Colleges in Palayamkottai, Tirunelveli District, Tamil Nadu. <https://doi.org/10.13140/2.1.4024.0322>
- [42]Sacco, T. L., & Kelly, M. M. (2021). Nursing Faculty Experiences During the COVID-19 Pandemic Response. *Nursing Education Perspectives*, 42(5), 285–290. <https://doi.org/10.1097/01.NEP.0000000000000843>
- [43]Sadeghi, A., Oshvandi, K., & Moradi, Y. (2019). Explaining the inhibitory characteristics of clinical instructors in the process of developing clinical competence of nursing students: A qualitative study. *Journal of Family Medicine and Primary Care*, 8(5), 1664. https://doi.org/10.4103/jfmpc.jfmpc_34_19
- [44]Scott, E. (2021, January 26). *Why Being Good to Others Is Also Benefits You*. Verywell Mind. <https://www.verywellmind.com/benefits-of-altruism-3144685>
- [45]Sharma, R. K. (2017). Emerging Innovative Teaching Strategies in Nursing. *JOJ Nursing & Health Care*, 1(2). <https://doi.org/10.19080/JOJNHC.2017.01.555558>
- [46]Sportsman, S. (2020). *Nurse Educators' Response to COVID-19*. 8.

- [47]Suen, L.-J. W., Huang, H.-M., & Lee, H.-H. (2014). [A comparison of convenience sampling and purposive sampling]. *Hu Li Za Zhi The Journal of Nursing*, 61(3), 105–111.
<https://doi.org/10.6224/JN.61.3.105>
- [48]*Systems Theory in Nursing*. (2012, January 30).
http://currentnursing.com/nursing_theory/systems_theory_in_nursing.html
- [49]Taherdoost, H. (2016). Sampling Methods in Research Methodology; How to Choose a Sampling Technique for Research. *SSRN Electronic Journal*.
<https://doi.org/10.2139/ssrn.3205035>
- [50]Toquero, C. M. (2020). Challenges and Opportunities for Higher Education amid the COVID-19 Pandemic: The Philippine Context. *Pedagogical Research*, 5(4), em0063.
<https://doi.org/10.29333/pr/7947>
- [51]Von Bertalanffy, L. (1967). General theory of systems: Application to psychology. *Social Science Information*, 6(6), 125–136. <https://doi.org/10.1177/053901846700600610>
- [52]Whelan, J. (n.d.). *American Nursing: An Introduction to the Past*.
<https://www.nursing.upenn.edu/nhhc/american-nursing-an-introduction-to-the-past/>
- [53]Wilson, A. (2015). A guide to phenomenological research. *Nursing Standard*, 29(34), 38–43.
<https://doi.org/10.7748/ns.29.34.38.e8821>
- [54]Wu, Y.-C., Chen, C.-S., & Chan, Y.-J. (2020). The outbreak of COVID-19: An overview. *Journal of the Chinese Medical Association*, 83(3), 217–220.
<https://doi.org/10.1097/JCMA.0000000000000270>

Distance Learning: Its Influence on the Social Skills of STEM Students

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Abstract: Social skills improve students' positive behavior and promote students' academic success, health, and overall well-being. This descriptive-correlational study was conducted among STEM students of AUPA. Participants were recruited through purposive sampling. Potential participants were sent an email request letter with a link to a google form containing the survey questions. The respondents had a *moderate* perception of distance learning in terms of social activities (mean = 3.37) and class participation (mean = 3.27) and a high positive perception of the method of communication (mean = 3.52). Their social skills were *high* in terms of peer relationships (mean = 3.79) compliance (mean = 4.02) and assertion skills (mean = 3.89) but average in self-management (mean = 3.47). A positive perception of distance learning was significantly related to social skills ($r = .833$; $p = .01$). The results show that 63% of the variance in peer relationships is explained by two predictors, specifically, social activities and class participation. Method of communication and social activities predicts self-management. This study concluded that social activities, class participation, and method of communication are important aspects to maintain during distance learning, to successfully develop students academically, physically, and to improve their overall well-being. It is recommended that this study be expanded to a wider audience to see how distance learning affects other students' social skills outside of the sample in this current study and should consider having a larger sample size to achieve more generalizability.

Keywords: *distance learning, social skills, STEM Students, well-being*

Introduction

During the COVID-19 pandemic, different problems began to arise in relation to distance learning, some of which were manageable while some were more challenging (Adedoyin & Soykan, 2020). It was discovered that poor peer communication is one of the major difficulties when it comes to remote learning (Rotas & Cahapay, 2020).

Since the outbreak of the pandemic, social interaction is one of the difficulties that must be overcome. It is essential for students to maintain contact with classmates and teachers, to remain motivated in their studies (Belgica et al., 2020). The importance of social engagement in the improvement of a person's mental health cannot be overstated (Saladino et al., 2020).

The pandemic has affected high school students' skills in various ways: the pandemic has damaged students' cognitive capacities and has distanced them from social realities. It is also the case that boredom has a direct impact on students' cognitive development when they transfer systems or learning approaches directly online (Lestari et al., 2021).

Social skills development has long been recognized as a vital part of teaching and learning, leading to the creation of social skill training programs (Cartledge & Milburn, 1978). Self-control is necessary for classroom learning, but it's much more important for online learning since students will not be able to interact face-to-face with a teacher or faculty member (Barak et al., 2016). Social competency is built on the foundation of social skills. Five aspects of social skills are defined by Gresham, Sugai, and Horner (2001): (a) peer relationship skills, (b) self-management skills, (c) academic skills, (d) compliance skills, and (e) assertion skills. They describe social competence as the degree to which learners can form and sustain desirable interpersonal connections, achieve social validation, develop and keep friendships, and cease unfavorable or harmful interpersonal ties.

Previous studies address the problems that develop during remote learning, but they have failed to address the impact of online learning on a student's social capabilities. Learners' perceptions of the course, perceived learning outcome, attitude, intrinsic motivation, and extrinsic motivation are the components that make up the dimensions of online learning.

This study generally aims to determine the influence of distance learning on the social skills of STEM students.

Especially, this study shall seek answers to the following questions:

1. What are the perceptions of the participants of the study in distance learning in terms of:
 - a. social activities
 - b. class participation
 - c. method of communication
2. What is the status of the social skills of the students in terms of:
 - a. peer relationship skills
 - b. self-management skills
 - c. compliance skills
 - d. assertion skills
3. Does distance learning significantly influence the social skills of the respondents?
4. Which among the dimensions of distance learning best predict social skills?
5. Is there any significant difference in the social skills of the respondents when their sex is considered?

Methodology

Research Design

The descriptive-correlational research design was used in this study. Descriptive design was used to analyze, interpret, and describe quantitative data that determined the perceptions of the STEM students in distance learning and the status of students' social skills. Correlational design was also used in this study to find the influence of distance learning on the social skills of STEM students.

Population and Sampling Technique

The respondents of the study were senior high school students at Adventist University of the Philippines enrolled in the Science, Technology, Engineering, and Mathematics (STEM) strand during the second semester of the school year 2021-2022. Currently, there are 91 STEM students in Grade 11 and 87 STEM students in Grade 12 with an overall 178 students in the STEM strand. However, the researchers reduced the number of respondents to a total of 75 students for this study, because of the current situation. Frankel, Wallen, and Hyun (2012), put forward a few guidelines with regards to the minimum number of subjects needed for descriptive studies; a minimum of 30% of the population and a sample of at least 50 is deemed necessary to establish the existence of the relationship.

The researchers used purposive-convenient sampling because it can save the researcher's time, effort, and energy since the respondents can answer the questionnaire at their own convenience and students who are under the STEM strand could be purposely targeted.

The distribution of participants in the study is presented in Figure 1. Most (46, 61.3%) of the participants in the study are female. On the other hand, 38.7% are males.

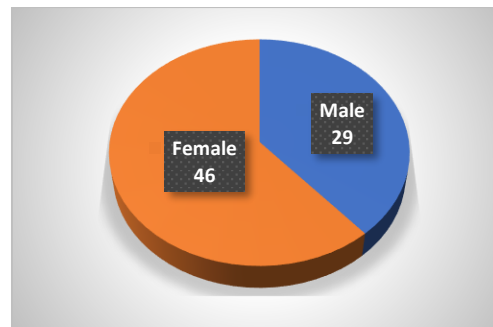


Figure 1. *Distribution of Participants by Sex*

Instrumentation

The researchers prepared an adapted but modified instrument guided by their readings of relevant publications. The instrument was divided into three different parts.

1. **Demographic Survey (DS).** This section of the questionnaire was created to determine the participants' sex.
2. **Test of e-Learning Related Attitude (TeLRA) Scale.** This questionnaire was developed and validated by Kisanga & Ireson G. (2016). It was used to investigate the different dimensions of e-Learning related attitudes. It consists of 6 main themes such as: the social implication of e-learning, attitude toward e-learning, benefits from e-learning, enjoyment of computer experiences, leisure interest in e-learning affairs, and interest in teaching through e-learning technologies. The researchers adapted some of the questions and made modifications according to the objectives of the study. The variation of themes in the TeLRA scale were made to include different items that may not only influence attitudes towards e-learning. The final questionnaire used a Likert scale ranging from strongly disagree to strongly agree.
3. **Social Skills Improvement System (SSIS) Rating Scale.** This questionnaire was adapted from Gresham & Elliot (2008). SSIS is a set of norm-referenced rating forms that are used to evaluate social skills, problem behaviors, and academic competency in individuals and small groups. It identifies learners who are at risk for poor social behavior and academic achievement. It serves as a starting point for assessing post-intervention improvement and monitoring progress.

The instruments went through expert validation and reliability testing. The reliability test result of each subscale of the instruments used is shown in Table 1.

Table 1. *Reliability of Perceptions in Distance Learning and Status of Social Skills*

Sub Scale	Reliability
Perceptions in Distance Learning	
<i>social activities</i>	0.857
<i>class participation</i>	0.939
<i>method of communication</i>	0.769
Status of Social Skills	
<i>peer relationship skills</i>	0.799
<i>self-management skills</i>	0.874
<i>compliance skills</i>	0.897
<i>assertion skills</i>	0.881

Data Gathering Procedures

Upon AUP ERB's approval to conduct the study, the researchers wrote a letter to the AUPA principal outlining the project's purpose, aims, and non-disclosure of the students' replies. A cover letter was also added to the online survey, explaining the study's goals, voluntary participation, and the participant's right to withdraw from the study at any time. Throughout the investigation, anonymity and confidentiality were observed. The study's intended participants received a link to access a Google Form survey containing the ERB permission and questionnaire through Facebook Messenger.

Data Analysis

Data was collected through Google forms and tabulated in Jamovi to allow for interpretation. Descriptive statistics of frequency, percentage, mean, and standard deviation were applied to get the profile of the respondents, perceptions of the STEM students in distance learning, and the status of social skills students. Pearson Correlation was used to find the relationship between distance learning and the social skills of the respondents. A t-test was used to find the difference between the social skills of the respondents when their sex is considered.

Results and Discussion

Respondents' Perceptions in Distance Learning

Table 2 presents the results of the study regarding the participants' perceptions in distance learning. It indicates that the participants have an *average level* of social activities with an overall mean of 3.37 and a standard deviation of 0.67. This result implies that students experienced a moderate number of social activities whilst distance learning during the pandemic.

Moreover, participants of the study had *average levels* of class participation with an overall mean of 3.27 and a standard deviation of 0.74. Since the social activities during the pandemic were moderate, the class participation and involvement of the students were also moderate.

Lastly, the participants of the study scored *highly*, with regards to their method of communication, with an overall mean of 3.52 and a standard deviation of 0.57. This result implies that the students had a good method of communication during online classes.

The results are associated with conventional teachers' roles from leader to facilitator and moderator in an online learning environment and have been linked to perceived learning results and satisfaction. It also indicates that students who have a good perception of distance learning may have more positive attitudes toward the course, and their learning, which may lead to attending their online classes regularly and improving their social skills.

Table 2. *Respondents' Perceptions in Distance Learning*

Distance Learning	Mean	SD		Verbal Interpretation
<i>Social Activities</i>	3.37	0.67	Sometimes	<i>Average</i>
<i>Class Participation</i>	3.27	0.74	Sometimes	<i>Average</i>
<i>Method of Communication</i>	3.52	0.57	Often	<i>High</i>

1.0 -1.49 = **SD**; 1.50-2.49 = **D**; 2.50-3.49 = **MA**; 3.50-4.49 = **A**; 4.50-5.00 = **SA**

Someone who scores highly on social activities is likely to involve themselves in communicating and interacting with others (Spacey, 2021). They are likely to ensure that all students, especially those who are more reserved or introverted, get equal speaking opportunities in class (Israeli, 2020). Active coping methods and social support from others are strongly associated with participation in social activities (Kim et al., 2020). Most of the respondents enjoyed social activities,

socializing with others through different programs, interacting with others as well as participating in school events.

Attendance and attentiveness in class have an impact on a student's class participation (Bekkering & Ward, 2020). Partaking in a classroom community or classroom group encourages participation, and idea-sharing, and gives children a sense of belonging (Benard, 1993). Participating in a school community allows students to better grasp how a group works, absorb social rules, and acquire more complete social skills (Benard, 1993). Students who score highly on *method of communication* may find it simple to communicate through various methods such as verbal communication, nonverbal communication, listening, written communication, and visual communication (Vain, 2021).

Respondents' Social Skills Status

Table 3 presents the results of the study regarding the status of the social skills of the students, in terms of peer relationships, self-management, compliance, and assertion skills. Participants of the study had a *high level* of peer relationship skills (mean of 3.79; SD= 0.53) compliance skills (mean = 4.02; SD = 0.62), assertion skills (mean of 3.89; SD = 0.53), and an *average level* of self-management skills (mean = 3.47; SD = 0.73).

This results imply that the participants of the study gain ideas, information, techniques, and perspectives from their peers, provide perspective for the benefit of others, accomplish tasks and collaborate with others toward a shared goal, and were willing to learn about and pursue new opportunities.

Table 3. Respondents' Social Skills Status

Distance Learning	Mean	SD	Scaled Response	Verbal Interpretation
<i>Peer relationship skills</i>	3.79	0.53	Often	High
<i>Self-management skills</i>	3.47	0.73	Sometimes	Moderate
<i>Compliance skills</i>	4.02	0.62	Often	High
<i>Assertion skills</i>	3.89	0.53	Often	High

1.00 -1.49 = **SD**; 1.50-2.49 = **D**; 2.50-3.49 = **MA**; 3.50-4.49 = **A**; 4.50-5.00 = **SA**

Social skills include using words in a dialogue, expressing emotions, having a social viewpoint, and deciding on a course of action in a social setting (Grover et al., 2020; Harrison & Oakland, 2015). These interactions teach children social skills that help them establish a strong foundation in the classroom, develop a positive outlook on future relationships, and increase school involvement (Stuhlman & Pianta, 2009). These are the actions and various types of communication that are required to build and sustain effective partnerships.

Self-management is the ability to organize and provide one's own ideas for any project. It entails accepting responsibility for one's own acts and doing the best. Walker et al. (1995) proposed an empirically supported self-related form of adjustment occurring later in a child's life (during middle school years) that shares characteristics of the self-management dimension. It is also referred to as "self-control" or "self-regulation," which is the ability to effectively regulate one's emotions, thoughts, and behaviors in various situations.

In the context of peer interactions, someone who scores highly on peer relationship skills is more likely to acquire a range of essential social-emotional abilities, such as empathy, cooperation, and problem-solving (Pepler & Bierman, 2018). Classroom interactions, particularly those between peers, can aid in the development of social skills required for school transition and long-term academic achievement (Bulotsky-Shearer, Bell, Romero, & Carter, 2011; Sebanc, 2003; Stuhlman & Pianta, 2009). Peer connections can assist adolescents to improve their social skills, boost their school involvement, and develop a good attitude towards school, the relationships they make, and the

learning process (Milteer, Ginsburg, & Mulligan, 2011; Stuhlman & Pianta, 2009). Students who acquire communication-based social skills, as well as social skills that focus on conflict resolution and coping strategies, have a better chance of succeeding in peer interactions and having a favorable school trajectory (Benard, 2003; Stuhlman & Pianta, 2009).

Relationship of Distance Learning to Social Skills

Table 4 shows the relationship between distance learning and social skills. The result of the study shows that social activities significantly influence social skills in terms of peer-relationship ($r = 0.721$), self-management ($r = 0.677$), compliance ($r = 0.615$), and assertion ($r = 0.619$). The relationship of social activities to peer relationship skills is strong positive and moderately positive in self-management, compliance, and assertion skills, significant at .001 level. Class participation bears a strong positive relationship to peer-relationship ($r = 0.718$), and is moderately positively related to self-management ($r = 0.626$), compliance ($r = 0.599$), and assertion ($r = 0.683$). Moreover, method of communication is moderately positively related to peer-relationship ($r = 0.657$), self-management ($r = 0.681$), compliance ($r = 0.577$), and assertion ($r = 0.498$), significant at .001 level.

These results indicate that if the students have good and positive perception in distance learning such as involvement in social activities, interactive class participation, and method of communication, the social skills of the students are also high in terms of peer relationship, self-management, compliance, and assertion.

The null hypothesis, which states that distance learning does not significantly influence the social skills of the respondents was *rejected*.

Table 4. *Relationship of Distance Learning to Social Skills*

<i>Social Skills</i>	Peer-relationship skills	Self-management skills	Compliance skills	Assertion skills
<i>Distance Learning</i>				
Social Activities	0.721 ***	0.677 ***	0.615 ***	0.619 ***
Class Participation	0.718 ***	0.626 ***	0.599 ***	0.683 ***
Method of Communication	0.657 ***	0.681 ***	0.577 ***	0.498 ***

Note. * $p < .05$, ** $p < .01$, *** $p < .001$

Social skills are used to help promote communication among a group of people (Gresham, et al., 2006). Online students often interact by participating in several conversations in a virtual classroom forum. While the forums allow students to debate many topics and express ideas at the same time, forum answers are not immediate, and students must wait for a classmate or instructor to read their post before receiving a reply. Online students can also connect with their teachers via live chat or video conference (Vrasidas & Zembylas, 2003).

A student could also share struggles or triumphs with the course work on discussion board forums to obtain feedback, suggestions, or praise from fellow classmates. When compared to peers, Barnett and Weber (2018) discovered that the more time a student spends in extracurricular activities, the more socially competent they are. This might be related to spending more time socializing with peers while employing a larger range of abilities such as teamwork, character development, and intrinsic motivation.

Variables that Best Predict Social Skills

Table 5 presents the result of linear regression analysis on predictor variables of social skills. Class participation and social activities predict social skills in terms of peer relationship with a Beta of 0.261 and 0.263, respectively. This value indicates that positive perception in class participation and social activities implies good peer relationships.

Method of communication predicts self-management ($B = 0.449$), social activities to compliance ($B = 0.277$), and class participation to assertion ($B = 0.382$). This result strengthens the findings that good method of communication will result in good self-management skills, having social activities will help students to improve their compliance skills, and providing activities that requires class participations will help students to improve assertion. These results imply that the hypothesis stating that none among the distance learning dimensions predict social skills is to be rejected.

Table 5. Predictor Variables of Social Skills

<i>Dependent Variable</i>	<i>Predictor</i>	β	t	r^2	F	p
<i>Peer Relationship</i>	Class Participation	0.261	3.182	0.614	40.3	0.002
	Social Activities	0.263	3.031	0.475	37.8	0.003
<i>Self-Management</i>	Method of Communication	0.449	3.024	0.566	30.9	0.003
<i>Compliance</i>	Social Activities	0.277	2.223	0.453	19.6	0.002
<i>Assertion</i>	Class Participation	0.382	4.043	0.510	24.6	0.001

Some studies demonstrate that the academic-social relationship can be reciprocal, with higher academic success resulting in improved social abilities. Studies have indicated that striving to improve students' academic performance early in their school careers, through interventions like math and reading tutoring, may lead to beneficial social development (Schneider et al., 2012). This shows that the lack of peer connection in online learning may be harmful, as previously thought.

Difference in the Social Skills when Sex of the Respondents is Considered

As shown in Table 6 females and males had means of 3.68 (SD=0.486) and 3.96 (SD=0.549) in peer relationship skills, respectively. The results of the study indicate that there is a *significant difference* in social skills in terms of peer relationship skills between males and females with a t-value of -2.323 and an associated probability of 0.002. It shows that females have higher social skills in terms of peer relationship compared to males.

Since there is no significant difference in the social skills of respondents when their sex was considered, the null hypothesis pertaining to these two variables is rejected.

Table 6. *Difference in social skills of respondents when sex is considered*

Social Skills	Group	N	Mean	SD	t	p	Verbal Interpretation
Peer relationship skills	Female	46	3.68	0.49	-2.32	0.023	Significant
	Male	29	3.96	0.55			
Self-management skills	Female	46	3.34	0.76	-1.91	0.060	Not Significant
	Male	29	3.67	0.63			
Compliance skills	Female	46	3.95	0.621	-1.16	0.249	Not Significant
	Male	29	4.12	0.617			
Assertion skills	Female	46	3.85	0.52	-0.84	0.406	Not Significant
	Male	29	3.96	0.54			

Within the peer setting, the sex differences in relationship processes reveal some constant distinctions in the styles and experiences of females and males. Females are more likely than males to: engage in prosocial interactions characterized by social conversation and self-disclosure; emphasize the importance of connection-oriented goals; are more sensitive to distress in others and the status of their peer relationships and friendships are exposed to a wider variety of stressors both in the broader peer group and in their friendships; are more likely to seek support, and express their emotions (Rose & Rudolph, 2011).

Conclusions and Recommendations

With regards to the relationship of social skills to distance learning, based on the results, it was evident that distance learning influenced the social skills of the respondents. Social interaction in online learning allowed students to share their ideas on various subjects with each other. Student-led online discussions typically motivated deeper understanding and yielded interesting personal applications of course concepts and theories.

It is recommended that students should maintain their positive status of social skills in terms of peer relationships, self-management, compliance, and assertion skills, to improve their social ability to get along with people and be productive, in their academic endeavors and beyond.

Parents and teachers should recognize the factors that influence the social skills of their students so that they can provide guidance and support to help them improve their social skills.

Future researchers should consider expanding the study to a wider audience to see how distance learning affects other students' social skills outside of the provided sample in this current study and should identify other variables that could affect the social skills of the students.

References

- [1] Adedoyin, O. & Soykan E. (2020). Covid-19 pandemic and online learning: the challenges and opportunities. <https://www.tandfonline.com/doi/full/10.1080/10494820.2020.1813180>
- [2] Akcaoglu, M., & Lee, E. (2016) Increasing Social Presence in Online Learning through Small Group Discussions. <http://www.irrodl.org/index.php/irrodl/article/view/2293/3731>
- [3] Arkkelin, D. (2003). Putting Prometheus feet to the fire: student evaluations of Prometheus in relation to their attitudes towards and experience with computers, computer self-efficacy, and preferred learning style. <http://faculty.valpo.edu/darkkeli/papers/syllabus03.htm>
- [4] Baber H. (2021) Social interaction and effectiveness of online learning-A moderating role of maintaining social distance during the pandemic COVID. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3746111
- [5] Backhtiar (2015). Development of Icebreaking Video as Media for Counseling Guidance in Improving Social Skills. <https://ojs.unm.ac.id/JPPK/article/view/1816/825>

- [6] Bandura, A. (1977). *Social learning theory*. Englewood Cliffs, NJ: Prentice Hall
- [7] Barbour, M. & Plough, C. (2009). Social networking in cyber schooling: helping to make online learning less isolating. *Techtrends*, 53(4), 56-60
- [8] Barnett, L.A. & Weber, J.J. (2008). Perceived benefits to children from participating in different types of recreational activities. *Journal of Park & Recreational Administration*, 26(3), 1-20
- [9] Benard, B. (1993). Fostering resiliency in kids. *Educational Leadership*, 51(3), 44-48.
- [10] Bulotsky-Shearer, R. J., Bell, E. R., Romero, S. L., & Carter, T. M. (2012). Preschool interactive peer play mediates problem behavior and learning for low-income children. *Journal of Applied Developmental Psychology*, 33, 53-65.
- [11] Cockerham D., Lin Lin, Sharon Ndolo, Marc, Shwartz. (2021) Voices of the students: Adolescent well-being and social interactions during the emergent shift to online learning environments. <https://link.springer.com/content/pdf/10.1007/s10639-021-10601-4.pdf#page=17&zoom=100,66,752>
- [12] Creswell, J.W., (1994) *Research Design: Qualitative & Quantitative. Approaches*, London: SAGE Publications
- [13] Daley, B. J., Watkins, K., Williams, S. W., Courtenay, B., Davis, M., & Mike (2001). Exploring learning in a technology-enhanced environment. *Educational Technology and Society*, 4(3).
- [14] Davies, R. S. (2003). Learner intent and online courses. *The Journal of Interactive Online Learning*, 2(1).
- [15] Davis, D. F., Bagozzi, P. R., & Warshaw, R. P. (1989). User acceptance of computer technology: a comparison of two theoretical models. *Management Science*, 35(8), 982–1003.
- [16] Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, 13, 319–340.
- [17] Davis, F. D., Bagozzi, R. P., & Warshaw, P. R. (1992). Extrinsic and intrinsic motivation to use computers in the workplace. *Journal of Applied Social Psychology*, 22(14), 1111–1132.
- [18] Faigley, L. (1990). Subverting the electronic network: teaching writing using networked computers. In D. Daiker & M. Morenberg (Eds.), *The writing teacher as researcher: Essays in the theory and practice of class-based research*. Portsmouth: Boynton/Cook. https://www.researchgate.net/publication/223771086_Exploring_dimensions_to_online_learning
- [19] Fidalgo, P., Thormann, J., Kulyk, O., Lencastre, J. A. (2020). Students' perceptions on distance education: A multinational study. <https://educationaltechnologyjournal.springeropen.com/articles/10.1186/s41239-020-00194-2>
- [20] Frankel, J.R., Wallen N.E., & Hyun, H.H. (2012). *How to design and evaluate research in education* (8th edition). New York, NY: McGraw Hill Companies, Inc.
- [21] Giddens A., Duneier M., & Appelbaum R., W. W. Norton. *Introduction to Sociology*.
- [22] Gresham, F.M. & Elliot, S.N. (2008). *Social Skills Improvement System Rating Scales manual*. Pearson, Inc.:MN
- [23] Gresham, F.M., Elliott, S.N., & Kettler, R. (2010). Base rates of social skills acquisition/performance deficits, strengths, and problem behaviours: An analysis of the Social Skills Improvement System- Rating Scales. *Psychological Assessment*, 22(4), 809-815.
- [24] Gresham, F. M., Sugai, G., & Horner, R. H. (2001). Interpreting outcomes of social skills training for students with high-incidence disabilities. *Exceptional Children*, 67(3), 331-344.
- [25] Gresham, F.M., Van, M.B., & Cook, C.R. (2006). Social skills training for teaching replacement behaviors: Remediating acquisition deficits in at-risk students. *Behavioral Disorders*, 31(4), 363-377.
- [26] Gresham, F.M. & Elliot, S.N. (2008). *Social Skills Improvement System Rating Scales manual*. Pearson, Inc.:MN

- [27]Grover R., Nangle D., Buffie M., Andrews L. (2020) Defining social skills.
- [28]Harrison and Oakland, (2015) ABAS-3: Adaptive behavior assessment system - third edition (3rd ed.), Western Psychological Services, Torrance C
<https://www.sciencedirect.com/science/article/pii/S2666374022000292>
- [29]Henslin (1999). Theories of Socialization. <https://courses.lumenlearning.com/boundless-sociology/chapter/theories-of-socialization/#:~:text=Forms%20of%20Socialization-,Group%20socialization%20is%20the%20theory%20that%20an%20individual's%20peer%20groups,with%20peers%20than%20with%20parents.>
- [30]Hogan, R., & Shelton, D. (1998). A socio analytic perspective on job performance. Human Performance <https://psycnet.apa.org/record/1998-02488-001>
- [31]Irwin, C. & Berge, Z. (2006). Socialization in the Online Classroom, e-Journal of Instructional Science and Technology.
http://www.usq.edu.au/electpub/ejist/docs/vol9_no1/papers/full_papers/irwin_berge.htm
- [32]Jenks, C.J. (2009). When is it appropriate to talk? Managing overlapping talk in multiparticipant voice-based chat rooms. Computer Assisted Language Learning, 22(1), 19-30
- [33]Kisanga D. and Ireson G. (2016). Test of e-Learning Related Attitudes (TeLRA) scale: Development, reliability, and validity study.<https://files.eric.ed.gov/fulltext/EJ1099575.pdf>
- [34]Krendl, K. A., & Lieberman, D. A. (1988). Computers and learning: a review of recent research. Journal of Educational Computing Research, 4(4), 367–389
- [35]Kum, L. C. (1999). A study into students' perceptions of web-based learning environment. In HERDSA annual international conference, Melbourne (pp. 12–15).
- [36]Kwaske and Mclennan. Why Social Interaction Important in Online Learning.
<https://sopa.tulane.edu/blog/why-social-interaction-important-online-learning>
- [37]Kyne S. & Thompson C. (2020) "The COVID Cohort: Student Transition to University in the Face of a Global Pandemic," "The COVID Cohort: Student Transition to University in the Face of a Global Pandemic,"<https://pubs.acs.org/doi/abs/10.1021/acs.jchemed.0c00769>
- [38]Lowell, R. (2001). The Pew Learning and Technology Program Newsletter.
<http://www.math.hawaii.edu/~dale/pew.html>
- [39]Marzano, R. J., & Pickering, D. J. (1997). Dimensions of learning trainer's manual. Alexandria VI: Mid-Continent Research for Education and Learning
- [40]Mensah, E. A., White, K.R., Yankey, B., & Brown, S. S. (2020). COVID-19 & Distance Learning: Effects of Georgia State University School of Public Health Students.
[https://www.frontiersin.org/articles/10.3389/fpubh.2020.576227/full#:~:text=Distance%20earning%2C%20also%20known%20by,and%20learning%20process%20\(9\).](https://www.frontiersin.org/articles/10.3389/fpubh.2020.576227/full#:~:text=Distance%20earning%2C%20also%20known%20by,and%20learning%20process%20(9).)
- [41]Mercado, C. M. (2006). A new approach to thesis writing: Simplifying social research. Quezon City, Philippines: Development Centre for Asia Africa Pacific (DCAAP).
- [42]Milteer, R. M., Ginsburg, K. R., & Mulligan, D. A. (2012). The importance of play in promoting healthy child development and maintaining strong parent-child bond: Focus on children in poverty. Pediatrics, 129(1), 204-213. https://wp.nyu.edu/steinhardt-appsych_opus/peer-relationships-protective-factors-and-social-skill-development-in-low-income-children/
- [43]Nakaya, A. (2018). Overcoming ethnic conflict through multicultural education: The case of West Kalimantan, Indonesia. International Journal of Multicultural Education, 20, 118-137.
<https://ijme-journal.org/index.php/ijme/article/view/1549>
- [44]Picciano, G. A. (2002). Beyond student perceptions: issues of interaction, presence, and performance in an online course. Journal of Asynchronous Learning Networks, 6(1), 21–40
- [45]Rotas, E., Cahapay, M. (2020). Difficulties in Remote Learning: Voices of Philippine University Students in the Wake of COVID-19 Crisis. <https://eric.ed.gov/?id=EJ1285295>
- [46]Saade', G. R. (2003). Web-based educational information system for enhanced learning, (EISEL): student assessment. Journal of Information Technology Education(2), 267–277
<http://jite.org/documents/Vol2/v2p267-277-26.pdf>

- [47]Schneider, F. W., Gruman, J. A., & Coutts, L. M. (2012). *Applied Social Psychology: Understand and Addressing Social and Practical Problems* (2nd ed.). SAGE Publications, Inc.
- [48]Sebanc, A. M. (2003). The friendship features of preschool children: Links with prosocial behavior and aggression. *Social Development*, 12(2), 249-268
- [49]Selasa (2021) DetikHealth. Keterampilan Sosial yang Tercederai Sekolah Online <https://health.detik.com/berita-detikhealth/d-5658995/keterampilan-sosial-yang-tercederai-sekolah-online>
- [50]Stangor, C. (2011). *Research methods for the behavioural sciences* (4th ed.). Mountain View, CA: Cengage.
- [51]Stuhlman, M., & Pianta, R. (2009). Profiles of educational quality in first grade. *The Elementary School Journal*, 109(4), 323-342.
- [52]Sunal, W. D., Sunal, S. C., Odell, R. M., & Sundberg, A. C. (2003). Research-supported best practices for developing online learning. *The Journal of Interactive Online Learning*, 2(1), 1–40.
- [53]Taylor, J. L. (2020). *Online Distance Learning: A Literature Review*. <https://cirl.etoncollege.com/online-distance-learning-a-literature-review/>
- [54]Tejero, E. G. (2006). *Thesis and dissertation writing: A modular approach*. Mandaluyong City: National Book Store
- [55]Triandis, C. H. (1979). Values, attitudes, and interpersonal behavior. In *Nebraska symposium on motivation: Beliefs, attitudes, and values* (pp. 159–295). Lincoln, NE: University of Nebraska Press.
- [56]Vallerand, R. J. (1997). Toward a hierarchical model of intrinsic and extrinsic motivation. *Advances in Experimental Social Psychology*, 29, 271–374.
- [57]Venkatesh, V. (1999). Creation of favorable user perceptions: Exploring the role of intrinsic motivation. *MISQuarterly*, 23(2), 239–260.
- [58]Venkatesh, V., & Davis, F. D. (2000). A theoretical extension of the technology acceptance model: four longitudinal field studies. *Management Science*, 46(2), 186–204.
- [59]Venkatesh, V., Speier, C., & Morris, M. G. (2002). User acceptance enablers in individual decision-making about technology: toward an integrated model. *Decision Sciences*, 33, 297–316.
- [60]Vrasidas, C., Zembylas, M. (2003). The nature of technology-mediated interaction in globalized distance education. *International Journal of Training and Development*, 7(4), 271-286.
- [61]Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes*. Cambridge, MA: Harvard University Press. <https://www.simplypsychology.org/vygotsky.html>
- [62]Walker, H. M., Colvin, G., & Ramsey, E. (1995). *Antisocial behavior in schools: Strategies and practices*. New York:Brooks/Cole <https://files.eric.ed.gov/fulltext/ED509631.pdf>
- [63]Wlodkowski, R. J. (1999). *Enhancing adult motivation to learn, revised edition, a comprehensive guide for teaching all adults*. San Francisco, CA: Jossey-Bass.
- [64]You, S., Kim, E., & Lee, D. (2017). Virtually real: Exploring avatar identification in game addiction among massively multiplayer online role-playing games (MMORPG) players. *Games and Culture*, 12, <https://journals.sagepub.com/doi/10.1177/1555412015581087>

Perceptions and Practices of Classroom Assessment Among University Teachers

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Abstract: Teachers' perception of assessment influences their assessment practices and their teaching. Therefore, this study aimed to examine university teachers' perceptions and practices using a mixed-method design. Twenty-two university lecturers completed 33-item questionnaires on the perceptions and practices of classroom assessment. Five lecturers participated in semi-structured interviews. The study results showed that university teachers perceived improving students' learning as the primary purpose of classroom assessment. Continuous assessment during the process and formative assessment with feedback may help students learn better. However, some lecturers pointed out the difficulties of implementing formative assessments due to the number of students and the heavy workload. Furthermore, 82% of respondents stated that their assessments were designed to assess students' higher thinking skills, such as analyzing, synthesizing, and creating information. In terms of the form of assessment, the respondents mostly used typical forms such as written assignments or quizzes (86%). However, respondents also used alternative assessments such as reflective journals (54%) and projects-based assessment (50%). The study showed that respondents were informed about different assessment practices and approaches.

Keywords: *assessment, perceptions of assessment, assessment practices, formative assessment*

Introduction and Literature Review

Assessment is an essential element of teaching and learning, and is an integral part of teachers' work (Hildén & Fröjdendahl, 2018). Assessments significantly impact students' learning in various ways (Simms & George, 2014; Jimaa, 2011; Ramsden, 2004). How assessments are planned and implemented affects students' learning (Segers, Gijbels, & Thurlings, 2008). A recent study showed that teachers' perception of assessment influences their assessment practices and the teaching and learning process (Fletcher et al., 2012). The assessment methods employed by teachers impact students' learning even before they are assessed regarding their learning approaches (Fletcher, Meyer, Anderson, Johnston, & Rees, 2012; Boud & Falchikov, 2006).

Teachers' approach of instruction are linked to their concepts of teaching which in turn will affect how they evaluate students' learning (Watkins, Dahlin, & Ekholm, 2005). According to Gardner and Galanouli (2015), teachers' behavior is influenced by their perceptions of the dimensions of the assessment. Varied teachers' perspectives lead to different evaluation techniques, according to Samuelowicz and Bain (2002). Hence, teachers who consider the teaching and learning process as the replication or transmission of knowledge assess their students' capacity to replicate the learned knowledge. Teachers who emphasize critical thinking and learning, on the other hand, consider evaluation as a means of transforming knowledge and a crucial component of the learning process (Samuelowicz & Bain, 2002).

According to DeLuca, Coombs, and LaPointe-McEwan (2019), assessment practices "influence students' learning and classroom learning cultures." Hence, it is crucial to examine and improve teachers' assessment perceptions and practices.

Assessment in the classroom is seen as a crucial component of successful teaching and learning. It is essential because it provides instruction to students on how to improve their performance (Popham, 2008). Classroom assessments provide feedback on students' progress over time so that any learning difficulties can be detected and addressed. According to research (Stiggins, Arter, Chappuis, & Chappuis, 2006), classroom assessment is a crucial component of the teaching and learning process,

and when it is included into regular classroom activities, it can facilitate significant learning advantages.

The aim of this study was to explore how university lecturers perceived and used classroom assessment. Given that perceptions have an impact on behavior, researching how instructors view assessment is crucial.

Methodology

The study aimed to explore university teachers' perceptions and practices of assessment. The study intended to achieve the following objectives:

1. To examine teachers' perceptions of classroom assessment.
2. To examine teachers' classroom assessment practices.

This study used questionnaires and semi-structured interviews to investigate the research questions. The questionnaires aimed to establish the lecturers' perceptions about assessment. Interviews were undertaken to obtain more understanding of the assessment practices. The questionnaire contained questions that the researcher adapted from the teachers' perception questions developed by Maclellan (2001).

The participants in this study were teachers in a private university in Thailand. The respondents in the study were informed about the purpose of the study, confidentiality measures, the use of data, and voluntary participation. In total, 22 teachers completed the survey questionnaire. Questionnaires were sent out by the researchers, through 'office forms' (online). Five lecturers participated in the semi-structured interviews, that were conducted informally to allow them to speak freely about the topics or issues regarding classroom assessment.

Quantitative data and qualitative data were analyzed separately. The qualitative data was used to validate the survey and to obtain more information about assessment practices. As this study employed a cross-sectional design, descriptive statistics were used to analyse the data. The Statistical Package for Social Science (SPSS) was used to help analyze the demographic information and respondents' responses. Data from semi-structured interviews were analyzed through a deductive approach.

Findings

The research was conducted in a private university in Thailand. The study used a 33-item questionnaire on perceptions and assessment practices. The questionnaire included items pertaining to: demographic information, purposes of assessment, the content of assessment, timing of assessment, modes of assessment, assessment marking criteria, and value of feedback. Twenty-two lecturers from five departments participated in the study. Five lecturers participated in the semi-constructed interviews that were used to investigate the perceptions and practices of assessment.

As indicated in Table 1, twenty-two university lecturers – 11 male and 11 female – participated in the study. Six (27.3%) were from the Faculty of Arts and Humanities, and the rest 4 (18.2%) were from the Faculty of Business, Education, Religious Studies, and Science, respectively. In terms of educational qualification, the respondents were Master's and Ph.D. Degree holders. Most lecturers had more than 11 years of teaching experience in higher education settings.

Table 1. *Respondents' Demographic Information*

		Frequency	Percent
Gender	Male	11	50.0
	Female	11	50.0
Department	Arts and Humanities	6	27.3
	Business	4	18.2
	Education	4	18.2
	Religious Studies	4	18.2
	Science	4	18.2
Educational Qualification	Master	11	50.0
	PhD	11	50.0
Years of Teaching Experience	3-5 years	3	13.6
	6-10 years	5	22.7
	11 years and above	14	63.6

Lecturers' Perceptions on Purposes of Assessment

In the questionnaire, lecturers were asked about their perceptions of assessment purposes. The results showed that lecturers perceived identifying students' strengths and weaknesses as the most important purpose of assessment, beyond other possible purposes such as, to motivate student learning, to rank students' achievement, and to reflect the lecturer's teaching performance.

Table 2. *Perceptions on Purposes of Assessment*

Lecturers' Perceptions on Purposes of Assessment	Mean
Assessment is used to identify students' strengths and weaknesses.	4.45
Assessment is used to motivate student learning.	4.09
Assessment is used to rank student achievements.	3.91
Assessment is used to reflect lecturer's teaching performance.	3.23

The interviews also sought to explore respondents' perceptions regarding the purpose of assessment. In the interview, two lecturers stated that assessments exist to check students' learning progress and evaluate their performance:

In general, the purpose of assessment is to assess the student's learning outcomes, their learning progress, and their performance. An assessment is for teachers to see how well students have achieved the objectives (Lecturer C)

To me, the purpose of assessment is to make an impartial assessment of learners' performance or progress or to define each individual learning continuum and compare learners academic performance. Sometimes, assessment tools are heart-breaking since they serve to penalize the retarded learners who need more endeavors and attention from the instructor. (Lecturer E)

Lecturers' Perceptions on Contents of Assessment

The respondents were asked to share their perceptions of the contents of assessments. Each question aimed to elicit information on how lecturers think about the design of assessment tasks. On a five point Likert scale, they were asked to rank the importance of each item in connection to assessment contents. Table 3 summarizes the respondents' perceptions about the contents of assessments.

Table 3. *Perceptions on Contents of Assessment*

Contents of Assessments	Never	Rarely	Sometimes	Often	Always	Mean
<i>Assessments are designed to assess students' ability ...</i>						
... to present information			4 (18.2%)	13 (59.1%)	5 (22.7%)	4.05
... to analyze information			3 (13.6%)	15 (68.2%)	4 (18.2%)	4.05
... to synthesize information			4 (18.2%)	13 (59.1%)	5 (22.7%)	4.05
... to apply knowledge into real life situations		1 (4.5%)	4 (18.2%)	12 (54.5%)	5 (22.7%)	3.95
... to evaluate information			6 (27.3%)	11 (50.0%)	5 (22.7%)	3.95
... to develop new knowledge		1 (4.5%)	8 (36.4%)	11 (50%)	2 (9.1%)	3.64

Table 3 shows that 59% of lecturers decided that presenting information is often an essential aspect of content assessment, while 22% rated this aspect as being always important. Most lecturers (68.2%) rated analyzing information as an aspect of assessment content that is often important. Lecturers perceived the development of new knowledge as less important than other aspects of assessment content. Only 9.1% of lecturers perceived this aspect as always important.

Data obtained from the interviews indicated that lecturers viewed the role of course objectives as an essential aspect in designing assessment tasks. Lecturers designed assessment tasks to compare the course objectives with what students had learnt:

The assessment meets the course description. Each assessment task would fulfill the requirement of the course aims. (Lecturer A)

The main objectives for designing assessment tasks are to measure learners' understanding of the contents or to evaluate if they meet the designated outcomes/goals of the chapter/topic that has been instructed or presented. (Lecturer D)

Lecturers' Perceptions on Timing of Assessment

In the questionnaire, lecturers were asked about the timing of the assessment. Table 4 shows that the majority of lecturers, 50% and 36% respectively, reported they "often" and "always" assess students when they finished chapters, modules, or a course. Most teachers rarely assess students at the beginning of a chapter, module, or course. Based on the result, it might be said that lecturers used more summative assessments in their classes than ongoing assessments.

Table 4. *Lecturer's Perceptions on Timing of Assessment*

Timing of Assessment	Never	Rarely	Sometimes	Often	Always	Means
<i>Assessment is conducted ...</i>						
... at the start of the course/chapter.	1 (4.5%)	7 (31.8%)	7 (31.8%)	3 (13.6%)	4 (18.2%)	3.09
... during the course/chapter.	1 (4.5%)	2 (9.1%)	7 (31.8%)	8 (36.4%)	4 (18.2%)	3.55
... at the end of the course/chapter.			3 (13.6%)	11 (50%)	8 (36.4%)	4.23

Data obtained from interviews indicated that only a few lecturers assess students' prior knowledge before the class or at the start of a chapter or module:

Mostly, I give [an] assessment to my students at the end of the chapter or unit, rarely at the start of chapters. (Lecturer C)

Lecturer's Perceptions on Modes of Assessment

Lecturers were also asked about the mode of assessment practiced in their courses. The eight modes of assessment reflect the lecturer's assessment practices. Table 5 summarises the responses regarding the modes of assessment used:

Table 5. Lecturer's Perceptions of Modes of Assessment

Modes of Assessment	Never	Rarely	Sometimes	Often	Always	Mean
<i>Assessment is conducted through....</i>						
... individual presentations.	1 (4.5%)	1 (4.5%)	5 (22.7%)	11 (50%)	4 (18.2%)	3.73
... written assignments.			3 (13.6%)	12 (54.5%)	7 (31.8%)	4.18
... multiple-choice questions.	2 (9.1%)	4 (18.2%)	8 (36.4%)	7 (31.8%)	1 (4.5%)	3.05
... short answer questions	1 (4.5%)	1 (4.5%)	5 (22.7%)	12 (54.5%)	3 (13.6%)	3.68
... reflective journal-writing	1 (4.5%)	4 (18.2%)	5 (22.7%)	9 (40.9%)	3 (13.6%)	3.41
... group-project presentations with formative feedback		3 (13.6%)	8 (36.4%)	9 (40.9%)	2 (9.1%)	3.45
... a final exam	1 (4.5%)	1 (4.5%)	1 (4.5%)	7 (31.8%)	12 (54.5%)	4.27
... presentation without feedback	9 (40.9%)	8 (36.4%)	4 (18.2%)	1 (4.5%)		1.86

The most common mode of assessment lecturers practiced was the final examination. 54.5% of lecturers reported they always use final exams as a mode of assessment, while 32% indicated that they often use final exams in their course. The least frequent mode of assessment used was presentation without feedback, 41% reported that they never use it. In comparison, another 36% stated that they rarely conducted assessments through presentation without feedback. Other frequent modes of assessment were written assignments (54.5% with a mean of 4.18), followed by the individual presentation and short answer questions.

The interview, data showed that final exams were a common form of summative assignment, while written assignments and short quizzes were also conducted to check students' learning progress:

I use [written] assignments, class activities (only when I have a small class), quizzes, presentations and final exams. I used these modes because it helps to measure students learning progress and their performance in class. (Lecturer B)

I generally use [written] assignments, reading reports, quizzes, presentations and exams. I used these modes because I learned using them when I was in school and found them very useful. (Lecturer C)

Lecturers' Perceptions of Assessment Criteria

In one of the sections in the questionnaire, lecturers were asked to indicate their practices regarding assessment criteria. Table 6 summarizes the respondents' answers to the assessment criteria.

The majority of lecturers (59%) stated they often gave explicit marking criteria, while 18% revealed that their assessments were always based on explicit criteria. Most of the respondents (50% = always, and 36% = often) indicated that assessment criteria are clearly stated in the course outline, while almost all lecturers specified that assessment requirements and criteria are made available at the beginning of the course in the course outline.

Interview data substantiated the quantitative result, that in the case of most lecturers, the total marks for each assessment were explicitly indicated in the course outline and made available to students at the beginning of the course:

I use rubrics (holistic ad analytical) for scoring criteria, and the percentage or weight for each category is clearly explained in my class. (Lecturer D)

Marking criteria for written assignment is based on organization, grammar, and language structure. (Lecturer E)

Table 6. Lecturers' Perceptions of Assessment Criteria

Assessment Criteria	Never	Rarely	Sometimes	Often	Always	Mean
Marking (scoring) is based on implicit criteria.	6 (27.3%)	7 (31.8%)	6 (27.3%)	3 (13.6%)		2.27
Marking (scoring) is based on explicit criteria.		2 (9.1%)	3 (13.6%)	13 (59.1%)	4 (18.2%)	3.86
Detailed marking criteria are provided for all assignments.		2 (9.1%)	4 (18.2%)	11 (50.0%)	5 (22.7%)	3.86
Assessment criteria are clearly stated in the course outline.			3 (13.6%)	8 (36.4%)	11 (50.0%)	4.36
Assessment requirements and marking criteria in the course outlines are made available to students at the beginning of the course.			1 (4.5%)	9 (40.9%)	12 (54.5%)	4.50

Lecturers' Perceptions on Value of Feedback

Lecturers were asked about: the value of feedback, and how it relates to facilitating learning, discussions with lecturers and classmates, and perceptions of future assessments. A summary of respondents' answers is shown in Table 7.

Most lecturers indicated that all aspects of feedback were important. 50% of lecturers assumed feedback could often encourage deep learning, while 41% believed detailed feedback would always encourage deep learning. Most lecturers (72.7%) believed that feedback always improves students learning.

In the interview data, lecturers highlighted their beliefs that feedback could improve students' learning and encourage deep learning:

[the purpose of] giving feedback is to indicate strengths and weaknesses, improve learning, and amend mistakes. (Lecturer A)

Feedback is necessary for genuine and continuous learning. Feedback will make students more reflective and grow in their learning. Without feedback, students do not know their strengths and weaknesses and areas to improve their learning. (Lecturer B)

Table 7. *Lecturers' Perceptions on Value of Feedback*

Value of Feedback	Never	Rarely	Sometimes	Often	Always	Mean
Detailed written feedback is necessary to encourage deep learning.			2 (9.1%)	11 (50.0%)	9 (40.9%)	4.32
Feedback on assessment is given within a reasonable time to facilitate learning.		1 (4.5%)	2 (9.1%)	15 (68.2%)	4 (18.2%)	4.00
Feedback allows students to prepare for future assessments.			2 (9.1%)	12 (54.5%)	8 (36.4%)	4.27
Feedback prompts discussion between students in the classroom.		2 (9.1%)	5 (22.7%)	12 (54.5%)	3 (13.6%)	3.73
Feedback prompts discussion between students and lecturers.			5 (22.7%)	11 (50.0%)	6 (27.3%)	4.05
Feedback helps students to improve their learning.				6 (27.3%)	16 (72.7%)	4.73

Even though lecturers accepted that feedback was a motivating tool for supporting learning, they nonetheless highlighted difficulties with providing feedback. Such challenges included: class sizes, time constraints, and other academic loads.

Discussion

Lecturers perceived identifying students' strengths and weaknesses as the primary purpose of assessment. The findings also indicated that traditional forms of assessment, such as tests and written assignments, are the predominant practice in the focal university of this study. The data also revealed that assessment criteria is explicitly stated and made available to students to inform them of what they are expected to do.

Results suggests that in most cases, the content of assessment is focused on analytical skills and information presenting skills. It was shown that most lecturers used summative assessments. This is not consistent with perceptions about the purpose of assessment. According to previous research (Fisher & Frey, 2013), diagnostic assessments are mostly used to identify students' strengths and weaknesses.

Limitations and Implications

Although the study was carefully prepared and carried out, there were some unavoidable limitations. The study was undertaken in only one private university, and thus the findings may be different across other private universities. The study examined only the teachers' perceptions of classroom assessment. It would be useful to explore university students' perceptions of classroom assessment and compare them with those of university teachers.

The study could help explore practices of assessment that enhance student learning in the private university context. The study's findings provide insights into teachers' classroom assessment practices beyond the grading of students' performance. Moreover, it showed that assessment could facilitate student learning. Lecturers in the university should broaden their understanding of the purposes and modes of assessment.

Based on the results, the study suggests that the implementation of a variety of alternative assessment tools in the university could encourage deep learning and foster critical and analytical thinking skills. Therefore, lecturers need to be encouraged to explore and attend professional development activities regarding assessment techniques and tools.

Conclusion

The findings showed that lecturers believed in assessment for learning; however, assessment of learning is largely practiced – using summative assessment and practicing traditional modes of assessment. Several pieces of literature indicate that assessment for learning effectively supports students learning. Assessment and instruction go hand in hand. Helping students meet their learning goals is the primary goal of classroom instruction, and assessment is an integral part of the teaching and learning processes. (Miller, M. D., Linn, R. L., & Gronlund, N. E., 2013).

References

- [1] Fletcher, R., Meyer, L., Anderson, H., Johnston, P., & Rees, M. (2012). Faculty and students' conceptions of assessment in higher education. *Higher Education*, 64(1), 119-133. doi:10.1007/s10734-011-9484-1.
- [2] Fisher, D. & Frey, N. (2013). *Better learning through structured teaching: A framework for the gradual release of responsibility*. 2nd ed., Alexandria, VA: ASCD.
- [3] Gardner, J. & Galanouli, D. (2015). Teachers' perceptions of assessment. *The SAGE Handbook of Curriculum, Pedagogy and Assessment*. SAGE Publication.
- [4] Jimaa, Shihab (2011). The impact of assessment on students learning. *Procedia - Social and Behavioral Sciences*, 28 (2011) 718 – 721.
- [5] Miller, M. D., Linn, R. L., & Gronlund, N. E. (2013). *Measurement and assessment in teaching*. 11th ed., New Jersey: Pearson.
- [6] Popham, W. J. (2008). *Classroom assessment: what teachers need to know*. 5th ed., Boston: Allyn and Bacon.
- [7] Segers, M., Gijbels, D., & Thurlings, M. (2008). The relationship between students' perceptions of portfolio assessment practice and their approaches to learning. *Educational Studies*, 34(1), 35 -44. doi:10.1080/03055690701785269.
- [8] Simms, M., & George, B. (2014). Approaching assessment from a learning perspective: Elevating assessment beyond technique. *Educational Assessment Evaluation and Accountability*, 26 (1), 95- 104. doi:10.1007/s11092-013-9176-8.
- [9] Stiggins, R. J.; Arter, J. A.; Chappuis, J. and Chappuis, S. (2006). *Classroom assessment for student learning: Doing it right – using it well*. Princetown, NJ: Education

The Challenges of Learners with Special Needs in Virtual Learning: Parent's Perspective

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Abstract: The responsibility of guiding learners with special needs had been passed on to the parents when distance learning was implemented because of the pandemic. Few studies are being done in Asia related to this topic in Faith-Based Institutions and to date, no such study exists in the Philippines. This study aimed to determine the challenges faced by the parents in the virtual learning of their children in FBI, and how they address those challenges. This phenomenological study interviewed four purposively sampled parents whose children have special needs. The data were interpreted using thematic analysis to find out the relationship between the data and themes. Furthermore, varied triangulations were made for cross-checking of data. Therefore, five themes emerged, which were students' difficulty in reading comprehension, lack of proper accommodation, working in a group, difficulty in using online educational platforms, and short attention span. The research implies that learners with special needs require appropriate accommodation and programs from the school, so the challenges of the parents would decrease in this virtual learning setup. The researchers recommend that there should be support for parents and teachers and a tailored program for special children in a Faith-Based institutions.

Keywords: learners with special needs, virtual learning, inclusive education

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Introduction

Parents are usually busy with all the house chores and with their own respective work, but because of this pandemic, they are faced with more, due to the challenges associated with the virtual learning of their children. In March 2020, DepEd announced that they are supporting distance learning, as classes were not yet finished when the pandemic started to spread worldwide. It was a challenge because parents are either busy with household chores or their respective work, and some are not educated enough to be able to teach their children the lessons that they need to learn. Virtual learning is one of the modalities of distance learning. Virtual learning recently came up as a new form of teaching students during the pandemic. There is little to no study yet in existence related to the challenges faced by the parents, teachers, school administrators, and students in relation to special needs in (modular or virtual) distance learning in faith-based or secular institutions, particularly in Asia. This study sought to support school programs in inclusive education. The researchers aimed to conduct a phenomenological study about the challenges faced by the parents of children with special needs who are enrolled in faith-based institutions that provide virtual modes of learning. The researchers aimed to answer the following research questions: (1) What are the challenges faced by the parents in the virtual learning of their children with special needs in faith-based institutions? (2) How do the parents of children with special needs address those challenges?

Literature Review

Many schools have closed, affecting many students and teachers. With the whole world in quarantine, the Philippine government instructed the educational sector to transfer the traditional classes of students to distance learning, because of the COVID-2019 global pandemic (Toquero, 2020). Toquero (2020) stated in his research that the needs of people with disabilities are not addressed in COVID-2019 rules and recommendations from well-known organizations that are spearheading the dissemination of information and scientific results, and people with disabilities have not been included

in the emergency preparedness planning of emergency and public health designers. According to Oxbridge Academy (2020), The term "distance learning" refers to a type of education in which students and teachers have little or no face-to-face contact. Virtual learning or e-learning is a course of learning that is fully online. A study by Bartolome et al., (2017) implied that there is a need for more parenting programs to improve parental involvement practices, particularly those that promote active parental involvement in their children's learning, at home and in school. Cahapay (2020) further explained that structured home education programs, specifically for children with disabilities, are only just being developed in the Philippines, and that it is mostly only in private institutions. According to Smith et al. (2016), "The increased demands on and expectations for their children were one of the biggest barriers that parents encountered with totally online education." (p.110).

Methodology

Research Design

This study used a phenomenological approach. Phenomenological research examines the in-depth lived experiences of participants that exist in a real situation (Yuksel & Yildirim, 2015). This design best suited this study which aimed to understand the perceptions, viewpoints, and understandings of a situation by the participants.

Participants of the Study

Purposive sampling was used to determine the participants for this study. According to Ayiro (2012), purposive sampling strategy was used in selecting subjects to be part of the study or represent "typical samples." Purposive sampling was chosen by the researchers because they wanted to select participants who would be the most appropriate for the study. The researchers selected a minimum of four (4) parents of children with disabilities from faith-based institutions located in Calabarzon that met these criteria: (a) parents who have child/children with special needs; (b) child was diagnosed and (c) the child was enrolled in a faith-based institution in the year 2020-2021.

Data Gathering Tool

This research utilized a semi-structured interview guide validated by experts to collect data. According to Creswell (2013), information collected through the internet can lessen the cost of travel and data transcription and allows participants to have time, space, and flexibility in the interview process. The researchers used computer-mediated communication based on Salmon's (2010) four types of synchronous communication through audio and video. The video conference facility, computer, or mobile device was connected to both researchers and participants during the interview.

Data Gathering Procedures

In this study, the researchers followed the following steps: First, the researchers sought approval from the Ethics Review Board (ERB) of the University. After gaining the approval of the ERB, letters to the head principals asking permission to conduct a study were disseminated. When the Head of the school approved the letter, the researchers started to ask questions to gather information about special needs students who were enrolled in online classes in faith-based institutions. Then, the researchers sent a permission letter to the parents, asking if they would like to be participants in the study, and to set appointments for online interview. Next, the researchers explained to the parents the ethical considerations and the confidentiality of the information. The interview lasted from 20 to 40 minutes. After the interview, the data collected was transcribed, interpreted, and analyzed.

Analysis of Data

A thematic approach analysis of data was used. According to Alhojailan (2012), thematic analysis is helpful for the researchers to find out the relationship of data and themes gathered from the participants. This technique helps to uncover details of different issues through interpretation. The

researchers explored the depth of understanding concerning the phenomenon through virtual interviews with every participant.

Triangulation was employed after the interview to cross-check the data from various sources (Chako, 2017). It is a technique that can be utilized to increase the study findings' credibility and validity. Furthermore, it may benefit the research by involving a variety of datasets (Noble & Heale 2019). First, observations of the students during their online class were conducted before the interview took place, to gather background information of the students such as age, diagnosis, grade level, etc. Next member checking was carried out, researchers sent the transcribed data to the participants. The participants then verified the information in the transcripts through a signature and sent the transcribed data back to the researchers. The teachers were then interviewed to validate the data gathered. Lastly, the Otter Application was used in transcribing the data, to ensure that all the information, conversation, and data gathered, were captured (Moore & Llompart, 2016).

Results and Discussion

Research data results were analyzed and interpreted with the following themes:

A. Challenges of Parents in the Virtual Learning of Their Children with Special Needs

Students' Difficulty in Reading Comprehension. The researchers gleaned from the data gathered, that one of the challenges parents face in the virtual learning of their children is connected to reading out loud and reading comprehension. Parent 3 said:

"During their online class, she often joined but did not listen. Then when his teacher calls him to read, he doesn't read especially when it's English because you only know basic words, but in Filipino, he reads when his teacher calls him even if he reads slowly. It's just a syllable and that's also the hard part that I still really need to teach him to read."

An article by Tindle et.al. (2016) stated that most learners are assigned homework and instructions that require comprehensive reading, something that most students with special needs find challenging. They also added that reading support is a must, through the provision of attention to their needs and guidance to complete their assignments.

Lack of Proper Accommodation. Another challenge that parents faced in the virtual learning of their children is the lack of proper accommodation. One of the reasons was the appropriateness of the lesson and activities, and lack of academic and behavioral assessment. Participants stated that activities were not adjusted to the capabilities of their children. Students were doing essays that required explanations and arts that challenge the child's fine motor skills. Parent 4 declared:

"There are other parts like essay, because his problem is communication disorder, so it's a bit difficult for him to explain and express through writings, so we only guide him there but when it comes to quizzes, and when the questions are very objective, he can do it. That's him, but if it's an explanation like that or in the arts, because his fine motor is still a bit weak, that's where we really help him."

The claims of Smith et. al. (2016) indicates that parents have a hard time assisting their children with special needs in their online classes. Further evidence of the lack of accommodation is the absence of proper academic assessment. The teachers' only way of monitoring the progress of students with special needs was through their grades, and no other means of evaluation.

Parent 4 said that *"they only use grades"*, She added:

"They do not really use anything else since our school is not ready for sped. So that is their only basis. And they depend on the shadow teachers for modifications, they assume that it's the shadow teacher's responsibility. Even if I had explained to each of them the need for modification, they still do not do so. Some are good, because they modify, but some really are not. That is why it is a challenge for the children. It is a good thing that my tutor is hardworking, he always reviews my son. He'll give him keywords to get the lesson. How to look for

something, if this is the question, here is what you should do. So, the tutor is the one who intervenes. The school does not really do anything because, again, they are not ready for these kinds of things."

Another parent 3 also stated, " *just giving them grades, that's it.*" According to Assessment in Grade (2020), Learning evaluation may and should rely on or be related to grades, and in this way, grades can be a significant source of data for assessment. Grades would have to be split into components that are indications of learning outcomes and those that are indicators of other behaviors, before they could be used as the basis for learning outcomes. Second, grades would have to be based on well-defined criteria that were applied consistently. Third, distinct grades or sub-scores for the primary components of knowledge and skills would have to be computed in order to identify evidence of students' specific areas of strength and weakness. Galevska and Pesic (2018), summative assessment is the summary of the students' achievements in particular time and assigned grade of the test (e.g., graded test, assignments, and project). According to Miller (2020), The majority of teachers found it difficult to execute good teaching in a distance learning context, and evaluation was undoubtedly a factor. He went on to say that many institutions were grappling with the grading processes, with some opting for pass/fail systems and others continuing with the traditional grading system.

There is no behavioral assessment when it comes to the proper accommodation of students with special needs. Two participants indicated that they do not have any assessment method when it comes to their child's behavior. Parent 3 said that,

"There seems like none... especially when there are no breakout sessions, scheduled consultations, or individual special class or group. I don't think something like those happens. There are no assessments for behavior, as in during synchronous classes is the only time they are monitored" Parent 4 also stated that, *"His behavior at home, and as what we have told before that he had a bullying problem at school. Even his teacher was shocked, they did not expect that he has special needs. He seems like a normal student during online class, he is very active, you won't be able to notice that he has special needs, they won't know if we won't tell them, and if they won't ask the teacher about it. So he really isn't noticeable online, but if it is a face-to face class, because of those incidents, it is noticeable (his special needs)."*

The child's impairment may have an impact on his or her conduct. As a result, in the real world of school staffing, there is a gap between recognizing the need for evaluation and actually conducting it, at the same time behavior continues to occur (Mauro , 2020). Meanwhile, the students keep being disruptive and it might interfere with their learning behavior and thus it can be a major challenge for both parents and teachers. According to Bleiberg and West (2013) the assessment of children with special needs was the thorniest issue in education policy. Bleiberg and West (2013) also added that over the years, students with special needs were not assessed or educated along with their peers.

Challenge in Working in a Group . The data gathered, indicates that parents were challenged by their children's communication skills and their difficulties with regards to group belonging. The participants indicated that in the virtual learning setting, their children would not communicate to their group mates nor to their teachers in relation to lesson requirements, and asking questions regarding their activities. Parent 1 divulged:

"In research, the problem with research is that, although the teacher places him in a group, the problem is, he doesn't communicate much with the research group, because he wanted his research group to reach out to him first. Also, when it comes to his requirements he sometimes do not follow up with the teacher, the teacher is the one who needs to follow up. The problem with him is he doesn't know how to ask, he's shy to ask, he doesn't insist, he's not persistent. Sometimes he waits to be told first. That's how it is with those who have this case, they do not initiate."

This finding agrees with the study of Rohman and Wright (2021). Their study stated that communication concerns have risen with the transition to remote learning. Unlike remote learning,

face-to-face classes, students and teachers can easily communicate concerns regarding lack of time, the assignments, grades and clarifications.

The major challenge mentioned by participants, in relation to working in a group was that, the participants children had difficulty finding a partner or group because no one chose their child to be part of the group work. Parent 1 disclosed:

"When they do synchronous activities, it is difficult for him to team up, to find a partner, especially during this virtual set up. Because sometimes, no one wants to partner with him, so that's also a challenge for him. So group works are a challenge to him."

Ramos (2009) stated that the lack of experience in an inclusion setting is one of the challenges teachers face in inclusive classrooms. They do not have enough knowledge on how they would include all students and how they would create or modify activities to accommodate all learners. Therefore, they may not realize that taking the lead in assigning partners and groups will be better in an inclusive classroom so that no one would be left behind.

Difficulty in Using Online Educational Platforms . Parents face challenges in using the online platform during online classes. In addition, their children do not know that they have to rejoin when they are removed from the platform if the internet is slow:

Parent 1 said, *"There was a time when he could not enter the class. He seems to forget the schedule, that's another challenge. He can't enter the MS teams, or he can't really enter, he said they kicked him out, so when he gets kicked out, he doesn't enter anymore, he assumes he is no longer included. That's another challenge, the teacher says "Ma'am, he didn't get in." I said, "Why didn't he come in, when he was already since 7:30 in the morning." He said it was because of the internet connection, when he was kicked out, he does not go back in anymore."*

This challenge can be met by students staying engaged through something as simple as a daily or weekly check-in sheet that can provide feedback to assess student learning and engagement in distance learning (Duke, 2020). This check-in form should be made accessible to parents and teachers to better monitor student engagement.

Children's Short Attention Span . The majority of the participants faced behavioral challenges related to the virtual learning of their children, most specifically when it comes to their attentiveness during synchronous classes. The participants answered that their children: refuse to sit down, make faces on the camera, which can be distracting to the class; are not being able to sit down for more than 15 minutes; are easily distracted and sometimes play, walk around, lie down on the bed, play with the phone during class, and refuse to turn on the camera. Parent 2 stated:

"He can't really sit for long in the actual classroom, so how much more here at home? Especially of course with the environment, he sees the TV, and because it's online, the teacher won't be able to pay much attention and discipline him, right? Not all children can be seen by the teacher. Then during their synchronous classes, he makes faces like sticking out his tongue, so of course, the other classmates can see him... He sits for about 10 minutes, 15 minutes... he doesn't last long."

Another parent added,

"Like I said before, he doesn't have tantrums, but he is always distracted. He plays, stands up, lies down and sometimes do not finish their 2-hour class. When they had a class once and his cellphone is on the table, he suddenly went to the bedroom, put his bed on the floor, there he will lie down while having a class. He also often doesn't want to turn on his camera even if I or the teacher tells him to."

Reckdahl (2020), wrote in his article that parents of students with special needs find remote learning to be extremely difficult. He added that evaluation and managing students in the context of virtual learning is hard unlike during face-to-face classes where teachers can physically see and manage students. The transition from traditional to online learning makes the management of student behavior less teacher-dependent and puts the weight of responsibility on the parents.

B. The exploration of Solutions to Address the aforementioned Challenges, resulted with following themes:

Teacher-Given Accommodation .One participant indicated that one of the ways the challenges were addressed is through the accommodations the teachers provided for their children. Parent 2 said:

"Teacher J gives him 30 minutes every day, but we cannot do it every day. They have one to one session every day. For example, in addition, he will say, "Student E, what are the days of the week?"

For students with special needs, the key success in the classroom lies in having appropriate instructional material and support. Teachers make the learning accessible to all students, especially those students with special needs, to demonstrate their learning. According to the Center of Parent Information and Resources (2020), accommodation is the change that can help the students to complete the given task. Responses to intervention (RTI) techniques are one of the most prevalent means of altering inclusion to fit the requirements of children with any form of learning issue (Spring, 2008).

Following the Feedback of the Teacher .One participant answered that they assess the progress of their children depending on the feedback that is given by the teacher. Parent 2 stated that:

"The only thing the teacher does is when my child has an incomplete assignment, they will message me to inform me, and from there, I will find a way to complete it."

Teachers must give immediate feedback so that the student will be more motivated, and it can also help the students to improve (Mustafa, 2020). Teachers should connect with families over the phone after each study, to verify whether students have completed their homework or not, according to the research, in order for distance education to be successful.

Follow Assessment by the Teacher . One of the participants responded that they assess their child's progress through observation. Parent 4 said that:

"Instrument used by the school? The school does not seem to have a special assessment tool. I think it is the same as with the regular student. So, it is whatever it is on their evaluation. they just ask us about our children's behavior at home, and they observe during synchronous class, so I think that is their assessment during this online set up"

According to Patell (2016) observation is one of the tools used to be able to follow the child's progress and struggles, the aim of observation is to refine the parent's or teacher's reasoning and knowledge, in order to assist the youngster. Systematic observation exposes many fascinating things about a kid's character, and it aids the adult in discerning the child's needs and responding to them in order to better serve the child.

One participant stated that they assess the behavioral progress of their child through the evaluation results of the behavioral tutor. Parent 1 said that,

"Student 1 has a behavioral tutor. He is the one who monitors his behavior. He reports to me every week, and he tells me my son's progress. He is fine behaviorally; he just needs to improve more on comprehension and independence."

According to Steps by Stones Association (2020), this support is helpful to the learner in a variety of ways, including filling in gaps in the learning process, assisting the student in developing self-confidence, encouraging classroom engagement, and ensuring that the student remains focused on the classroom. The behavioral tutor also assists the student in being prepared and organized for class, as well as assisting the student with learning strategies and reminding him or her to be a responsible and devoted student.

Monitoring of Attention Span .One participant revealed that she assesses the behavior of her child by monitoring their short attention span. Parent 2 stated that:

"The time is the same- around 10-15 minutes. His shirts are now actually loose because I keep on pulling on it to have him sit down."

Carling (2020) argued that if the child is not focused or is distracted a basic visual checklist of tasks needed for a particular activity, can be helpful.

To Assist. One participant responded that they assist or guide their child in their virtual learning as a way of addressing the challenges they face. Parent 3 stated;

"How do I assist him? When he has assignments, I study the lessons first so I can teach it to him. Because he can't answer their assignments if I don't explain it to him."

Collaboration between families and teachers has become more vital in order to improve student achievement. (Kritzer & Smith, 2020; Mustafa, 2020; Zheng, 2020). Parents serve as the child's first teacher. When parents and families are involved the children are more likely to do better and show interest in attending school.

Parent 2 emphasized the need for review, *"all the time, review"*. Reviewing the lessons before going to another topic can be a big help to the child/children especially to those with special needs. Spence, (2013) stated that when parents or teachers ask the children to review something, it can help them build confidence. It builds that "I can do it" spirit. The same is true of teaching. The importance of reviewing is that it can help the child to recall the past lessons and connect the contents to the new one. Reviewing can allow the children's learning to take root and thrive.

Implications

The results of the study shows that the challenges of the parents seem to stem from the lack of programs for students with special needs in faith-based Institutions, especially since the majority of the challenges is due to the lack of proper accommodation and modification for the children, and the solution for this comes from the parents and not from the school. The researchers also discovered that challenges depend on the severity of the child's disabilities. For some children with severe disabilities, virtual learning becomes more difficult. With regards to future research it is recommended that an experimental study be conducted for the discovery of more in depth implications of virtual learning for students with special needs in an inclusive education program.

Conclusion

Due to the challenges faced by participants, researchers recognized a strong need for accommodation for every child with special needs in a faith-based Institutions, especially in this pandemic era. Collaboration of teachers and parents are imperative, to have the level of accommodation that can facilitate a more meaningful learning experience for children with special needs. When those challenges are addressed in a structured accommodation program then parents and their children with disabilities can possibly access a more effective learning experience.

References

- [1] Alhojailan, M. (2012, October 14). Thematic analysis: A critical review of its process and evaluation. <https://www.westeastinstitute.com/wp-content/uploads/2012/10/ZG12-191-Mohammed-Ibrahim-Alhojailan-Full-Paper.pdf>
- [2] Ayiro, L. P. (2012). A functional approach to educational research methods and statistics : Qualitative, quantitative, and mixed methods approaches. <https://www.worldcat.org/title/functional-approach-to-educational-research-methods-and-statistics-qualitative-quantitative-and-mixed-methods-approaches/oclc/894995487>
- [3] Assessment in Grade. (2020). Grading vs. assessment in learning outcomes. What's the difference? https://www.westga.edu/administration/vpaa/iea/assets/docs/grading_vs_assessmentof_learning_outcomes_whats_the_difference.pdf

- [4] Bartolome, M. T., Mamat, N., & Masnan, A. H. (2017). Parental involvement in the Philippines: A review of literatures. *eJournal UPSI*.
<https://ejournal.upsi.edu.my/index.php/SAECJ/article/view/1000>
- [5] Bleiberg, J., & West, D. M. (2016, July 29). Special education: The forgotten issue in No Child Left Behind reform. *Brookings*. https://www.brookings.edu/blog/up-front/2013/06/18/special-education-the-forgotten-issue-in-no-child-left-behind-reform/?fbclid=IwAR1w0dkjJNm6fl8oVYdIIQTl8Q6bRZZGuyyzVu39P8uOxqCazf_yvtEBW78
- [6] Cahapay, M. B. (2020). How Filipino parents home educate their children with autism during COVID-19 period. *Taylor & Francis*.
<https://www.tandfonline.com/doi/full/10.1080/20473869.2020.1780554>
- [7] Center for Parent Information and Resources. (2020). Supports modifications and accommodations for students. parentcenterhub.org.
- [8] Center for Parent Information and Resources. (2021). Your central hub for parent centers serving families of children with disabilities.
<https://www.parentcenterhub.org/category/topics/accommodations/>
- [9] Creswell, J. W. (2013). *Qualitative Inquiry and research design choosing among five approaches* (3rd Ed). Sage Publications.
- [10] Duke, J. (2020). Addressing challenges in online special education. *College of Education*.
<https://education.fsu.edu/addressing-challenges-online-special-education>
- [11] Galesvka N., & Pesic M. (2018, November). Assessing student with special needs in the inclusive classrooms. *Los Angeles Education Department, Antioch University*.
- [12] Mauro, T. (2020). How an FBA can help children in the classroom.
<https://www.verywellfamily.com/what-is-an-fba-3105774>
- [13] Miller A., (2020). Summative assessment in distance learning. *George Lucas Educational Foundation*.
- [14] Mustafa, N. (2020). Impact of the 2019 - 20 coronavirus pandemic on education. *International Journal of Health Preference Research*,
<https://doi.org/10.13140/RG.2.2.27946.98245>.
- [15] Patell, H. (2016). Observation. *The NAMTA Journal*, 41.
<https://files.eric.ed.gov/fulltext/EJ1125306.pdf>
- [16] Reckdahl, K. (2020, November 12). 5 ways to support kids with ADHD during remote learning. *EduTopia*. https://www.edutopia.org/article/5-ways-support-kids-adhd-during-remote-learning?fbclid=IwAR2NPgMjUumd9FQewp4Xx6wYe6M1QUEWt7LfmpkQKQ5Zk5eTOF_HfBC8i3w https://www.betterevaluation.org/sites/default/files/43888_1.pdf
- [17] Rohman, B., & Wright, A. (2021, March 17). What is the plan? Communication challenges in K-12 education during the pandemic. *National Communication Association*.
<https://www.natcom.org/spectra/what-plan-communication-challenges-k-12-education-during-pandemic>
- [18] Salmon, J. (2010). Designing and conducting research with online interviews.
https://www.betterevaluation.org/sites/default/files/43888_1.pdf
- [19] Smith, S. J., Burdette, P. J., Cheatman, G. A., & Harvey, S. P. (2016, September). Parental role and support for online learning of students with disabilities: A paradigm shift.
<https://eric.ed.gov/>. <https://files.eric.ed.gov/fulltext/EJ1118423.pdf>
- [20] Spence B., (2013). The importance of review in learning.
<https://www.reallifeathome.com/the-importance-of-review-in-learning/>
- [21] Spring, J. (2008). Research on globalization and education. *Review of Educational Research*, 78(2), 330–363.
- [22] Steps by STONES ASSOCIATION. (2020). The role of a shadow teacher. new/welcome/the-role-of-a-shadow-teacher.teppingstoneskenya.org.

- [23]Tindle, K., Mellard, D., & East, B. (2016, December). Online learning for students with disabilities: Recommendations for parent engagement. Center on Online Learning and Studies With Disabilities.
https://nasdse.org/docs/Parent_Resource_Document_December2016.pdf
- [24]Toquero, C. D. (2020). Inclusion of people with disabilities amid COVID-19: Laws, interventions, recommendations. COVID-19 Research Collaborations.
<https://covid19.elsevierpure.com/en/publications/inclusion-of-people-with-disabilities-amid-covid-19-laws-intervene>.
- [25]Yuksel, P., & Yildirim, S. (2015). Theoretical frameworks, methods, and procedures for conducting phenomenological studies in educational settings. *Turkish Online Journal of Qualitative Inquiry*, 6(1).

Determining the Digital Divides of Senior High School Students during COVID 19

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Abstract: School closures caused by the COVID-19 pandemic have created insurmountable difficulties for everyone involved, from students to teachers and parents. The new educational system makes it even harder for students struggling to access and use digital technologies for online learning. This study aims to explore the digital divide conditions of the senior high students in terms of digital access divide, digital capability divide, and digital outcome divide. Further, this study also determines significant differences in digital divides in gender, parents' income, and occupation. This study employed a quantitative research approach with a descriptive analysis design. The research instrument was a set of questionnaires distributed through an online survey among senior high school students in Cavite public schools. A total of 75 students responded to the survey. This study was conducted within the second semester of 2020-2021. Moreover, descriptive statistics such as mean and standard deviation were used to answer the research questions. Moreover, to find the significant differences in digital divides among senior high school students the T-test and ANOVA were employed in this study. The findings revealed that the senior high school students' digital divide has moderate accessibility, moderate capability, and average outcomes in online learning. The study found no significant difference in the digital divide between males and females among senior high school students. On the other hand, there was a significant difference in digital divides in terms of parents' income and parents' occupation.

Keywords: *digital divide, digital access divide, digital capability divide, digital outcome divide, senior high school students, Covid-19 pandemic*

Introduction and Literature Review

When COVID-19 took hold in the Philippines, the living conditions of all Filipinos deteriorated, particularly those from low-income families. According to the United Nations Development Program (UNDP, 2020), the coronavirus COVID-19 pandemic is the most serious global health issue and the greatest threat to all, particularly those in the education sector. Students who cannot afford digital resources struggle the most in the current learning system (online class), and the digital disparity has emerged as a significant issue. Cullinane and Montacute (2020) affirm that closure of schools because of the COVID-19 pandemic have posed serious difficulties for everybody associated, from students to parents and teachers. The present COVID-19 global epidemic has posed major challenges and has had an impact on education.

In the Philippines, Zubiri and Tomacruz (2014) claimed that most public-school students have limited access to traditional learning opportunities. Those who own personal computers or laptop computers, on the other hand, can cope with this inaccessibility because they have near limitless access to information technology at home. Such access provides individuals with a wide range of educational advantages by enabling them to get involved in activities that enrich and contribute to their own learning. Cullinane and Montacute (2020) argued that the online provision would not be available to all students in a way that would facilitate effective learning and that if no further action is taken, there is a risk that existing achievement gaps will widen; with the poorest students being most negatively affected. The issues range from inadequate infrastructure and internet accessibility to access problems, the need for extra student assistance, and the lack of resources available for schools to deliver remote learning. Educational institutions face new planning, implementation, and assessment challenges, particularly in the Philippines. On the other hand, the global pandemic,

according to Toquero (2020) allowed the country to modernize its educational delivery system and emphasize emerging technology.

Generally, the COVID-19 global epidemic has had a major impact on students' lives. The new educational setup makes it even harder for students who struggle to access and use digital technologies for online learning. Furuholt and Kristiansen (2007) stated that the digital divide is the gap among those who have consistent, dependable access to digital technology especially the Internet, and those who do not. The digital divide is a term that is used to characterize the social consequences of inequality in access to communication and information technology, including the development of necessary skills by specific sectors of the population. Computers and the Internet, as well as the ability to use them effectively, are becoming highly significant for active engagement in today's learning process (Cronin, 2002).

Banker and Vaja (2020) mentioned that the divide is the most serious problem in the digital age of education. Roy et al. (2020) predicted that the digital divide in online education would harm the nation's poor learners. Students who cannot afford a home Wi-Fi link or have a mobile device or computer, may not, benefit as much from online education, as their peers, and this will further affect their online learning process. Based on Mefalopulos' (2008) study, the acknowledgement, description, hearing, and understanding of the individuals or stakeholders concerned is essential for the development of communication. There is a need to analyze and revisit operational circumstances such as the global health pandemic, which has changed how educational systems works to promote development, ensure competitiveness, and sustain organizational initiatives. The Department of Education (DepEd) provided methods such as blended and online learning instructional methods through the online learning platform as well as DepEd Commons; TV and radio use; and print and digital learning modules and packets deemed appropriate in their context (DepEd, 2020).

There are studies conducted on the digital divide and how it impacts educational opportunities (Barzilai-Nahon, 2006; Compaine, 2001; Mutula, 2008; Tiene, 2002). However, the current situation forced schools to conduct classes online. Studies conducted on the use of digital technology are still limited in the context of the senior high school students during the COVID-19 pandemic. The goal of this study is to find out the senior high school students' current condition with regards to 'digital divide'. Also, the study aims to determine the difference in digital divides of the senior high school students in terms of their demographic profile during the COVID-19 pandemic. This study answered the following questions:

1. What are the digital divide conditions of the senior high students in terms of:
 - a. Digital Access Divide
 - b. Digital Capability Divide
 - c. Digital Outcome Divide
2. Is there a difference in the digital divide of senior high school students in terms of their demographic profile?
 - a. Gender
 - b. Income of Parents (based in the Philippines)
 - c. Occupation of the Parents

Theoretical Framework

This study is anchored within digital divide theory., Vulnerable people will surely be negatively impacted by school closures. In these unusual times, thousands of students may also find it extremely difficult to pursue their online education due to a lack of digital materials, typically resulting in digital divides (Padlan, 2020). To assist this research, Jan A.G.M. van Dijk's (2008) theory of Digital Divide was used.

The central premise of van Dijk's theory is that inequalities in personal status and context contribute to inequalities in individual wealth, leading to inequalities in access and, ultimately, differences in individual involvement in society. This involvement feeds back to positional characteristics, forming a complete feedback loop. According to the basic assumption of digital divide

theory, inequalities are perpetuated in the entire process of accessing and using technology in society (Pick & Sarkar, 2016). The central argument of the theory is that personal status and background inequalities result in individual resource inequalities, which then contribute to access inequalities and, ultimately, discrepancies in the individual's participation in society. The involvement then feeds back to positional features, completing the feedback loop. The basic premise is that inequalities persist in the entire process of using technology in society (Pick & Sarkar, 2016).

The three-level digital divide frameworks recognize factors associated with the digital divide of connectivity, such as access to or use of information and communication technology (ICT) in homes or schools, individual factors such as gender and academic ability, and environmental conditions in the home and school. The digital divide framework also influences opportunities in various sources of social reasoning skills related to individuals' learning practices as well as levels of machine self-efficacy, demonstrating that digital capacity divides between individual citizens (Wei et al., 2011). Therefore, all these factors will have an impact on how unique skills and knowledge are acquired, which will have further impacts on an individual's learning outcomes, contributing to the digital outcome divide. According to Adhikari (2018), learning experiences in both formal and informal settings contribute to the disparity in digital capability. Such practices can be contextualized based on learners' digital skills in conducting different kinds of software applications, the impact to which learners use technology tend to range from similarity to addiction, and evaluations of their skills through computer self-efficacy.

This study determines the digital access divide, digital capability divide, and digital outcome divide in the learning process. Also, the study aims to determine the demographic profile by knowing the gender, parent's income, and occupation. Further, this research study determines if there is a difference in the digital divide of senior high school students in terms of their demographic profile.

Methodology

A descriptive research design was employed in this study to determine the digital divide differences and conditions of the senior high students. The respondents of this study were senior high school students from public senior high schools. Convenience, purposive sampling was employed using the following criteria to select the respondents: (1) respondents had to be enrolled in an online mode of learning; (2) respondents had to be senior high school students, and (3) respondents could be either male or female, studying within five Cavite Public Senior High Schools. This study involved 75 senior high school students.

The instruments for this study were composed of two parts. The first part determined the three digital divides conditions; digital access divides, digital capability divide and digital outcome divide which were measured using a Likert Scale from 1 to 5. The second part determined the demographic profile such as gender, parents' income, and occupation. The survey was conducted online using google forms to gather data. Only the students who had Internet access answered the survey. Overall, 75 respondents participated in this study. The data gathering was done during the months of May to June of 2021, after which, the data was analyzed. The data gathered in this study was coded, classified, quantified, tabulated, and analyzed based on the study's objectives. Descriptive statistics such as the mean and standard deviation were used to answer research question 1. For research question 2, t-test and ANOVA were employed to find the significant differences in digital divides among senior high school students in terms of their demographic profile such as gender, the income of parents (based on the Philippines), and occupation.

The reliability test results for the sub variables had .94 Cronbach Alpha which means the instruments were excellent. In total, the digital divides of senior high school students were composed of 45 questions with a Cronbach alpha of .94, which was an excellent reliability for the entire instruments.

Findings and Results

Digital Access Divide

Table 2 below shows the result of the digital access divide. Item no. 2, "I have access on a desktop computer for online learning", has the lowest mean of 2.05. The results revealed that during the Covid-19 pandemic, the senior high students had more access to mobile phones than desktop computers for online learning. The items 1 and 2, "I have access to laptop and desktop computers for online learning," has a low mean of 2.39 and 2.05 respectively. This result indicates that senior high school students have fair accessibility.

Table 2. *Digital Access Divide*

Items	N	Mean	Std. Dev.	Scaled Response
I have access to a laptop /computer for online learning.	75	2.39	1.64	Fairly Accessible
I have access to a desktop computer for online learning.	75	2.05	1.49	Fairly Accessible
I have access to a mobile phone for online learning.	75	4.25	1.16	Accessible
I have access to postpaid Wi-Fi internet at home.	75	3.19	1.70	Moderately Accessible
I have access to prepaid or data for internet access.	75	3.55	1.36	Accessible
The laptop that I can access for online learning is for sharing with other household members.	75	2.44	1.61	Fairly Accessible
The desktop computer that I can access for online learning is for sharing with other household members.	75	4.00	1.44	Accessible
The internet access I use provides the speed I need for online learning.	75	3.53	1.23	Accessible
I can access my mobile phone for taking photos and record audio and videos for my assignment and projects.	75	4.21	0.97	Accessible
I have limited access to the Internet at home for learning online.	75	2.77	1.31	Moderately Accessible
<i>Overall Digital Access Divide</i>		3.24	0.62	Moderately Accessible

Scoring System: 4.5-5.00 *Highly Accessible*; 3.50-4.49 *Accessible*; 2.50-3.49 *Moderately Accessible*; 1.50-2.49 *Fairly Accessible*; 1.0-1.49 *Inaccessible*

On the other hand, item 10, "I have limited internet access at home for learning online", and item no.4 "I have access to postpaid Wi-Fi internet at home" have mean scores of 2.77 and 3.19. It implies moderate accessibility for internet access and postpaid Wi-Fi at home for online learning. Moreover, item 5, "I have access to prepaid or data for Internet access", has a high mean of 3.55. The results show that the students rely on prepaid or mobile data for accessing the Internet during online classes. In addition, item No. 3, "I have access to mobile phone for online learning", has the highest mean (4.25). Next is item no. 9, "I can access my mobile phone for taking photos and record audio and videos for my assignment and projects", also had a high mean score of 4.21.

The overall mean digital access divide of the senior high students was 3.23. This means that the senior high students have moderate access to the Internet for online learning. The digital access of senior high students is one of the significant issues in online learning, therefore, there is a need to address this digital divide; the gap in digital accessibility amongst students in the country.

Digital Capability Divide

Table 3 below shows the results of digital capability in terms of the usage and operation of computer applications. Item no. 7, "ability to use Skype", has the lowest mean of 1.767. Another item with a low mean is item 10, using "Moodle" with a mean score of 1.97. It implies that the students are slightly capable of using it.

Table 3. *Digital Capability: Ability to Use and Operate Computer Applications (Software).*

Items	N	Mean	Std. Deviation	Scaled Response
Word	75	3.78	0.98	Capable
PowerPoint	75	3.47	1.12	Moderately Capable
Excel	75	3.32	1.10	Moderately Capable
Gmail/Yahoo	75	3.89	1.09	Capable
Messenger	75	4.61	0.67	Extremely Capable
Viber	75	1.96	1.12	Slightly Capable
Skype	75	1.77	1.06	Slightly Capable
GoToMeeting	75	2.66	1.42	Moderately Capable
Videoconferencing, e.g., Zoom, Google Meet/Classroom, etc."	75	3.90	1.27	Capable
Moodle	75	1.97	1.19	Slightly Capable
<i>Overall Digital Capability Divide: Ability to use and operate computer applications (software)</i>		3.13	0.63	Moderately capable

Scoring System: 4.5-5.00 *Extremely Capable*; 3.50-4.49 *Capable*; 2.50-3.49 *Moderately Capable*; 1.50-2.49 *Slightly Capable*; 1.0-1.49 *Incapable*

Item no. 1, "ability to use MS Word" with the means of 3.78, item no. 4 Gmail/Yahoo with a mean score of 3.89, and item no. 9, "Videoconferencing (Zoom, Google Meet/Classroom)" with a mean of 3.90, all show high results. This indicates that the senior high students could operate digital educational resources for online learning. In addition, item no. 5, "ability to use Messenger", has the highest mean, 4.61. This indicates that senior high students were able to use Messenger as a tool for an online class during the pandemic.

The digital capability divide: the ability to use and operate computer applications (software) has an overall mean of 3.13. This result revealed that the senior high students were moderately capable of using and operating applications for online learning.

Table 4 shows digital capability results regarding technical ability to operate digital devices and run basic troubleshooting (software). Item no. 1, "Installing apps in my computer/desktop", has the lowest mean of 2.507. Moreover, item no. 2, "Installing apps on an iPad/tablet device", has a mean of 2.62. Item 12 "Using Art Smart on MS Word," has a mean score of 2.63, item no. 7, "Updating computer/desktop software operating system", has a mean of 2.74. Item 8, "Updating mobile/iPad/tablet applications," has a mean score of 3.80, item 10, "Operating basic formulas in Excel", has a mean of 2.81. Item 14 "Uploading videos on YouTube" has a mean of 2.86, item 11 "Inserting videos on PPT" has a mean of 2.89, item no. 9 "Tracking Changes on MS Word" has a mean of 3.10, item no. 15 "Utilizing google drive" has a mean of 3.21. Item 13, "Narrating PPT using record slideshow," has a mean of 2.89. The overall mean of the items implies that the senior high students were moderately capable of operating digital devices and running basic troubleshooting (software).

Table 4: Digital Divide: *Technical Ability (Digital Devices and Basic Troubleshooting)*

Items	N	Mean	Std. Deviation	Scaled Response
Installing apps on my computer/desktop.	75	2.51	1.48	Moderately Capable
Installing apps on an iPad/tablet device.	75	2.62	1.55	Moderately Capable
Installing apps on a mobile device.	75	4.33	1.00	Capable
Downloading files.	75	4.27	0.83	Capable
Uploading files.	75	4.15	0.87	Capable
Opening downloaded files.	75	4.14	0.91	Capable
Updating computer/desktop software operating system.	75	2.74	1.53	Moderately Capable
Updating mobile/iPad/tablet applications.	75	3.80	1.21	Moderately Capable
Tracking Changes on MS Word.	75	3.10	1.19	Moderately Capable
Operating basic formulas in Excel.	75	2.81	1.21	Moderately Capable
Inserting videos on PPT.	75	2.89	1.36	Moderately Capable
Using Art Smart on MS Word.	75	2.63	1.18	Moderately Capable
Narrating PPT using record slideshow.	75	2.89	1.23	Moderately Capable
Uploading videos on YouTube.	75	2.86	1.44	Moderately Capable
Utilizing google drive.	75	3.21	1.26	Moderately Capable
<i>Overall Digital Capability Divide: Technical ability to operate digital devices and run basic troubleshooting</i>		3.28	0.81	Moderately Capable

Scoring System: 4.5-5.00 *Extremely Capable*; 3.50-4.49 *Capable*; 2.50-3.49 *Moderately Capable*; 1.50-2.49 *Slightly Capable*; 1.0-1.49 *Incapable*

On the other hand, item no. 4 "Downloading files" had a mean score of 4.27, item no. 5 "Uploading files" had a mean score of 4.15, and item no. 6 "Opening downloaded files" had a mean score of 4.14. Further, item no. 3 "Installing apps on a mobile device" has the highest mean of 4.329. these scores imply that the students were capable of operating mobile devices by installing apps.

Due to the lack of skills in using and operating digital devices, the results show that the overall means of digital capability divide, the technical ability to operate digital devices and run basic troubleshooting has 3.27 mean. The results show that the senior high students were moderately capable. It implies that the respondent's capability to operate digital devices and run basic troubleshooting needs to be improved.

Digital Outcome Divide

Table 5 shows the results of the digital outcome divide. Item 6, "I can easily manage synchronous meeting through videoconferencing for online classes", has the lowest mean of 3.04. Item 7, "I can easily manage asynchronous activities in virtual classrooms being used for online classes", with a mean of 3.06 and item no. 2, "I can actively participate in my online classes", with a mean of 3.27 both have low means as well. These results imply that the senior high students had difficulties managing synchronous meetings through videoconferencing and asynchronous activities in virtual classrooms for online classes. Moreover, item no. 8, "I can easily communicate with my teachers regarding the requirements." has a high mean of 3.70.

Table 5. *Digital Outcome Divide*

Items	N	Mean	Std. Deviation	Scaled Response
I can easily manage to tune in to all my teacher's instructions online.	75	3.45	0.94	Average Outcome
I can actively participate in my online classes.	75	3.27	1.12	Average Outcome
I can easily submit my assignments online on time.	75	3.49	1.09	Average Outcome
I can easily submit the photos that I took with my phone through online on time.	75	3.67	1.07	Good Outcome
I can easily submit the videos that I took with my phone through online on time.	75	3.34	1.09	Average Outcome
I can easily manage synchronous meetings through videoconferencing for online classes	75	3.04	1.08	Average Outcome
I can easily manage asynchronous activities in virtual classrooms being used for online classes	75	3.06	1.15	Average Outcome
I can easily communicate with my teachers regarding the requirements.	75	3.70	1.08	Good Outcome
I appreciate using a variety of digital technologies for online learning.	75	3.62	1.14	Good Outcome
I am willing to learn more about digital technologies for online learning.	75	4.15	0.96	Good Outcome
<i>Overall digital outcome divide</i>		3.48	0.84	Average Outcome

Scoring System: 4.5-5.00 *Excellent Outcome*; 3.50-4.49 *Good Outcome*; 2.50-3.49 *Average Outcome*; 1.50-2.49 *Poor Outcome*; 1.0-1.49 *Very Poor Outcome*

Furthermore, item no. 10, "I am willing to learn more about digital technologies for online learning", has the highest mean of 4.151. This only shows that the senior high students were eager to learn digital technologies for online learning, despite the challenges during the Covid-19 pandemic.

Table 5 shows that the overall mean of digital outcome divide is 3.479. The result implies that senior high students have this average outcome due to the challenges of online education. The result shows that there is a gap in the processes of learning. Digital accessibility and digital capability need must be considered, to improve students' outcomes during online education.

The Difference in Digital Divides According to Gender, Income of Parents and Occupation of the Parents

Gender

Table 6 shows the digital divide in relation to gender. Among five public senior high schools, 48% of the respondents were male, and 52% were female. In addition, an independent-samples t-test was conducted to compare the scores for males and females on the digital divide. Male respondents had a mean of 3.28 ($SD = .65$) and female respondents had a mean of 3.34 ($SD = 0.68$). The magnitude of the differences in the means (mean difference = $-.054$, 95% CI: $.253$ to $-.361$) at equal variance assumed. The results revealed no significant difference in male and female scores ($p = 0.727$, two-tailed).

Table 6. *The Difference of Digital Divide: Gender*

Gender	Mean	Std. Deviation	df	Sig.	T	IV
Male	3.28	0.65				
female	3.34	0.68	71.71	0.727	0.805	Not Significant

Parents' Income

Table 7 shows the digital divide of senior high students in terms of parents' income. The parents' income is divided into 4 groups: group 1 (₱10,481 below), group 2 (₱10,481 to ₱20,962), group 3 (₱20,962 to ₱41,924), and group 4 (₱41,924 to ₱73,367). In terms of income, the highest percentage of students fell within group 1 (72%), 25.33% fell within group 3, and 1% within groups 2 and 4. Group 1 (₱10,481 below) had a mean of 3.16, group 2 (₱10,481 to ₱20,962) a mean of 2.28, group 3 (₱20,962 to ₱41,924) a mean of 3.76, and group 4 (₱41,924 to ₱73,367) had a mean of 3.84.

Table 7. *Parents' Income*

Income	N	Mean	Std. Deviation	df	sig
₱10,481 below	53	3.16	.54	71	.01
₱10,481 to ₱20,962	1	2.28			
₱20,962 to ₱41,924	20	3.76	.73		
₱41,924 to ₱73,367	1	3.84			

The results for parents' income revealed that most of the parents earned ₱10,481 or below, and only a few earned ₱41,924 to ₱73,367. Based on the results, there is a significant difference between the digital divides of the 10k-20k income group and 41k-73k income group.. This means that those students whose parents earn 41k and above, are more capable, have good skills and learning outcomes in their online studies. The results are significantly different at the 0.01 level (2-tailed). these students faced financial problems in a distance learning setup. The current crisis has made it even more difficult for the students to support their learning needs (Matswetu et al., 2013). In the Philippines, financial struggles have worsened for low-income families during the outbreak due to an unprecedented economic shutdown (Ade, 2020).

Parents' Occupation

Parents' occupation was grouped by collar color to determine the digital divides of senior high students in terms of mother's occupation. Group 1 was blue-collar, group 2 was white-collar, group 3 was pink, and group 4 was N/A (not available). Among four collar colors, blue-collar dominated the survey. The result indicated that 79% of the mother's occupations were blue-collar, 16% were white-collar, 1% were the pink-collar, and 4% were not available. Group 1 or blue-collar has the highest percentage, and group 3 or pink collar has the lowest percentage.

The digital divides of senior high students were also determined by their father's occupation, the occupations were grouped by collar color. Group 1 was blue-collar, group 2 was white-collar, group 3 was the gold-collar, and group 4 was N/A or unavailable. Among the four collar colors, the blue-collar category was the most predominant. 69% of the father's had blue collar occupations, 17% had white-collar occupations, 4% had gold-collar occupations, 1% had pink-collar occupations, and 9%

were not available. Whilst the blue-collar category was the largest, with the highest percentage, group 4 or gold collar had the lowest percentage.

Table 8. *Parents Occupation*

Parents occupation	Mean	Std. Deviation	F	Sig.
Mother				
Blue-collar	3.23	0.58	4.15	.009
White-collar	3.81	0.84		
Pink collar	2.97	1.07		
Not Available	3.24	0.28		
Father				
Blue-collar	3.14	0.58	7.10	.000
White-collar	3.95	0.69		
Gold collar	3.33	0.72		
Not Available	3.38	0.36		

Table 8 presents the differences between mother's and father's occupation. In terms of mother's occupations, there was a significant difference between blue-collar and white-collar. Similarly, with regards to father's occupation, there were difference between blue and white-collar. The blue-collar category for mother's occupation had a high mean of 3.23, while the same category for fathers' occupation had a mean of 3.14. Also, in relation to the white-collar category, father's occupation had a high mean of 3.95 while mother's occupation had a low mean of 3.81. The "not available" category in parents' occupation, included those who did not have a job during the Covid-19 pandemic. This group had a 3.38 mean, blue-collar occupation, and 3.24 is the mother's occupation. The result of the N/A group indicates that more fathers were jobless because of pandemic when compared to mothers.

Also, shown on Table 8, is the mean of a statistical difference in the mother's occupation. A significant difference lies between white-collar and pink-collar category, with $f=4.15$, $p=.009$ when the significant level was placed at $p<0.05$. there is also, a significant statistical difference in the father's occupation between the blue-collar and white-collar categories with the $f=7.10$, $p=.000$ when the significant level was placed at $p<0.05$. The overall results revealed a significant difference in parents' occupation. It indicates that the COVID-19 pandemic, has caused some struggles in relation to employment. Some Filipinos have jobs, and some are jobless. It might be that one of the reasons why students have difficulty in the online class is because their parents cannot afford to provide the learning materials they need. Thus, parents' occupation has a major impact on students' digital divide.

Discussion

Digital Access Divide

The senior high school students of Cavite, Philippines have fair accessibility to desktop computers for online learning. According to Lake and Makora (2020), access to computers is now critical to students' ability to access education. However, most of the respondents only scored moderate which means that for some senior high students accessibility levels are not adequate enough to achieve high level outcomes in their learning. It also verifies the findings of Reimer and Saavedra's (2020) study, which suggest that when schools change to online distant learning amid a global health emergency, students access to online learning devices such as laptops has been a reoccurring difficulty. More so, the findings are also supported by the study of Casillano (2019), who stated that only a minimum of the students have access to online learning. In another study, students

who did not own laptops and desktop computers had difficulties during online learning. Thus, the availability of technological devices is one of the biggest challenges to address in education (Cleofas & Rocha, 2021).

According to Cortez (2020), in the Philippines, most students rely on prepaid or mobile data to have Internet access. They have smartphones and laptops with Internet access via mobile data (Scherer, 2020). Thus, to meet the students' learning demands, a new educational strategy with minimal mobile data usage should be designed to reduce the students' cellular data expenses. The current study also reported that there was a high mean of sharing data among household members. It implies that the students have access to attend the classes online; however, the devices they use are for sharing with other household members. This finding is similar to Madden et al. (2005), who mentioned that for students living in rural areas, the computer they most frequently use is often a shared computer. Students indicated that the device they use the most is shared with family.

Esteban (2021) reported that smartphones top the list for new normal education as the primary learning device. The Philippine Social Weather Stations (SWS) discovered that among individuals who had never had a device even before pandemic, the most prevalent type of device acquired or rented was a mobile phone, which was purchased or rented by 79 % of those who had never owned a device before the outbreak (Lalu, 2021). The results of item no. 3 indicates that students use mobile phones as their tool for online education. In addition, Kapasia et al. (2020) mentioned that most students used android mobile to attend their classes online. The students used mobile for accessing the online classes. Thus, students must be given with exercises and schoolwork that may be conveniently accessible via mobile smart phones as classes move to online schools.

Indeed, access to digital devices, such as computers, has been a serious issue for students as schools switch to online learning during a global health pandemic.

Digital Capability Divide

Several schools in the Philippines used digital measures to keep classes running during the lockdown. Google Classroom, Skype, Facebook groups, Messenger, and Zoom were just a few of the most widely used online channels in the country for holding classes. However, the results show that the ability of senior high students to use and operate Skype applications is low. These learning platforms are known to impact students' learning performance positively; however, the results indicate that students are only slightly capable.

Another item with a low mean is the use of Moodle. It implicates that the students are slightly capable of using it. Modular Object-Oriented Dynamic Learning Environment is known as Moodle is an open-source platform that allows teachers to add instructional content and other stuff for students to access. It is free to access and use. Moodle has technologies that encourage students' interactions and provides online inquiry and discovery learning opportunities (Brandl, 2005). Moodle's collaborative tools enable students to connect in groups, assess their performances, create e - mail accounts, chat, obtain grades, and monitor their progress (Costa et al., 2012). Martin-Blas and Fernández (2009) explained that Moodle tools are convenient to use and manage. Google Classroom, Skype, Facebook groups, Messenger, and Zoom were the most popular online learning platforms in the Philippines (Abad & Gonazales, 2020). Being unfamiliar with Moodle application might be the reason why students are only slightly capable of using it. Thus, to widen students' capability in the online platform, students need to explore the Moodle application for online learning.

Further, the ability to use MS Word/Gmail/Yahoo, and Videoconferencing (Zoom, Google Meet/Classroom) showed high results. This indicates that senior high students could operate digital educational resources for online learning. This finding parallels with the study of Saliyeva and Zhumabekova (2016), which pointed out that the ability of students to use digital educational resources in their online activity is a steady characteristic of the student's identity. Students' abilities to use digital educational resources in online activity reached a high level of abilities.

In addition, the ability to use Messenger is the highest online learning platform that senior students can use. De Bakker et al. (2007) mentioned in a questionnaire study of the campus ecology that students use Messenger for online activities such as communicating activities with classmates, sharing of files, collaborating on activities, negotiating course work, collecting data for classwork, relating on classmates' task, and checking teachers' advice. However, Rutter (2009) argued that Messenger distracts the students. Students are enticed into waste time by utilizing this application. Furthermore, when they need to concentrate, they disable Messenger, exhibiting an understanding of the limitations of constant partial attention. This indicates that Messenger is a waste of time of users' resources and may have a negative impact on student success.

For the technical ability to operate digital devices and run basic troubleshooting (software). "Installing apps in my computer/desktop", has a very low mean. According to Children's Joy Foundation Inc. (2019), about 70% of the Philippine public schools do not even have a single computer unit. Computer lessons are still being conducted but only using sketches of the keyboard, monitor, and other computer parts. This condition has resulted in an imbalance of education for the students. Due to imbalances in computer lessons, therefore, the lowest result and that the study revealed that senior high students' lack access to computers/laptops and do not have the opportunity to learn how to install computer applications. It implicates that the senior high students are moderately capable of operating digital devices and running basic troubleshooting. Thus, senior high students is encouraged to improve the technical ability for online learning.

Digital Outcome Divide

The results of the study revealed that students have low digital outcome divide especially in managing synchronous meetings through videoconferencing and asynchronous activities in virtual classrooms for online classes. The low mean of this item is supported by the study of Perveen (2016) which suggests that one of the most problematic aspects of asynchronous and synchronous learning, is the need for students to be available at a specific time and the need for reliable Internet access. Also, Ahmed (2007) stated that most students have insufficient access to high speed internet or reliable Internet networks, making online learning difficult.

In addition, Radha et al. (2020) mentioned that learning outcomes during a pandemic vary based on the quality of the Internet connection. Online classes are less effective in rural settings than in metropolitan ones, due to the absence of equipment that online classes require, and hence learners in these settings struggle to participate in the online learning. The access to technology and the ability to use it are less likely to increase learning outcomes and experiences. The World Bank (2020) warns of COVID-19 making education outcomes even worse. Higher digital accessibility contributes to increased skills development and quality learning, as indicated by effective learning outcomes (Bailey et al., 2012). The results of this study reveal that there is a gap in the processes of learning. Thus, this problem needs to be addressed.

The overall means of digital outcome divide is only average. During the pandemic, online learning has become necessary for students and teachers worldwide (Ali, 2020). However, during the COVID-19 pandemic, students' learning outcomes have been challenged (Wyatt, 2005). In the Philippines, students' learning outcomes have been affected due to a lack of accessibility to the learning devices and Internet connection for online classes (Jones, 2019). The result implies that senior high students have average outcomes due to the challenges of online education. Digital accessibility and digital capability must be considered in order to improve students' outcomes within online education.

The Difference in Digital Divides: Gender, Income of Parents and Occupation of the Parents

The current study revealed that there is no significant difference in male and female average scores for digital divides. However, according to some studies, female students use ICT less frequently and have lesser ICT skills than male students (Volman & van Eck, 2001). Ong and Lai, (2006) stated that female students have less favorable views of e-learning and male students are less satisfied with

digital learning (Lu & Chiou, 2010). However, some studies suggested that there are no differences in digital learning between boys and girls (Cuadrado-Garca et al., 2010; Hung et al., 2010).

Moreover, the results for parents' income revealed that there is significant difference in the digital divides of the various groups. This study implies that those students whose parents have an income of 41k and above, are more capable, have skills and achieve good learning outcomes in their online studies. Thus, these are the students whose parents can provide them with gadgets even when they are still young and thus, they are much more familiar with the tools and apps in the gadgets/laptops/computers. Rashid et al. (2021) explained that students who came from upper-income schools tend to use more devices and were more able to purchase their own mobile phones compared to students who came from lower-income families. On the contrary, some students faced financial problems in a distance learning setup, due to parents' income. The crisis has made it even more difficult for the students to support their learning needs (Matswetu et al., 2013). In the Philippines, financial struggles have worsened for low-income families during the outbreak, due to an unprecedented economic shutdown (Adle, 2020).

Parents' occupation was grouped by collar color to determine the digital divides of senior high students in terms of both father and mother's occupation. The study revealed that there is a significant difference in the digital divides among students based on parental income. As Soharwardi (2020) claimed that father and mother's occupation positively and significantly impact students' academic performance. Hence, parents' occupation has a major role in students' academic performance (Omalde et al., 2014), and parents' occupation can therefore harm the learners' academic success (Walter, 2018). The overall results indicates that due to the COVID-19 pandemic, some Filipino struggles when it comes to occupation. Some Filipinos have jobs, and some are jobless. It might be one of the reasons why some students have difficulty in the online class because their parents cannot afford to provide the learning materials they need. Thus, parents' occupation has a major impact on students' digital divide.

Limitations and Implications

This study focuses on the level of digital divides of the senior high school students during the COVID-19 pandemic and how demographic factors such gender, parents' income and their occupation affect the gaps in digital accessibility, capability, and outcome. The main contribution of present study is to provide quantitative data, so that the department of education in the Philippines can plan how to resolve digital divide among the senior high school students. To boost educational communication strategy and enhance students' ability to operate digital technology, schools should develop official online services or blended learning, where instructors can provide engaging educational activities. It is also advised to begin with an adaptable education program. Most of the respondents were using cellular data as their primary internet access, a diverse learning strategy with low mobile data usage will reduce students' mobile data expenses. For students who do not have access to the internet, offline classes or learning materials may be an option.

The Government must advocate for technology improvements and provide students with access to electricity and the Internet, especially in rural areas. This move, hopefully, will lessen digital imbalances across different geographical locations and financial backgrounds. A law in the Philippines promotes the use of ICT to enhance key public services, including the education sector. RA 10844 "*An Act Creating the Department of Information and Communications Technology, Defining Its Powers and Functions Appropriating Funds Therefor, And for Other Purposes*". Thus, advocacy for communication policies infrastructure under DICT law is highly recommended. To achieve this, policies and initiatives must be formulated in coordination with the Department of Education (DepED). The commission on higher education (CHED) and the Technical Education and Skills Development Authority (TESDA) develop and promote ICT in education consistent with the national goals and objectives.

To bridge the digital divide, the government may provide devices such as working computers/laptops with installed applications for academic purposes, and also internet access, so that students can easily engage in classes. This study emphasizes the need for increased government support for schools. It is the legal obligation of educational institutions and the government to provide students in the Philippines with the necessary skills and knowledge. Priority should be given to the provision of equitable access to ICT education in all Philippine schools, as well as the expansion of ICT infrastructure. A holistic approach to the digital divide in education should take account of the students' learning and social needs. It requires governments to partner with other relevant agencies such as community organizations, social work agencies, and development communication practitioners, to address the complex needs of the most vulnerable students during and after the coronavirus crisis. To ensure that nobody is left behind, every sector of society must work together to bridge the gap created by the growing digital divide.

Conclusion

The three digital divides have a major role in the lives of learners. Students who had higher Internet access, skills, and usage benefited the most from the online classes. People with lower social statuses and less access to the Internet, on the other hand, benefited less from all these outcomes. Ensuring equalized access to technology and digital skills are important steps toward closing the digital divide in education. However, other gaps still remain. Limited access to computers and the Internet were the main challenges in relation online learning during the COVID-19 pandemic when schools were closed. Digital accessibility and digital capability must be considered in order to achieve equity in learning outcomes during a pandemic. Learners should be equipped by improving access and skills pertaining to digital technologies, to achieve full digital inclusion.

References

- [1] Abad-Segura, E., Gonzalez-Zamar, M. D., Luque-de la Rosa, A., & Morales Cevallos, M. B. (2020). Sustainability of educational technologies: An approach to augmented reality research. *Sustainability*, 12(10), 4091. doi:10.3390/su12104091
- [2] Adhikari, J., Mathrani, A., & Parsons, D. (2015, January). Bring your own devices classroom: Issues of digital divides in teaching and learning contexts. In *26th Australasian Conference on Information Systems, ACIS 2015*. <https://pure.qub.ac.uk/en/publications/bring-your-own-devices-classroom-issues-of-digital-divides-in-tea>
- [3] Adhikari, J. (2018). Bring your own devices classroom: issues of digital divides in teaching and learning contexts: a thesis presented in partial fulfilment of the requirements for the degree of Doctor of Philosophy in Information Technology at Massey University, Albany campus, New Zealand (Doctoral dissertation, Massey University). <http://hdl.handle.net/10179/14111>
- [4] Adle, C. (2020, April 1). COVID-19 and the Poverty Pandemic. *Oxfam Philippines*. <https://philippines.oxfam.org/latest/blogs/covid-19-and-poverty-pandemic>
- [5] Ali, W. (2020). Online and remote learning in higher education institutes: a necessity in light of COVID-19 Pandemic. *High. Educ. Stud.* 10:16. doi: 10.5539/hes.v10n3p16
- [6] Bailey, J., Schneider, C., & Vander Ark, T. (2012). Funding the shift to digital learning: Three strategies for funding sustainable high-access environments. *Digital Learning Now*. <http://digitalllearningnow.com/site/uploads/2014/05/DLN-Smart-Series-Paper-1-Final.pdf>
- [7] Banker, V. P., & Vaja, B. L. (2020). Digital Divide in Higher Education. *International Multidisciplinary e-Journal*. https://www.researchgate.net/profile/Vipul-Banker/publication/335677350_Digital_divide_in_higher_education/links/5f1a78c645851515ef44cdac/Digital-divide-in-higher-education.pdf
- [8] Barzilai-Nahon, K. (2006). Gaps and bits: Conceptualizing measurements for digital divide/s. *The information society*, 22(5), 269-278. <https://doi.org/10.1080/01972240600903953>
- [9] Bawden, D. (2008). Origins and concepts of digital literacy. *Digital literacies: Concepts, policies and practices*, 30(2008), 17-32.

- [10]Bornman, E. (2016). Information society and digital divide in South Africa: results of longitudinal surveys. *Information, Communication & Society*, 19(2), 264-278.
<https://doi.org/10.1080/1369118X.2015.1065285>
- [11]Brandl, K. (2005). Review of are you ready to" Moodle"?. *Language Learning & Technology*, 9(2), 16-23.
- [12]Catalano, A. (2013). Patterns of graduate students' information seeking behavior: a meta-synthesis of the literature. *Journal of documentation*.
<https://www.emerald.com/insight/content/doi/10.1108/00220411311300066/full/html>
- [13]Casillano, N. F. B. (2019). Challenges of implementing an e-learning platform in an internet struggling province in the Philippines. *Indian Journal of Science and Technology*, 12(10),1-4.
DOI: 10.17485/ijst/2019/v12i10/137594
- [14]Cleofas, J. V., & Rocha, I. C. N. (2021). Demographic, gadget and internet profiles as determinants of disease and consequence related COVID-19 anxiety among Filipino college students. *Education and Information Technologies*, 26(6), 6771-6786.
<https://doi.org/10.1007/s10639-021-10529-9>
- [15]Children's Joy Foundation, Inc., (2019). Help 500 Filipino Children be Literate in Computer.
<https://www.globalgiving.org/projects/help-500-filipino-children-literate-in-computer/reports/?subid=139624/>:
- [16]Chung, E., Subramaniam, G., & Dass, L. C. (2020). Online learning readiness among university students in Malaysia amidst COVID-19. *Asian Journal of University Education*, 16(2), 45-58.
<https://doi.org/10.24191/ajue.v16i2.10294>
- [17]Coldwell-Neilson, J. (2021, February4). Developing students' digital skills through online learning. *Deakin-University*. <https://www.timeshighereducation.com/campus/developing-students-digital-literacy>
- [18]Costa, C., Alvelos, H., & Teixeira, L. (2012). The use of Moodle e-learning platform: a study in a Portuguese University. *Procedia Technology*, 5, 334-343.
<https://doi.org/10.1016/j.protcy.2012.09.037>
- [19]Cronin, B. (2002). The digital divide. *Library Journal*, 127(3), 48-48.
- [20]Cuadrado-García, M., Ruiz-Molina, M. E., and Montoro-Pons, J. D. (2010). Are there gender differences in e-learning use and assessment? Evidence from an interuniversity online project in Europe. *Proc. Soc. Behav. Sci.* 2, 367–371. doi: 10.1016/j.sbspro.2010.03.02
- [21]Cullinane, C., & Montacute, R. (2020). COVID-19 and social mobility impact brief# 1: school shutdown. Research Brief. <https://dera.ioe.ac.uk/35356/1/COVID-19-Impact-Brief-School-Shutdown.pdf>
- [22]De Bakker, G., Sloep, P., & Jochems, W. (2007). Students and instant messaging: a survey of current use and demands for higher education.
<https://doi.org/10.1080/09687760701470973>
- [23]DepEd, 2020. DepEd Learning Delivery Modalities for School Year 2020-2021:
<https://www.teacherph.com/depd-learning-delivery-modalities/>
- [24]Esteban Jr, A. M. (2021). Digital Divide in Times of Pandemic among Teacher Education Students. *Open Access Library Journal*, 8(04), 1. DOI: 10.4236/oalib.1107323
- [25]Foti, M. K., & Mendez, J. (2014). Mobile learning: how students use mobile devices to support learning. *Journal of Literacy and Technology*, 15(3), 58-78.
http://www.literacyandtechnology.org/uploads/1/3/6/8/136889/jlt_v15_foti.pdf
- [26]Furuholt, B., & Kristiansen, S. (2007). A rural-urban digital divide? Regional aspects of Internet use inTanzania. *The Electronic Journal of Information Systems in Developing Countries*, 31(1), 1-15.<https://doi.org/10.1002/j.1681-4835.2007.tb00215.x>
- [27]Lalu, G. (2021, March 02). 42% of school-age Filipinos don't use devices for distance learning — SWS. *INQUIRER.net*. <https://newsinfo.inquirer.net/1402187/42-of-school-age-filipinos-dont-use-devices-for-distance-learning-sws>

- [28] Geist, E., (2011). The game changer: using iPads in college teacher education classes. *College Student Journal*, 45(4), 758-768.
<https://web.p.ebscohost.com/ehost/detail/detail?vid=0&sid=414e6d24-e491-4ca3-a7fc-51c05d455881%40redis&bdata=JnNpdGU9ZWWhvc3QtbGl2ZQ%3d%3d#AN=77305728&db=aph>
- [29] George, D., & Mallery, P. (2003). *SPSS for Windows step by step: A simple guide and reference*. 11.0 update (4th ed.). Boston: Allyn & Bacon.
- [30] Gliem, J. A., & Gliem, R. R. (2003). Calculating, interpreting, and reporting Cronbach's alpha reliability coefficient for Likert-type scales. Midwest Research-to-Practice Conference in Adult, Continuing, and Community Education. <https://hdl.handle.net/1805/344>
- [31] Harpe, S. E. (2015). How to analyze Likert and other rating scale data. *Currents in pharmacy teaching and learning*, 7(6), 836-850. <https://doi.org/10.1016/j.cptl.2015.08.00>
- [32] Maramba, H. Jr. (2011) The Physiology of the Ethics Review Board.
<https://r1mc.doh.gov.ph/images/medicalinsight/volumeone/16Physiology.pdf>
- [33] Martin, A., & Grudziecki, J. (2006). DigEuLit: Concepts and tools for digital literacy development. *Innovation in teaching and learning in information and computer sciences*, 5(4), 249-267. <https://doi.org/10.11120/ital.2006.05040249>
- [34] Hung, M. L., Chou, C., Chen, C. H., & Own, Z. Y. (2010). Learner readiness for online learning: Scale development and student perceptions. *Computers & Education*, 55(3), 1080-
<https://doi.org/10.1016/j.compedu.2010.05.004>
- [35] Ignacio, G (2020, January 31). Comparative Analysis in the lifestyle of Computer Literate and Non-Computer Literate person in Barangay Pantalan Luma, Orani Bataan.
ComparativeResearchStudy.docx.
<https://www.coursehero.com/file/94820082/Comparative-Research-Studydocx/>
- [36] International Labor Organization (2020). Covid 19 and the World of Work.
<https://www.ilo.org/global/topics/coronavirus/lang--en/index.htm>
- [37] Lake, R., & Makori, A. (2020). The digital divide among students during COVID-19: Who has access? Who doesn't. *The Lens*.
- [38] Librero, F. (2012). Writing your thesis. <http://oldeclass.uop.gr/modules/document/file.php>
- [39] Lu, H. P., & Chiou, M. J. (2010). The impact of individual differences on e-learning system satisfaction: A contingency approach. *British Journal of Educational Technology*, 41(2), 307-323. doi: 10.1111/j.1467-8535.2009.00937.x
- [40] Madden, M., Lenhart, A., Duggan, M., Cortesi, S., & Gasser, U. (2005). Teens and technology 2013. https://heartmindinstitute.com/wp-content/uploads/2015/04/PIP_TeensandTechnology2013.pdf
- [41] Martín-Blas, T., & Serrano-Fernández, A. (2009). The role of new technologies in the learning process: Moodle as a teaching tool in Physics. *Computers & Education*, 52(1), 35-44.
<https://doi.org/10.1016/j.compedu.2008.06.005>
- [42] Matswetu, V. S., Munakandafa, W., Munodawafa, V., & Mandoga, E. (2013). Science student teachers' challenges and coping strategies in an open and distance learning environment in Zimbabwe. *Makerere Journal of Higher Education*, 4(2), 125-137. <https://doi.org/10.4314/majohe.v4i2.1>
- [43] Mefalopulos, P. (2008). *Development communication sourcebook: Broadening the boundaries of communication*. World Bank Publications.
- [44] Nemoto, T., & Beglar, D. (2014). Likert-scale questionnaires. In *JALT 2013 conference proceedings* (pp. 1-8). 10.1016/j.chb.2004.03.006
- [45] Padlan, N. (2020, July 21). Bridging Digital Divide in the time of COVID-19 Pandemic.
<https://philippines.makesense.org/2020/07/21/bridging-digital-divide-in-the-time-of-covid-19-pandemic/>

- [46]Perveen, A. (2016). Synchronous and asynchronous e-language learning: A case study of virtual university of Pakistan. *Open Praxis*, 8(1), 21-39.
<https://www.learntechlib.org/p/171556/>.
- [47]Pick, J., & Sarkar, A. (2016, January). Theories of the digital divide: Critical comparison. In 2016 49th Hawaii International Conference on System Sciences (HICSS) (pp. 3888-3897). IEEE. 10.1109/HICSS.2016.484
- [48]Radha, R., Mahalakshmi, K., Kumar, V. S., & Saravanakumar, A. R. (2020). E-Learning during lockdown of Covid-19 pandemic: A global perspective. *International journal of control and automation*, 13(4), 1088-1099. <https://d1wqtxts1xzle7.cloudfront.net/64029090/covid-pandemic-scopus-with-cover-page-v2.pdf>
- [49]RAND Corporation (2020, May 6). American Educator Panels.
<https://www.rand.org/education-and-labor/projects/aep.html>
- [50]Rashid, S. M., Mawah, J., Banik, E., Akter, Y., Deen, J. I., Jahan, A., ... & Mannan, A. (2021). Prevalence and impact of the use of electronic gadgets on the health of children in secondary schools in Bangladesh: A cross-sectional study. *Health science reports*, 4(4), e388.
<https://doi.org/10.1002/hsr2.388>
- [51]Reimers, F., Schleicher, A., Saavedra, J., & Tuominen, S. (2020). Supporting the continuation of teaching and learning during the COVID-19 Pandemic. *Oecd*, 1(1), 1-38.
https://globaled.gse.harvard.edu/files/geii/files/supporting_the_continuation_of_teaching.pdf
- [52]Rutter, M. (2009). Messenger in The Barn: networking in a learning environment. *ALT-J*, 17(1), 33-47.<https://doi.org/10.1080/09687760802649863>
- [53]Saliyeva, A. Z., & Zhumabekova, F. N. (2016). On the Students' Ability to Use Digital Educational Resources. *International Journal of Environmental and Science Education*, 11(11), 4669-4679. <http://www.ijese.net>
- [54]Scherer, R., Siddiq, F., & Tondeur, J. (2020). All the same or different? Revisiting measures of teachers' technology acceptance. *Computers & Education*, 143, 103656.
https://d1wqtxts1xzle7.cloudfront.net/60332142/All_the_same_or_different_TAM20190819-42882-rlpbmk-with-cover-page-
- [55]Setiawan, B., & Isha, V. (2020). Covid-19 Pandemic: The Influence Of Full-Online Learning For Elementary School In Rural Areas. *JPSd (Jurnal Pendidikan Sekolah Dasar)*, 6(2), 114-123.
<http://dx.doi.org/10.30870/jpsd.v6i2.8400>
- [56]Sharma, A., Tiwari, S., Deb, M. K., & Marty, J. L. (2020). Severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2): a global pandemic and treatment strategies. *International journal of antimicrobial agents*, 56(2), 106054. doi: 10.1016/j.ijantimicag.2020.106054
- [57]Soharwardi, M. A., Fatima, A., Nazir, R., & Firdous, A. (2020). Impact of parental socioeconomic status on academic performance of students: A case study of Bahawalpur. *Pakistan. J. Econ. Econ. Educ. Res*, 21, 1-8.
- [58]Slutsky, D. J. (2014). The effective use of graphs. *Journal of wrist surgery*, 3(02), 067-068. doi: 10.1055/s-0034-1375704
- [59]Statista Research Department (2021, Jul 23) Coronavirus COVID-19 impact on employment Philippines 2020. <https://www.statista.com/statistics/1106978/philippines-employment-impact-novel-coronavirus-covid19/>
- [60]Straub, D. W. (1989). Validating instruments in MIS research. *MIS quarterly*, 147-169.
<https://doi.org/10.2307/248922>
- [61]Toquero, C. M. (2020). Challenges and opportunities for higher education amid the COVID-19 pandemic: The Philippine context. *Pedagogical Research*, 5(4).
<https://www.pedagogicalresearch.com>
- [62]Tsang, S., Royse, C. F., & Terkawi, A. S. (2017). Guidelines for developing, translating, and validating a questionnaire in perioperative and pain medicine. *Saudi journal of anaesthesia*, 11(Suppl 1), S80. doi: 10.4103/sja.SJA_203_17

- [63]UNESCO (2020). COVID-19 Educational Disruption and Response.
<https://en.unesco.org/covid19/educationresponse>.
- [64]UNESCO (2020). COVID-19 Educational Disruption and Response.
<https://en.unesco.org/covid19/educationresponse>.
- [65]UNDP (2020) COVID-19 pandemic Humanity needs leadership and solidarity to defeat the coronavirus.<https://www.undp.org/content/undp/en/home/coronavirus.html#:~:text=The%20coronavirus%20COVID%2D19%20pandemic,to%20every%20continent%20except%20Antarctica>.
- [66]Van Dijk, J. A. Van & Deursen, A. J. (2019). The first-level digital divide shifts from inequalities in physical access to inequalities in material access. *New media & society*, 21(2), 354-375.
<https://doi.org/10.1177/1461444818797082>
- [67]Van Dijk, J. A. G. M. (2008). The digital divide in Europe. *The handbook of Internet politics*.
- [68]Van Dijk, J. A. (2005). *The deepening divide: Inequality in the information society*. Sage Publications.
- [69]Volman, M., and van Eck, E. (2001). Gender equity and information technology in education: the second decade. *Rev. Educ. Res.* 71, 613–634. doi: 10.3102/00346543071004613
- [70]Walter, K. (2018). Influence of parental occupation and parental level of education on students' academic performance in public day secondary schools. *International Journal of Research and Innovation in Social Science*, 2(2), 201-211. URL.
<https://www.rsisinternational.org/journals/ijriss/Digital-Library/volume-2-issue-12/201-211.pdf>
- [71]Wei, K. K., Teo, H. H., Chan, H. C., & Tan, B. C. (2011). Conceptualizing and testing a social cognitive model of the digital divide. *Information Systems Research*, 22(1), 170-187.
<http://www.jstor.org/stable/23015630>
- [72]Wickramanayake, L., & Jika, S. M. (2018). Social media use by undergraduate students of education in Nigeria: A survey. *The Electronic Library*. <https://doi.org/10.1108/EL-01-2017-002>
- [73]WHO (2020). Coronavirus disease 2019 (COVID-19) Situation Report - 51. *World Health Organization*. https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200311-sitrep-51-covid-19.pdf?sfvrsn=1ba62e57_10
- [74]Wyatt, G. (2005). Satisfaction, academic rigor and interaction: Perceptions of online instruction. *Education*, 125(3), 460.
<https://web.p.ebscohost.com/ehost/pdfviewer/pdfviewer?vid=0&sid=0420fd9e-4109-48bc-ae1a-9a577887adcf%40redis>
- [75]Zubiri, J. R., & Tomacruz, S. C. (2014). Digital Demands: Addressing the Digital Divide in Basic Education and Its Relation to Academic Performance and Aspirations.
https://www.21caf.org/uploads/1/3/5/2/13527682/9hrd-4060_zubiri.pdf

External Factors and Musical Self-Esteem as Correlates of Music Performance Anxiety Among College Students

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Abstract: This study was conducted to determine the correlates between external factors which consist of: family support and peer competition, musical self-esteem towards music performance anxiety. There were 108 respondents from selected Universities and Colleges in National Capital Region (NCR) and Calabarzon, Philippines. The study used four self-constructed questionnaires which measured the respondents' external factors, musical self-esteem and music performance anxiety. The respondents were selected using purposive and snowball sampling techniques. The result shows high family support and moderate support from peers. Likewise, musical self-esteem and music performance anxiety were moderate. Further, the findings suggest no correlation between external factors, musical self-esteem and music performance anxiety. In addition, the level of music performance anxiety is the same regardless of sex, duration of music lessons, and type of musical instrument. The implications and discussions of the findings are explored in the study.

Keywords: *music performance anxiety, musicians, peer competition, family support, self-esteem, instrument.*

Introduction

As former trained music students, both researchers have experienced music performance anxiety to varying degrees, shown through symptoms such as the cold clammy hands, dry mouth, and heightened consciousness before or during a performance. Just like any other performer, musicians may often experience music performance anxiety (Brodsky, 1996). Debilitating or not, performance anxiety certainly has an impact. Although not every musician is exposed directly to performance anxiety, every musician faces influences from external factors and their own self-esteem. There is convincing evidence that most young musical performers' trust and abilities are supported by loving parents dedicated to assisting their children through the challenging yet enriching experience of learning an instrument (Davidson et al., 1996). This support is considered supreme in a student's early musical development, since it gives a sense of security and trust in their abilities. Music performance anxiety (MPA) is a distressing experience for musicians of all ages, but it has undergone little scientific research to date. (Osborne and Kenny, 2005).

This research study was designed to address a number of specific issues; the first of these is family support in music education. Although some music teachers welcome and encourage parents to be present during their children's lessons, others prefer that parents not attend at all (Jorgensen, 1986). The researchers were interested in observing the development of high-achieving musicians who received a higher level of parental involvement in their music education. The second issue to be addressed was peer competition and whether peer interactions that foster competitive attitudes have a positive or negative impact towards the subjects' music career. The third issue of interest is self-esteem, particularly in music ability. Do musicians with higher musical self-esteem attain further success than those with less assurance? The final research inquiry pondered whether the (IV) "External factors" which included: family support towards music education and peer competition and "musical self-esteem", affected (DV) musicians' music performance anxiety.

Research Questions

- What is the level of external factors in the music education of student musicians in Philippine universities in terms of the following:
 - Family support?

- Peer competition?
- What is the level of musical self-esteem of the respondents?
- What is the level of music performance anxiety of the respondents?
- Is there a significant relationship between external factors and music performance anxiety?
- Is there a significant relationship between musical self-esteem and music performance anxiety?
- Is there a significant difference in the music performance anxiety considering the following demographic variables:
 - Duration of formal music lesson?
 - Sex?
 - Type of musical instrument?

Methodology

Research Design

This study used quantitative methods specifically descriptive-correlation design. The descriptive method utilized in determining external factors which consist of: family support and peer competition, as well as their level of musical self-esteem. Moreover, the correlation design was used to determine how external factors and musical self-esteem relates to performance anxiety.

Participants of the Study

The target population of the study was students enrolled in several colleges and universities in the Luzon region of the Philippines. The respondents had to fulfill all three of the specific criteria: be between the ages of 18-30, be enrolled in a college in Luzon, and have at least one year of formal music education and training in various specialties. Among these were: voice, piano, percussion, string, wind, brass instruments, and music theory. The participants for the full study came from several colleges and universities within the National Capital Region (NCR) and Calabarzon, Philippines.

Instrumentation

In order to obtain data necessary to answer the research questions, the investigators used four instruments. Firstly, the Parental Involvement and Home Environment in Music (PI-HEM) scale was adapted to measure family support. The second instrument was the Competitive Attitude Scale (CAS) designed by Ryckman et al. (1996), which measured the respondents' attitudes towards peer competition within a positive framework of development. The third instrument was the Self-Esteem of Music Ability (SEMA) scale, originally designed by Schmitt (1979) to measure students' musical self-esteem levels, and the final instrument was the Kenny Music Performance Anxiety Inventory (K-MPAI), developed by Kenny (2004) to measure students' performance anxiety levels.

Data Gathering Procedure

Due to the ongoing coronavirus outbreak and the unpredictable quarantine regulations in the Philippines, the researchers gathered data and responses from participants online. The researchers approached several colleges from NCR and CALABARZON using email addresses which were found on their school websites and sent a request letter to the head dean of the college asking permission to conduct the study. Upon approval, the questionnaire was sent only to the consenting participants, through a Google Document form which was distributed via email or Facebook messenger, depending on the participant's preference. The questionnaires required participants to document their email address, age, type of instrument (including voice), and the duration of musical education, alongside the different inventories. The participants' responses were recorded automatically once the forms were completed and submitted. Finally, after the researchers collected all the data, the researchers encoded them in MS Excel, and they were submitted to the statistician to obtain the statistical analysis data.

Statistical Treatment of Data

The statistician used descriptive statistics to determine the variables' overall levels, and Pearson-R Correlation, to find the relationship between the variables. Other tests utilized were independent t test, Kruskal-Wallis, and ANOVA. The SPSS program was used to interpret the gathered data.

Ethical Considerations

The researchers assured participants that ethical considerations were appropriately discussed in the study. The study's respondents were kept anonymous. A briefing was conducted and informed consent obtained prior to the questionnaire administration participants were given adequate information about the study. Respondents were assured of their ethical rights such as anonymity, the right not to be coerced, the right to withdraw, and the right to confidentiality, whilst they participated in the study.

Results and Discussion

The data was analyzed using descriptive statistics, Pearson-R Correlations, independent t test, Kruskal-Wallis, and ANOVA. The following discussion follows the sequence of the statement of the problem written in Chapter 1.

Level of External Factors in Music Education Family Support

Table 1. *Level of Family Support*

No.	Items	Mean	SD	Scaled	Response	VI
1	My parents pay for my music lessons.	4.31	1.28	Agree		High
2	My parents ensure that I do sufficient practice at home.	3.88	0.99	Agree		High
3	My parents provide transportation to my music activities.	4.20	1.20	Agree		High
4	My parents attend my school concerts/recitals.	4.22	0.98	Agree		High
5	My parents would say that being in Music is a worthwhile experience.	4.43	0.79	Agree		High
6.	My parents brag about my musical involvement.	3.55	1.09	Agree		High
7.	My parents value my musical achievement.	4.24	0.89	Agree		High
8.	My parents provide music instruction materials (e.g. music sheets, music supplies, etc.)	3.91	1.12	Agree		High
9.	My parents emphasize to me that music Mod. education should be in all schools.		3.47	1.06	Neither Agree nor Disagree	
	Grand Mean	4.02	0.67	Agree		High
	Mean of Sum Scores	36.7	6.02			Moderate

The results show that the overall level of family support ($M = 4.02$; $SD = 0.67$) is interpreted as *high support*.

Peer Competition**Table 10.** *Level of Peer Competition*

No.	Items	Mean	SD	Scaled Response	VI
1	Winning in competition makes me feel more accomplished as a person.	3.54	1.05	Neither Agree nor Disagree	Moderate
2	Competition inspires me to excel.	3.55	1.07	Agree	High
3	I often find myself turning a friendly game or activity into a serious contest or conflict.	2.82	1.19	Neither Agree nor Disagree.	Moderate
4	Gaining praise from others is not a serious reason in joining competition.	2.32	0.99	Disagree	Low
5	I tend to view my friends as rivals.	2.39	1.11	Disagree	Low
6.	I enjoy competition because it brings me to a higher level of motivation to bring out the best of myself.	3.55	1.11	Agree	High
7.	Competition does not help me develop my abilities more.	3.67	0.86	Agree	High
8.	It is okay to quit during competition.	3.63	1.05	Agree	High
9.	I feel envy toward my peers who receive Rewards for their accomplishments.	2.89	1.07	Neither Agree nor Disagree	Moderate
10.	Failure/loss in competition makes me feel inferior to others.	3.17	1.16	Neither Agree nor Disagree	Moderate
	Grand Mean	3.15	0.59	Neither Agree nor Disagree	Moderate
	Mean of Sum Scores	31.5	5.87		Moderate

The overall result shows the grand mean of peer competition ($M=3.15$; $SD=0.59$) which is interpreted as *moderate*. This means that generally the respondents were neither highly competitive or uncompetitive.

Musical Self-Esteem**Table 11.** *Level of Musical Self-Esteem*

No.	Items	Mean	SD	Scaled Response	VI
1	I can read music well.	3.39	0.95	Neither Agree nor Disagree	Moderate
2	I can play music for others.	3.83	0.93	Agree	High
3	I'd be glad if teachers asked me to play or sing for programs.	3.37	1.08	Neither Agree nor Disagree	Moderate
4	I would like to have a professional career in music.	3.15	1.08	Neither Agree nor Disagree	Moderate
5	Music is harder for me than for other people.	3.32	0.99	Neither Agree nor Disagree	Moderate
6	I feel worthless every time I make mistakes	2.97	1.20	Neither Agree	Moderate

7.	during music performance. People my age admire my musical ability.	3.38	0.91	nor Disagree Neither Agree nor Disagree	Moderate
8.	Compared to other people, I think I am talented in music.	3.00	0.97	Neither Agree nor Disagree	Moderate
9.	My friends really like my musical performances.	3.56	0.74	Agree	High
10.	I know music well enough to help others learn it.	3.58	0.94	Agree	High
	Grand Mean	3.36	0.56	Neither Agree nor Disagree	Moderate
	Mean of Sum Scores	33.6	5.56		Moderate

The result presents the grand mean of musical self-esteem ($M = 3.36$ $SD; = 0.56$) which is interpreted as *moderate*.

Music Performance Anxiety

Table 12. *Level of Music Performance Anxiety*

No.	Items	Mean	SD	Scaled Response	VI
1	Prior to a performance, I experience increased heart rate like pounding in my chest.	4.25	0.78	Agree	High
2	I experience increased heart rate like pounding in my chest during performance.	3.92	1.08	Agree	High
3	My worry and nervousness about my performance interferes with my focus and concentration.	3.68	1.05	Agree	High
4	I worry so much before a performance, I cannot sleep.	2.95	1.20	Neither Agree Nor Disagree	Moderate
5	Prior to a performance, I experience shaking or trembling, or tremors.	3.25	1.21	Neither Agree Nor Disagree	Moderate
6	During a performance, I experience shaking or trembling, or tremors.	3.18	1.13	Neither Agree Nor Disagree	Moderate
7.	I remain committed to performing even though it causes significant anxiety.	3.99	0.88	Agree	High
8.	I am concerned about a negative reaction from the audience.	3.71	1.09	Agree	High
9.	I am uncertain before a concert whether I will perform well.	3.63	0.94	Agree	High
10.	Even in the most stressful performance situations, I am confident that I will perform well.	2.87	0.90	Neither Agree Nor Disagree	Moderate
11.	During a performance, I find myself thinking about whether I'll even get through it.	3.36	1.01	Neither Agree Nor Disagree	Moderate
12.	I worry that one bad performance may ruin my career.	2.86	1.19	Neither Agree Nor Disagree	Moderate

Grand Mean	3.47	0.66	Neither Agree	Moderate
Mean of Sum Scores	41.6	7.88	Nor Disagree	High

The above results present the grand mean of music performance anxiety ($M = 3.47$; $SD = 0.66$) which is interpreted as *moderate anxiety*. This indicates that the respondents generally do not experience high or low levels of music performance anxiety.

Relationship Between External Factors and Music Performance Anxiety

Table 13. *Correlation Analysis Between External Factors and Music Performance Anxiety*

Variable	Performance Anxiety	
	r	p
Family Support	0.33	0.09
Peer Competition	0.54	0.06

Table 13 presents the correlation analysis of external factors & music performance anxiety. The results show no significant relationship between external factors and performance anxiety. This means that neither family support ($p = 0.09$; $r = 0.33$) nor peer competition ($p = 0.06$; $r = 0.54$) have a correlation with performance anxiety. The result implies that the external factors such as support from family and peer competition do not influence the music performance anxiety levels of the respondents.

Relationship Between Musical Self-Esteem and Music Performance Anxiety

Table 14. *Correlation Analysis between Musical Self-esteem and Music Performance Anxiety*

Variable	Performance Anxiety	
	r	p
Musical Self-esteem	-0.09	0.37

The result shows that there is no significant relationship between musical self-esteem and music performance anxiety, meaning that musical self-esteem ($p = 0.37$; $r = -0.09$) and music performance anxiety are not correlated.

Differences in the Level of Music Performance Anxiety

Duration of Formal Music Lessons

Table 15. *Differences in the level of music performance anxiety by duration of formal music lessons*

Measure	Mean Rank	H	df	p	Verbal Interpretation
1-5 years	55.1	0.67	2	0.97	Not Significant
6-10 years	53.5				
More than 10 years	53.8				

Table 15 presents the results of the Kruskal-Wallis test to determine the differences in the level of performance anxiety, according to the durations of formal music lessons. The result shows no significant difference in the level of music performance anxiety considering duration of formal music lessons ($p = 0.97$; $H = 0.67$; $df = 2$). This implies that regardless of the duration of music lessons, (1-5 years, 6-10 years, and 10+ years), the level of music performance anxiety is the same.

Sex

Table 16. *Difference in the level of music performance anxiety considering sex*

Variable	Sex Group		t	df	p	Verbal Interpretation
	Male	Female				
Sex	M = 3.51 SD = 0.51	M = 3.45 SD = 0.72	0.46	106	0.09	Not Significant

The results show no significant difference in the level of music performance anxiety considering sex ($t = 0.46$; $p = 0.09$). The results suggest that regardless of sex, the level of music performance anxiety is the same.

Type of Musical Instrument

Table 17. *One-Way Analysis of Variance in Music Performance Anxiety by Musical Instrument*

Source	df	SS	MS	F	p	Verbal Interpretation
Between Groups	4	3.11	0.78	1.86	0.12	Not Significant
Within Groups	103	43.0	0.42			
TOTAL	107	46.1				

The result shows that there is no significant difference in the level of music performance anxiety considering the types of music instrument ($F [4, 103] = 1.86$; $p = 0.12$). This implies that the level of music performance anxiety is the same, regardless of the kind of instruments musicians play.

Conclusion and Implications

Summary of Findings

The student musicians report high levels of family support, and moderate levels of peer competition, musical self-esteem, and music performance anxiety. External factors, such as family support and peer competition, are not correlated with music performance anxiety. Musical self-esteem does not have a significant correlation with music performance anxiety. According to the results, none of those variables had a significant correlation with music performance anxiety, thus confirming the null hypothesis. Music performance anxiety is the same regardless of the demographic variables: duration of music lessons, sex, and type of musical instrument. Furthermore, the null hypothesis, which states that there is no significant difference, is accepted.

Conclusion

There are some possible explanations for the findings of this study. (1) Cultural perceptions of peer competition (2) developmental stage with regards to need for autonomy (3) faking bad/good in musical self-esteem, (4) pandemic effect, and finally, (5) other variables not measured in the study.

Cultural perceptions of peer competition in the Philippines may affect the respondents' performance anxiety through collectivism and the fatalistic mentality of "bahala na." Collectivism values working with others and discourages actions that may be at others' expense, while "bahala na" promotes accepting whatever happens. This can negate a desire for improvement or change. The cultural context of these values may provide an underlying reason for the respondents' moderate level of peer competition, and therefore, its nonsignificant relationship with music performance anxiety.

Another possible factor may be the development stage that the respondents are in. Most of the respondents were in their late teens to 30 years old, the young adult stage, according to Erikson (1950). They were all college students. Although they had all taken music lessons for at least a year, many respondents may no longer have been as actively involved in music as they once were, due to business in academic studies or work scheduling. It may even be the case that some respondents may have pulled away from their family's expectation of music, as a means of transitioning into their own autonomous lifestyle. Young adults who might have spent a great deal of time focused on music previously may acquire the financial means and independence to explore other interests. Erikson states that the search for intimacy is common in the young adult stage. As a result, music and whatever attitudes the respondents hold towards it, may fade and diminish in importance.

In regard to the third explanation, respondents may be manipulating their responses when answering the questionnaire, especially concerning musical self-esteem. This may be because respondents do not want to seem overconfident (anxiety over backlash) nor musically inferior (sense of pride) and would rather settle for a neutral option. Depending on how they truly see themselves, respondents may have been faking bad or good, resulting in a moderate level of musical self-esteem. Another issue is that the study only measures musical self-esteem and not the general self-esteem of the respondents.

Another unanticipated factor that may have affected respondents' attitudes and answers is the current global pandemic. Due to social restrictions at the time of the study, large gatherings were discouraged, making it difficult for music to be performed live. Any musical projects at the time, were usually pre-recorded at home or at other venues without a live audience. This may have impacted the respondents' attitudes toward music performance anxiety, as some of the items about live performances may not have been applicable at the time.

The final possible explanation related to the results of the study is that family support, peer competition, and musical self-esteem are not related to music performance anxiety at all. This is one of the new and surprising findings. The other variables not measured in the study, could have correlated with music performance anxiety.

Recommendations

In accordance with the preceding conclusions, the researchers of the present study have produced several recommendations. (1) The study suggests that universities in Luzon could hold training programs or seminars in order to help student musicians develop their musical self-esteem to an optimal level and discuss awareness of and techniques to reduce music performance anxiety. These programs could also strive to fine-tune and transform existing moderate levels of peer competition into peak motivations to excel, combined with musical sportsmanship. It is anticipated that we will have a greater understanding of performance anxiety in the near future, through the dissemination of information on: the issue, intervention strategies, and preventive measures, thus contributing to the well-being of musicians.

(2) The study also generated several new research questions to explore. Another study should be conducted regarding: external factors, peer competition, musical self-esteem, and music performance anxiety, but among participants at a younger developmental stage. Adolescents and children may face additional or different pressures related to music education, and it would be fascinating to note any differences.

(3) With regard to the third explanation, it is important to understand the Filipino value of *hiya*, commonly known as “shyness” or “shame.” It is a value deeply connected to pride and self-image. An article by Sabio (2017) quotes Robert Diaz, a Filipino professor at the University of Toronto, who states that “Hiya is not only shyness or shame... it's a particular type of saving face.” A study by Saito et al., (2010) also states that *hiya* is a term used by people to avoid being attacked by others. By using the word “*hiya*” as an excuse, they resist attack from others, while defending and magnifying their self-esteem. Filipino respondents may be utilizing the value of *hiya* when answering the questionnaire, especially concerning musical self-esteem. This may be because respondents do not want to seem overconfident (anxiety over backlash) nor musically inferior (sense of pride) and would rather settle for a neutral option. Depending on how they truly see themselves, respondents may be faking bad or good, resulting in a moderate level of musical self-esteem. Further examination of the Filipino values: *hiya*, *bahala na*, and collectivism should be conducted, to determine if they have a cultural impact on musicians' musical self-esteem, sense of peer competition, and music performance anxiety.

(4) A new area of study is the type of musical training received and its relationship with music performance anxiety. For example: Do classically trained musicians suffer from different levels of MPA than a musician trained for other genres? Do student musicians who underwent lessons with independent professional teachers have a different manifestation of MPA compared to student musicians who experienced music education in an academic setting?

(5) Another possible question to explore is whether there is a difference in MPA between music majors and non-music majors. Would the results of the study change if the respondents were strictly music majors?

(6) The researchers are also curious to discover differences in Asian musicians' music performance anxiety, peer competition, family support, and musical self-esteem, compared to musicians in other parts of the world, particularly the Western regions.

(7) Future research can be done to address the present study's research questions at a time when live music performances, such as concerts and recitals, are once again commonplace. Data gathered at such a time may have a different reflection of the variables.

Despite setbacks and limitations, the current study has generated novel results regarding college student musicians in the Philippines and sparked additional ideas for further investigations. With each subsequent research study and its findings, researchers anticipate a plethora of discoveries that may advance the understanding of the struggle musicians face, along with the methods to combat them, and the overall enhancement of musicians' welfare.

References

- [1] Brodsky W. (1996). Music performance anxiety reconceptualized. *Medical Problems of Performing Artists*, 11(3), 88–98. <https://doi.org/10.1177/87551233070260010103>
- [2] Davidson, J. W., Howe, M. J. A., Moore, D. G., & Sloboda, J. A. (1996). The role of parental influences in the development of musical performance, *British Journal of Developmental Psychology*, 14, 399-412. <https://doi.org/10.1111/j.2044-835X.1996.tb00714.x>
- [3] Erikson, E. H. (1950). *Childhood and society*. W W Norton & Co.
- [4] Jorgensen, E.R. (1986) Aspects of private piano teacher decision-making in London, England. *Psychology of Music*, 14, 111-129. <https://doi.org/10.1177/0305735686142003>
- [5] Osborne, M. S., & Kenny, D. T. (2005). Development and validation of a music performance anxiety inventory for gifted adolescent musicians. *Journal of Anxiety Disorders*, 19(7), 725-751. doi:10.1016/j.janxdis.2004.09.002
- [6] Ryckman, R. M., Hammer, M., Kaczor, L. M., & Gold, J. A. (1996). Construction of a personal development competitive attitude scale. *Journal of Personality Assessment*, 66(2), 374–385. https://doi.org/10.1207/s15327752jpa6602_15
- [7] Sabio, R. (2017, June 26). *I'm Ashamed Because I Don't Know What It Means To Be Filipino*. HuffPost Canada. https://www.huffingtonpost.ca/2017/06/22/filipino-shame_a_22583312/.
- [8] Saito, I., Miyagi, M., & Imamura, T. (2010). Filipino personality traits and values for social support : FOW as human resources for work life balance in Japan (1). *CiNii Articles*. <https://ci.nii.ac.jp/naid/120005422534>.
- [9] Schmitt, M. (1979). Development and validation of a measure of self-esteem of music ability. *Dissertation Abstracts International*, 40, 5357a-5358A. (UMI No. 8009164)

Humor Amidst Crisis: A Phenomenological Study

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Abstract: Humor is considered to influence learning. Although its study is widespread, little has been known on how humor may impact teachers and students especially during a pandemic like COVID-19 when there is call for teachers to be more alert for an answer to an unexpected situation and be creative of teaching strategies to ascertain an enhanced and effective teaching-learning process. This qualitative research, a phenomenological study, examines to what extent does humor have in the process and the role it plays when incorporated in the class to such challenging times as these. Through surveys among 10 tertiary students in West Indonesia, the findings of this study revealed that humor has a positive impact to learners' retention, willingness to class participation, enjoyment in classroom activities, and reduction of anxiety which eventually cater to successful language.

Key words: *COVID-19, humor, learning, teaching, strategy, phenomenological study*

The world has to face various challenges including a deadly virus. The Corona Virus 19 (COVID 19) "has wrapped the whole universe with a mood of fear, depression, anxiety and loss of hope. It has made countries of the world, west and east, rich and poor, advanced and underdeveloped, all engaged in a common task: facing one 'invisible' enemy: the pandemic" (Hussein & Aljamili, 2020, p. 1).

The COVID-19 pandemic has brought about significant changes. Studies show that it has affected health (Bennett, 2003), economy (Mckibbin & Fernando, 2020), travel (Toanoglou, Chemli, & Valeri, 2021), and education (Alaklabi, Alaklabi, & Almuhlafi, 2021; Kasradze & Zarnadz, 2021; Olawunmi & Nwamaka Osakwe, 2021) and other areas. Despite these, humor counter-attacks (see Bennett, 2003 and Olah & Ford, 2021).

Humor impacts health. As Bennett (2003) stresses, humor

has the potential to relieve stress in patients and medical professionals. Humor gives patients the opportunity to forget about their anxiety and pain, if only for a period of time. When doctors share humor with patients, they create lines of communication that encourage patients to discuss difficult times" (pp. 1259-1260).

Also, Olah & Ford (2021) emphasize that,

First, to the extent that people have a self-enhancing humor style they perceived less stress and hopelessness associated with COVID-19 and as a result reported engaging in more protective behaviors. Second, people higher in self-defeating humor style showed the opposite pattern; they perceived more stress and hopelessness due to COVID-19 and thus reported engaging in less protective behaviors. [Abstract]

This paper discusses the influence of humor to the teaching-learning process, especially during the pandemic. XXX

Review of Related Literature

October 25-26, 2022

Humor defined as “the ability to be amused by something seen, heard, or thought about, sometimes causing you to smile or laugh, or the quality in something that causes such amusement,” (Cambridge Dictionary, 2021) is a “type of expression and writing representing the humorous aspect of life by adorning with jokes and wit” (Kilic, 2016, p. 945). A destructive humor—a negative kind of humor—is a factor of the perceived stress of teachers (Sahin & Gok, 2020). On the other hand, an affiliative humor or a constructive humor, reflects a “stress-buffering effect on distress” (Fritz, Russek, & Dillon, 2017, p. 845). This paper discusses constructive humor.

Although learners may encounter some areas of challenges in understanding humorous texts and even in employing reading skills towards comprehending of humorous texts (Ersanlia & Cakir, 2017), still some educators advocate its use as a pedagogical tool. The other challenges to using humor which include a lack of seriousness (Furqoon, n.d) and teacher’s disapproval in its usage (Furqoon, n.d., & Stroud, 2013), learners’ confidence issues (Stroud, 2013), group dynamics issues whilst humor is present, and learner’s difficulties in humor usage especially language learning (Furqoon, n.d.), do not bar teachers. It is because humor improves teaching-learning in manifold ways (Ali, Ali, Uddin, & Rahman, n.d.).

Different teachers and learners may have different ways of processing humor because of each individual background in the process. Such a process can be shaped through education (Ilosvay, 2019) which is believed to have positive impact in education (Hismanoglu, Esra, Turan, 2018) as reflected in various valid evidence and studies (Hackathorn, Garczynski, Blankmeyer, Tennial, & Solomon, 2011; Huss & Eastep, 2016; Kim & Park, 2017; Rafiee, Kassaian, & Dastjerdi, 2010; Ziyaeemehr, Kumar, & Faiz Abdullah, 2011). No wonder, its use in class textbooks is around average (Baleghizadeh & Ghoreishi, 2014). It is because humor influences (Ge & Gretzel, n.d.) both teachers and students alike in various aspects. As Chronicle (p. 14) emphasizes,

Most professors enjoy teaching in person because of the opportunity to interact with students, share our passion for a subject, and watch understanding dawn on their faces. Some of us, admittedly, enjoy the performative aspect. We feed off the energy in the room. We use it to fuel our own energetic communication. Many of us have a unique teaching persona — different from the person we are in a hallway conversation or in a department meeting. We *employ humor* [emphasis mine]. We vary our delivery to best effect. We pause. We raise our voices. We gesticulate for emphasis.

Impact of Humor

Humor is beneficial. It is a fundamental part of a teaching plan (Huss & Eastep, 2016) which enhances students in varied areas. It is an “effective tool in teaching and/or learning a second or foreign language (Bilokcuoglu & Debreli, 2018, p. 347).

The analysis of the different cases in the study (see Dionigi & Canestrari, XXX) proves that humor, a cognitive therapy, serves an integrated therapeutic tool. It is also believed to enhance the psychological (Unsal, Reyhan, & Aydemir, 2018; Ziyaeemehr, Kumar, & Faiz Abdullah, 2011), social (Unsal, Reyhan, & Aydemir, 2018; Ziyaeemehr, Kumar, & Faiz Abdullah, 2011), physical (Unsal, Reyhan, & Aydemir, 2018), and educational/instructional (Unsal, Reyhan, & Aydemir, 2018; Ziyaeemehr, Kumar, & Faiz Abdullah, 2011) aspects of the students. How humor contributes to the aforementioned aspects are discussed below.

Psychological Aspects. Humor motivates (Aboudan, 2009; Kilic, 2016; Mahdiloo & Izadpanah, 2017; Tong & Tsung, 2020.) and relaxes students (Hismanoglu, Esra, Turan, 2018; Huss & Eastep,

2016). It reduces tension (Aboudan, 2009; Azizinezhad & Hashemi, 2011; Tunnisa, Mahmud, & Salija, 2019), gives comfort, and makes students more enthusiastic (Tunnisa, Mahmud, & Salija, 2019). It is a factor to a higher attendance rate, and a minimized number of sleepy students in the class (Tunnisa, Mahmud, & Salija, 2019).

Humor does not only enhance motivation but also success (Aboudan, 2009), and lessens anxiety (Stroud, 2013). The higher the humor is, the less the stress is (Abel, 2002). XXXXX

Social Aspects. Humor “enlivens life, entertains people, positively contributes to social relationships, and improves the imagination of individuals” (Kilic, 2016, p. X). It is an important part of human social life and when applied by the teacher in a classroom affects students’ learning of English as a second language, (Nadeem, 2012) for instance. Humor improves teacher-students relationship (Aboudan, 2009).

Humor is considered a powerful connector between the teacher and his materials (Smith & Wortley, 2017). Also, humor plays a positive impact on the student-teacher interactions (Azizinezhad & Hashemi, 2011) ‘school without laughter is sheer torture’ (2001, p. 110, Medyes, cited in Bell).

Instructional Aspects. Humor is a basic unit of any language which influences learning (Rafiee, Kassaian, & Dastjerdi, 2010; Ziyaeemehr & Kumar, 2014) for it facilitates learning (Aboudan, 2009; Tong & Tsung, 2020). It enhances knowledge and comprehension level quiz items (Hackathorn, Garczynski, Blankmeyer, Tennial, & Solomon, 2011), and second language comprehension (Ziyaeemehr & Kumar, 2014). It improves linguistics (Kilic, 2016), vocabulary (Andarab, 2019; Kilic, 2016), listening comprehension (Rafiee, Kassaian, & Dastjerdi, 2010), reading comprehension (Ersanlia & Cakir, 2017) and writing (Smith & Wortley, 2017) skills. It heightens course and skills interests (Kilic, 2016), and receptive skills over productive skills (Baleghizadeh & Ghoreishi, 2014).

Humor improves retention (Azizinezhad & Hashemi, 2011; Stroud, 2013), enhances the willingness to participate (Stroud, 2013) and attention (Azizinezhad & Hashemi, 2011), and advances student’s creativity (Rafiee, Kassaian, & Dastjerdi, 2010). It energizes creative and critical thinking (Azizinezhad & Hashemi, 2011). Humor enhances one’s ability to recall class related materials at later dates (Smith & Wortley, 2017). Humorous activities in the classroom tend to improve the student’s comprehension of the most difficult topics in their grammar book (Abdulmajeed & Hameed, 2017).

Humor promotes a constructive attitude towards mistakes (Azizinezhad & Hashemi, 2011). It makes students feel good and impresses confidence to learn and communicate in English (Raghavendra, 2018). With humor, students “experience a higher level of engagement with course content” (Smith & Wortley, 2017, p. XX).

Researches show on the positive impact of humor, may it be songs, reading texts, and video clips. While humorous songs impact immediate and delayed recall test scores in studies (see Rafiee, Kassaian, & Dastjerdi, 2010), humorous elements integrated in texts of reading courses achieved the best results for effective reading (Ersanlia & Cakir, 2017). Also, results in the study of Neissari, Ashraf, and Ghorbani (2017) prove that humorous video clips facilitated English as a Foreign Language not only in idiom achievement, but also their positive disposition in the the classroom.

Humor is believed to maximize learning outcomes in college classrooms (Al-Duleimi & Aziz, 2016; Hackathorn, Garczynski, Blankmeyer, Tennial, & Solomon, 2011). It heightens learners’ academic success (Kilic, 2016). Given all the benefits of humor, learners prefer to have humor in the class not to the “general contention that Thai classrooms should command decorum and order” (Embalzado & Sajampun, 2020, p. XXX).

The How's of Humor

No significant difference in the gender (Andarab & Mutlu, 2019; Aydemir, 2018; Baleghizadeh & Ghoreishi, 2014; Kilic, 2016; Nienaber, Abrams, & Segrist, 2019), nor age (Andarab & Mutlu, 2019) is noted in adopting humor styles in the classroom; and in their judgement of humor (Baleghizadeh & Ghoreishi, 2014). Also, there was no significant difference among the opinions of the teachers in terms of the use of humor in secondary school Turkish courses (Kilic, 2016). There was no differences between teachers' educational level in the use of humor styles. (Andarab & Mutlu, 2019). Students, as well, do not differ significantly in their views on the use of humor in education with respect to gender and types of school they attend (Unsal, Reyhan, & Aydemir, 2018). What is perceived is its importance for students (Ziyaeemehr & Kumar, 2014).

Since humor is deemed as a teaching strategy, teachers and classroom creators need to use various strategies both to encourage and engage students in the learning process. Humor offers satisfaction both in learning and classroom environments (Stroud, 2013) and can be a good reference for teaching materials in teaching English (Jaroenkitnoworn, 2020). The uses of humor in teaching and learning and its implementation, and ideas of the students are further discussed below.

Teachers. Some teachers are not humor-oriented in their teaching. Rather they are more syllabus-oriented (Ziyaeemehr, Kumar, & Faiz Abdullah, 2011). It is because using humor is not in their trait nor are they creative in creating humor especially in teaching a language which is not their own (Ziyaeemehr, Kumar, & Faiz Abdullah, 2011). Given the challenges of incorporating humor in teaching, even pre-service English language teachers need to understand texts with humorous elements (Ersanlia & Cakir, 2017).

Also, teachers are suggested to have training on how to effectively incorporate and use humor as a teaching strategy, especially in online classes (Huss & Eastep, 2016). Humor is need even in online classes for it is a way to make the environment a little more lighthearted. Humor can help to create a comfortable learning environment for students and can also create mutual respect and openness between the instructor and the students and among students (McCabe, Sprute, and Underdown, 2017, p. 4). Thus, the use of humor has to be incorporated in the classes as education continues to develop gradually in both the online and traditional settings (Smith & Wortley, 2017).

Teachers need to be more creative. In reading lessons, for instance, teachers must have a variety of authentic humorous reading materials to develop students' "humorous text comprehension, their humour appreciation, their overall reading comprehension and to motivate them to the courses more" (Ersanlia & Cakir, 2017, p. XXX). In a study conducted by Tong and Tsung (2020, p. XX), teachers are advised "to consider incorporating humour strategically in their teaching, which may contribute to students' long-term desire for language learning."

Teacher's humor style must be good-natured and not hostile nor sarcastic (Nienaber, Abrams, & Segrist, 2019). They are not only to cater funny examples using humorous activities but also provide captivating cultural information (Kim & Park, 2017). Since teaching with humor enhances students' overall performance on examinations (Hackathorn, Garczynski, Blankmeyer, Tennial, & Solomon, 2011), it is suggested in the study of Smith and Wortley (2017) that humor needs to be appropriate and delivered as a part of the instructor's natural personality. With humor, students are able to create more (Smith & Wortley, 2017). Given this, teachers need to have more effort to come up to friendly, sincere, and cordial relations with student through humor, an element in enhancing both teaching and learning processes (Nadeem, 2012).

Students. Humorous teachers are appreciated by the students (Jiang & Dewaele, 2019, see in Tong & Tsung, 2020). For language students, there is a correlation between how they perceived second language learning and the importance and effects of humor (Ziyaeemehr & Kumar, 2014). Students show a high level of agreement on the positive role of humor in classroom teaching (Hismanoglu, Esra, Turan, 2018). No wonder, positive humor climate styles were given significance in schools (Sahin, 2018).

Humor makes students make content connection in traditional and web-based classes (Huss & Eastep, 2016). Humor significantly increases students' overall performance (Al-Duleimi & Aziz, 2016). It is because it offers greater enjoyment of the learning process (Aboudan, 2009).

Classrooms Environment. Instructors hardly set such an environment that could promote effective English language teaching/learning (Nadeem, 2012). Humor, in language classes for instance, enhances classroom atmosphere and increases enjoyment (Azizinezhad & Hashemi, 2011). It plays an important role in the EFL classroom (Hismanoglu, Esra, Turan, 2018).

Since humor, rather than conventional material, enhances positive learning to have motivation (Syafiq & Saleh, 2012) and also sets language learning class environment (Kilic, 2016; Rafiee, Kassaian, & Dastjerdi, 2010) it has to be integrated in the lessons. It is because its usage in the classroom has positive feedback (Stroud, 2013).

Furthermore, humor generates a relaxed and open atmosphere for language learning (Azizinezhad & Hashemi, 2011), a more enjoyable classroom (Huss & Eastep, 2016) for it improves classroom climate (Aboudan, 2009). Humor creates a more cozy and conducive learning environment (Hismanoglu, Esra, Turan, 2018). Thus "humor" ought to be used by language teachers to make their classrooms more inviting and conducive to learning (Aboudan, 2009).

Lessons. Humor needs to be "lesson-relevant, appropriate to students' linguistic level, and used in a careful manner" (Kim & Park, 2017). Humor is deemed to be considered "as one of the best ways of teaching English as a foreign language to prospective teachers and should also be taken as teaching aid like others" (Nadeem, 2012, p. xxxxx).

Humor and the Holy Bible

Humor "the feeling of amusement" (Collins English Dictionary, 2021) is equated to *laughter*. A study (see Hendriks, XXX) that emphasized that the Holy Bible stresses the significance of humor (laughter) as reflected in its verses (Prov 15:13, Prov 17:22, Ps 126:2, Jer 33:11). Below is a summary (see Hendriks, XXXX, p. XXX).

King Solomon quotes "a merry heart maketh a cheerful countenance: but by sorrow of the heart the spirit is broken (Prov 15:13). King Solomon further exclaims that "a merry heart doeth good like a medicine: but a broken spirit drieth the bones (Prov 17:22).

King David also encourages laughter. "Then was our mouth filled with laughter, and our tongue with singing: then said they among the heathen, The Lord hath done great things for them (Ps 126:2). Prophet Jeremiah also states,

The voice of joy, and the voice of gladness, the voice of the bridegroom, and the voice of the bride, the voice of them that shall say, Praise the Lord of hosts: for the Lord is good; for his mercy endureth for ever: and of them that shall bring the sacrifice of praise into the house of the Lord. For I will cause to return the captivity of the land, as at the first, saith the Lord (Jer 33:11)

The following research questions helped guide this exploration:

1. How did the participants define humor?
2. What is the impact of COVID-19 to their psychological, physiological, social, and intellectual life?
3. How did humor affect the psychological, physiological, social, and intellectual life amidst crisis?

Methodology

Research Design

This is qualitative research, a phenomenological study. Qualitative research deals on “how people interpret their experiences, how they construct their experiences, how they construct their worlds, and what meaning they attribute to their experience” (Merriam, 2009, p. 5). It focuses on “studying the meaning of people’s lives, under real-world conditions” (Yin, 2011, p. 7).

A phenomenological study is a study which seeks reality in individual’s narratives of their lived experiences of the phenomena (Moustakas, 1994) with the purpose to comprehend and describe in-depth participants’ phenomenon but come up at the essence of the participants’ lived experiences (Yuksel & Yildirim, 2015). Phenomenological study helps in the investigation of the lived experiences of the participant—the role of humor amidst their life’s crisis. A phenomenological study specifically, this study “describes the meaning for several individuals of their lived experiences of a concept or a phenomenon” (Creswell, 2007, p. 57).

Research Setting and Participants

This study was conducted in a private university in West Indonesia during the second semester of the school year 2021-2022. There were eleven participants who were recruited through purposively sampling. The criteria had to be a (a) university student, and (b) has experienced schooling for more than a year during the Covid-19. These eleven participants agreed to voluntarily participate in the study.

Data Gathering Procedures

This study employed written interviews. Before the interviews, the researchers discussed with the participants what the interview would be all about. Enough information was given to the participants to prepare them for the questions.

Also, the participants were encouraged to share their experiences—on how humor has shaped better learning despite the pandemic when everyone has to face many challenges.

Ethical Considerations

Ethical considerations were taken into account in this study. Informed consent, signed by each participant after discussion and clarifications regarding the study, were signed. The recruited participants needed to have complete information about the study they were participating in—no coercion but willingness to participate in the study from the onset to the end of the study (Miles, 2014). Furthermore, information was guarded and individuals under study were not identifiable as a regard to participants’ privacy, confidentiality, and anonymity (Miles, 2014).

Data Analysis

Participants wrote their answers to the open-ended questions. During the gathering of data, both facial expressions and gestures were taken into account. Considering the need of immersion in a qualitative research, researcher entered into the participants' world and sought participants' perspective (Creswell, 2009). The answers to the open-ended questions were translated. Recurring categories were grouped into themes.

Findings

Findings of this study state that humor plays an important role in the learning process of the students especially this time when situations are difficult due to COVID. It includes learners' retention, willingness to class participation, enjoyment in classroom activities, and reducing of anxiety which eventually cater to successful language.

Conclusion

Findings support that idea that learners' retention, willingness to class participation, enjoyment in classroom activities, and reducing of anxiety which eventually cater to successful language are influenced by humor used in the classroom. It is therefore important for teachers to incorporate humor in the classroom to facilitate easier learning.

References

- [1] Abdulmajeed, R. K., & Hameed, S. K. (2017). Using a linguistic theory of humour in teaching English grammar. *English Language Teaching*, 10(2), 40-47.
- [2] Abel, M. H. (2002). Humor, stress, and coping strategies. *Humor*, 15(4), 365– 381
- [3] Aboudan, R. (2009). Laugh and learn: Humor and learning a second language. *International Journal of Arts and Sciences*, 3(3), 90- 99.
- [4] Alaklabi, M., Jamilah Alaklabi, & Almuhlafi, A. (2021). Impacts of COVID-19 on International Students in the U.S. *Higher Education Studies*, 11(3), 37-42
- [5] Al-Duleimi, A.D.D., & Aziz, R. N. (2016). Humour as EFL learning-teaching strategy. *Journal of Education and Practice*, 7(10), 105-115.
- [6] Ali, S.S., Ali, M. I. A., & Rahman, R. U. G. (n.d.) Appropriate use of humor in English language teaching: A case study of KUST (Kohat University of Science and Technology), Kohat. *Abasyn Journal of Social Sciences*, 8(1), 127-142.
- [7] Andarab, M. S. (2019). The effect of humor-integrated pictures using quizlet on vocabulary learning of EFL learners. *Journal of Curriculum and Teaching*, 8(2), 24-31. doi:10.5430/jct.v8n2p24
- [8] Andarab, M. S., & Mutlu, A. (2019). Using humor in language classrooms: Greasing the wheels or putting a spanner in the works? A study on humor styles of Turkish EFL instructors. *Eurasian Journal of Applied Linguistics*, 5(1), 23-39. doi:10.32601/ejal.543776
- [9] Aydemir, M. (2018). Humour-based learning: From the lens of adolescents. *REMIE – Multidisciplinary Journal of Educational Research*, 8(1), 29-55. <http://dx.doi.org/10.17583/remie.2018.3169>
- [10] Azizinezhad, M., & Hashemi, M. (2011). Humour: A pedagogical tool for language learners. *Procedia - Social and Behavioral Sciences*, 30, 2093–2098.
- [11] Baleghizadeh, S., & Ghoreishi, A. (2014). An evaluation of the use of humor in ELT coursebooks. *International Journal of Languages and Literatures*, 2(2), 187-201.

- [12]Bell, N. D (2009). Learning about and through humor in the second language classroom. *Language Teaching Research*, 13(3), 241–258.
- [13]Bennett, H. J. (2003). Humor in medicine. *Southern Medicine Journal*, 96(12), 1257-1261.
- [14]Bilokcuoglu, H., & Debreli, E. (2018). Use of humor in language classes: An effective or affective filter?" *Journal of Language and Linguistic Studies*, 14(3), 347-359.
- [15]Cambridge Dictionary (2021). Retrieved from <https://dictionary.cambridge.org/dictionary/english/humor>
- [16]Collins Dictionary (2021). Retrieved from <https://www.collinsdictionary.com/dictionary/english/laughter>
- [17]Creswell, J.W. (2009). *Research design: Qualitative, quantitative, and mixed methods approaches* (3rd ed.). Thousand Oaks, CA: Sage Publications, Inc.
- [18]Dionigi, A., & Canestrari, C. (XX). The use of humour by therapists and clients in cognitive therapy. *European Journal of Humour Research* 6 (3) 50–67.
- [19]Embalzado, H. & Sajampun, P. (2020). Perspectives of students in Thailand on the use of humor in university classroom. *International Education Studies*, 13(4), 17-26. doi:10.5539/ies.v13n4p17
- [20]Ersanlia, C. Y., & Cakir, A. (2017). Developing pre-service English language teachers' comprehension of texts with humorous elements. *Journal of Language and Linguistic Studies*, 13(1), 123-145
- [21]Fritz, H. L., Russek, L. N., & Dillon, M. M. (2017). Humor use moderates the relation of stressful life events with psychological distress. *Personality and Social Psychology Bulletin*, 43(6), 845–859 (p. 845, abstract)
- [22]Furqoon, M. Mufti Al (n.d.). The integration of humor in ELT classroom instruction: Solutions to the barriers.
- [23]Ge, J., & Gretzel, U. (2018). Impact of humor on firm-initiated social media conversations. *Information Technology and Tourism*. doi 10.1007/s40558-017-0097-0
- [24]Hackathorn, J., Garczynski, A. M., Blankmeyer, K., Tennial, R.D., & Solomon, E. D. (2011). All kidding aside: Humor increases learning at knowledge and comprehension levels. *Journal of the Scholarship of Teaching and Learning*, 11(4), 116 – 123.
- [25]Hismanoglu, M., Esra, Y., & Turan, Y. Z. (2018). Turkish EFL learners' perceptions on teachers' using humor in the EFL classroom. *International Journal of Languages Education and Teaching*, 6(2), 284-294 (Check again for the names of the editors)
- [26]Huss, J., & Eastep, S. (2016). The attitudes of university faculty toward humor as a pedagogical tool: Can we take a joke? *Journal of Inquiry & Action in Education*, 8(1), 39-65.
- [27]Hussein, A. T., & Aljamili, L. N. (2020). Covid-19 humor in Jordanian social media: A socio-semiotic approach. *Heliyon*, 6. 1-12.
- [28]Ilosvay, K. (2019). An analysis of communicative interactions in school: Learning from layered messages in humor. *Journal of Instructional Research*, 8(1), 39-50
- [29]Jaroenkitboworn, K. (2020). Funny English in the digital world. *Language Education and Acquisition Research Network Journal*, 13(1), 39-61.
- [30]Kasradze, T., & Zarnadze, N. (2021). Learning Losses Caused by the Covid-19 Pandemic - A Significant Threat to Economic Development. *European Journal of Education*, 4(1), 92-104.
- [31]Kilic, Y. (2016). The views of Turkish teachers on the use of humor in secondary school. *Academic Journals*, 11(9), 945-956. doi:10.5897/ERR2016.2785
- [32]Kim, S., & Park, S. H. (2017). Humor in the language classroom: A review of the literature. *Primary English Education*, 23(4), 241-262. <http://dx.doi.org/10.25231/pee.2017.23.4.241>
- [33]Mahdiloo, A., & Izadpanah, S. (2017). The impact of humorous movie clips on better learning of English language vocabulary. *International Journal of Research in English Education*, 2(2), 16-30.

- [34]McCabe, C., Sprute, K., & Underdown, K. (2017). Laughter to learning: How humor can build relationships and increase learning in the online classroom. *Journal of Instructional Research*, 6, 4-7.
- [35]Mckibbin, W. & Fernando, R. (2020). The economic impact of COVID-19. CEPR Press. UK, London.
- [36]Merriam, S. B. (2009). Qualitative research: A guide to design and implementation. San Francisco, CA: John Wiley.
- [37]Miles, M. B., Huberman, A. M., & Saldanya, J. (2014). *Qualitative data analysis: A method sourcebook* (3rd ed.). Thousand Oaks, CA: Sage.
- [38]Moustakas, C. (1994). *Phenomenological research methods*. Thousand Oaks, CA: Sage
- [39]Nadeem, M. (2012). Teaching with humor: A benevolent teaching technique for second language learners in teacher education (A reflective study). *International Journal of English and Literature*, 2(4), 89-96.
- [40]Neissari, M., Ashraf, H., & Ghorbani, M. R. (2017). Humorous videos and idiom achievement: Some pedagogical considerations for EFL learners. *Iranian Journal of Language Teaching Research* 5(3), 109-127.
- [41]Nienaber, K., Abrams, G., & Segrist, D. (2019). The funny thing is, instructor humor style affects likelihood of student engagement. *Journal of the Scholarship of Teaching and Learning*, 19(5), 53-60. doi: 10.14434/josotl.v19i5.24296
- [42]Olah, A. R. & Ford, T. E. (2021). Humor styles predict emotional and behavioral responses to COVID-19. *Humor*, 34(2): 177–199. <https://doi.org/10.1515/humor-2021-0009>
- [43]Olawunmi, K., & Nwamaka Osakwe, G. (2021). Covid-19: Ensuring continuity of learning during scholastic disruption in tertiary institutions in Nigeria. *World Journal of Education*, 11(3), 30-38. doi:10.5430/wje.v11n3p30
- [44]Rafiee, M., Kassaian, Z., & Dastjerdi, H. V. (2010). The application of humorous song in EFL classrooms and its effects on listening comprehension. *English Language Teaching*, 3(4), 100-108.
- [45]Raghavendra, C. (2018). Humour in English language communication skills (ELCS) training. *Language in India*, 18(6), 156-159.
- [46]Şahin, A., (2018). Humor climate of the primary schools. *European Journal of Education Studies*, 4(1), 95-117. doi:10.5281/zenodo.1155890
- [47]Şahin, A., & Gök, R. (2020). The effects of the schools' humor climates on perceived stress levels of the teachers. *International Journal of Contemporary Educational Research*, 7(1), 71-84.
- [48]Smith, V. D., & Wortley, A. (2017). Everyone's a comedian." No really, they are: Using humor in the online and traditional classroom. *Journal of Instructional Research*, 6, 18-23
- [49]Stroud, R. (2013). The laughing EFL classroom: Potential benefits and barriers. *English Language Teaching*, 6(10), 72-85.
- [50]Syafiq, A. N., & Saleh, M. (2012). Humor English teaching material for improving students' speaking skill with high and low learning motivation. *Language Circle Journal of Language and Literature*, 7(1), 45-54.
- [51]Toanoglou, M., Chemli, S., & Valeri, M. (2021). The organizational impact of Covid-19 crisis on travel perceived risk across four continents. *Journal of Organization Change Management*, 1-16. doi 10.1108/JOCM-12-2020-0369
- [52]Tong, P. & Tsung, L. (2020). Humour strategies in teaching Chinese as second language classrooms. *System*, 91, <https://doi.org/10.1016/j.system.2020.102245>
- [53]Tunnisa, D., Mahmud, M., & Salija, K. (2019). Investigating teachers' sense of humor in Indonesia. *International Journal of Language Education*, 3(2), 99-114.

- [54]Unsal, S., Reyhan, A., & Aydemir, M. (2018). Humour-based learning: From the lens of adolescents. *Multidisciplinary Journal of Educational Research*, 8(1), 29-55. doi: 10.17583/remie.2018.3169
- [55]Yin, R. K. (2011). *Qualitative research from start to finish*. New York, NY: The Guilford Press.
- [56]Yuksel, P., & Yildirim, S. (2015). Theoretical frameworks, methods, and procedures for conducting phenomenological studies in educational settings. *Turkish Online Journal of Qualitative Inquiry*, 6(1), 1-20. Retrieved from https://www.researchgate.net/profile/Soner_Yildirim/publication/271833455_Theoretical_Frameworks_Methods_and_Procedures_for_Conducting_Phenomenological_Studies_in_Educational_Settings/links/54d330400cf2b0c6146d0a88/Theoretical-Frameworks-Methods-and-Procedures-for-Conducting-Phenomenological-Studies-in-Educational-Settings.pdf?origin=publication_detail
- [57]Ziyaeemehr, A., & Kumar, V. (2014). The relationship between instructor humor orientation and students' report on second language learning. *International Journal of Instruction*, 7(1), 91-106.
- [58]Ziyaeemehr, A., Kumar, A., & Faiz Abdullah, M. S. (2011). Use and non-use of humor in academic ESL classrooms. *English Language Teaching*, 4(3), 111-119. doi:10.5539/elt.v4n3p111

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Challenges with Online Teaching Internship and Coping Strategies: A Phenomenological Study of Lived Experience of Student-Teachers During the Covid-19 Pandemic

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Abstract: The educational landscape was severely impacted by the COVID-19 outbreak, resulting in an unexpected shift from face-to-face instruction to screen-to-screen teaching and learning. This shift caught millions of teachers and students unprepared, including student-teachers who expected a normal internship experience. Many of them were prepared and trained to teach face-to-face in the classroom, but, in their internship, they were required to teach online. This phenomenological study was carried out to understand the nature of challenges faced by nine student-teachers who completed their teaching internship during the pandemic. The data, collected from online open-ended questions and online follow-up interviews, were analyzed thematically. The student-teachers described a variety of difficulties they encountered. The thematic analysis of the data identified five challenges in the following areas: technological skills, internet connection, classroom interaction, classroom management, and preparedness for online teaching. The analysis identified three strategies for dealing with the challenges—receiving support, willingness to learn new things, and positive response to challenges.

Keywords: *COVID-19 pandemic, student-teachers, internship, online teaching*

Introduction

Teaching practice for student-teachers is a fundamental requirement in any strong teacher-preparation educational program. The student-teachers need an opportunity to practice their teaching skills in a real-life setting to become effective teachers (Quinco-Cadosales, 2018). This effectiveness is nurtured when they have the venue to develop relevant personal and professional competencies and provide opportunities to apply their knowledge about children's development, implement curriculum content, and enhance teaching skills (Johnson et al. 2017; NAEYC 2009). In addition, the internship helps the student-teachers to discover their strengths and weaknesses in classroom teaching and provides opportunities to address their shortcomings and enrich their strengths. In other words, teaching practice is critical because it ensures that student-teachers are adequately prepared for their future careers. It is the culminating phase of becoming a teacher (Anderson & Stillman 2011). It is not surprising, therefore, that any good teacher-preparation program makes teaching internships in an actual setting a requirement for its student-teachers.

The Context of the Study

The education majors at a faith-based international university in Thailand take the internship in their senior year after taking all the content and methods courses. The internship lasts for one semester. Every student-teacher is assigned to a class or a grade at an elementary school. The student-teacher works closely with the homeroom teacher who is called the cooperating teacher. The cooperating teacher supervises and guides the student-teacher. The cooperating teacher works closely with the internship supervisor during the internship, keeping the internship supervisor informed of the progress of the student-teacher. The cooperating teacher and the internship supervisor will assess the performance of the student-teachers.

It was under the above context that several student-teachers began their internship during the pandemic. Unfortunately, instead of teaching face-to-face in a physical classroom, the pandemic forced the student-teachers to teach screen-to-screen. These students were trained for on-site instruction, not online teaching. The demand to shift to online instruction was very challenging for the

student-teachers. With the myriad of difficult tasks that the student-teachers had to perform, the challenge of effectively delivering the lesson online was at the forefront.

The Purpose of the Study

In recognition of the difficult time associated with the online teaching internship, the researchers wanted to find out the problems the student-teachers faced and the strategies they employed to deal with them. This desire led to this phenomenological investigation, which aimed to understand the experiences of the student-teachers while they did their teaching practice and to identify the challenges posed by the Covid-19 pandemic and their coping strategies. This study asked two questions: First, what were the challenges the student-teachers faced during their online teaching internship? Second, what strategies did they employ in dealing with those challenges?

The Significance of the Study

The insights obtained from the study of the challenges student-teachers faced in teaching online might inform the revision of the teaching curriculum so that future student-teachers will be well prepared for both on-site and online teaching. The findings can also potentially guide teachers and mentors on how they can better support student-teachers during their internship. In addition, future student-teachers can benefit from the experience of these students as they realize the challenges with online teaching and the strategies to deal with them.

Literature Review

The primary goal of a teaching internship is to prepare student-teachers to become knowledgeable and successful educators. Consequently, practical field experience is one of the most significant components of student education programs (Greve et al., 2020) because it is a venue where student-teachers can practice teaching in a real school context. It can significantly shape how student-teachers view teaching and learning (Gustafson and Rowell, 1995).

The COVID-19 pandemic disrupted education at an unprecedented scale all over the globe, including the educational system (Wajdi et al., 2020; UNESCO, 2020). The shift from face-to-face instruction to online classes severely affected teaching internships. Student-teachers who were trained to teach face-to-face classes had to teach in an online mode with no prior training for such instruction. Albrahim (2020) maintained that online teachers need skills in six categories for effective online teaching and learning –pedagogy, content, design, technology, management and institutional, and social and communication.

During the pandemic, both synchronous and asynchronous teaching and learning were carried out through various platforms (Sepulveda- Escobar et al., 2020). Moodle was widely used for teaching and learning (Osman 2020). Unfortunately, many student-teachers did not have adequate preparation for online teaching (Evagorou and Nisiforou, 2020) and some expressed negative feelings about their lack of online teaching training (Gonzalez-Calvo et al., 2020). However, Kim (2020) maintained that student-teachers should be allowed to teach online and reflect on their teaching to develop better.

To make matters worse, even the teachers who served as their mentors struggled to adapt to the new teaching-learning delivery (Marcum-Dietrich et al., 2020). They faced many challenges, including rolling blackouts, inadequate internet access, insufficient computer and technology skills, difficult classroom management, lack of preparation, and adjusting to a new personal work schedule (Capacio et al., 2021). Computers and other devices at home are problematic even in developing countries (Sahu, 2020). In addition, it was challenging to maintain student equity, including internet access (la Velle et al., 2020; Xue et al., 2020). The sudden shift from face-to-face classes to online learning was challenging for teachers, students, and families due to several lacks—finance, skills, technology infrastructure, internet access, and educational resources (Basilaia & Kvavadze, 2020). Singh et al. (2020) showed that, while students appreciated the use of online learning during the pandemic, half believed that the traditional classroom setting was more effective than the online learning platform did.

While teachers struggled to cope with the demand for online teaching, not all students were technologically savvy. Checking on students' needs for support with the use of technology for studying, especially those less comfortable with technology, was one of the effective strategies that instructors and teacher educators can do to reduce student stress and anxiety (Snelling & Fingal, 2020). Besides all the concerns with technology, there was the additional worry regarding the emotional and mental health of students. Teachers needed to think not only of their students' academics but also of their emotional needs throughout these challenging moments (Anderson, 2020). In fact, Morgan (2020) observed that consistently monitoring pupils' emotions significantly impacts their learning.

According to Farnell et al. (2021), most higher education institutions reported that the teaching and learning process in the online form gave positive results when technical support was provided, and training was provided. In fact, many perceive the pandemic as an opportunity to develop new online pedagogy (La Velle et al., 2020). Several factors were cited as reasons for positive results—strong support system and GRIT, which stands for growth mindset, resilience, integrity and tenacity (Iradel, Perez & Quinco-Cadosales, 2021). The current study also discovered that the student teachers appreciated how approachable the teacher educator was in giving them "more control of learning," which helped them maintain group participation and self-regulation (Morgan, 2020).

Methodology

Participants

Nine student-teachers at a faith-based international university in Thailand participated in this study: five from Myanmar, one from Malaysia, one from the Philippines, one from China, and one from Thailand. They were all in the final year of their four-year undergraduate studies and they all completed their teaching internship during the pandemic. Purposeful sampling was used in this study to ensure that the participants would inform the research question.

The researchers contacted pre-identified participants regarding the study. The purpose of the study was explained to them individually. They were made aware that their participation in the study was strictly voluntary and that any decision not to participate in the study or withdraw from the study at any point in time would not affect them. They were assured of the protection of their identities and the security of their responses. Those who took part in the study showed their consent from their willingness to respond to open-ended questions online. They also took part in a focus group interview that took place virtually. The main questions asked were as follows:

1. How was it like to be a student-teacher during the pandemic?
2. What challenges did you experience during your teaching practice?
3. How did you overcome the challenges?
4. What meaningful learning experiences did you have during your teaching practice?
5. What would you suggest to teachers and other students to prepare for online teaching practice?

The researchers employed the thematic approach in the cross-case analysis of the data. This analysis involved examining and identifying themes within the data that were important to describe the challenges and the coping strategies. Furthermore, to enhance the credibility and validity of this study, two people familiar with qualitative research were requested to review the research study.

Findings

The answers to the research questions are divided into two categories based on the interview questions. The categories are *challenges with online teaching* and *the strategies employed in dealing with the challenges*.

In the category of challenges, several themes were identified. The first one is the lack of technological skills that were required for online teaching. Student-Teacher 6 admitted that teaching

online during the internship was difficult because she had little familiarity with the technology required for online learning. She said, "It is hard because I know little technology...." She was not alone. Student-Teacher 2 struggled with technology as well. She admitted: "In the beginning, I struggled to effectively use technology to facilitate the teaching with my online students. I got easily distracted because of the online tools and functions glitches." Based on the experience of Student Teacher 6 and Student-Teacher 2, lacking the appropriate technological skills contributed to the difficulty because online teaching requires the strong support of technology. Student-Teacher 6 further explained:

...Moreover, student-teachers must search for more resources online or prepare to use different apps or the web. For example, [my university] uses only zoom and Teams, but when we arrived, they used Google Meetings and Line. We didn't know how to use those well. Therefore, it was a bit less effective when we first taught.

One of the keys to doing well with online teaching is given by Student-Teacher 5. She stated: "...If you are prepared well with the online teaching platform such as Zoom etc., you would be more confident in delivering your lesson." In other words, being familiar with online teaching platforms will help the student-teachers to be more confident in delivering their lessons because they know how to use the platform to meet the objectives of teaching.

The second theme is the problem with an internet connection, which is a fundamental infrastructure for online teaching. Student-Teacher 2 described the difficulty with an unreliable internet connection: "Internet connection frequently posed a problem. Several times, I was disconnected from the students due to a weak internet connection. This disrupts the flow of my teaching. I have to go back and re-explain the instruction of the lesson." As Student-Teacher 2 shows, an unstable internet connection is costly to online teaching. Disconnection disrupts the flow of the class. The time taken to reestablish connection and repeat instruction takes away precious time from teaching and learning. Weak internet connection is not only costly because of the disruption and time taken from teaching but also because of the personal financial cost to the student-teachers. One of them paid for her own connection for greater stability. Student-Teacher 6 explained: "The erratic Wi-Fi connection caused me to pay data for my internet connection, while others don't have the choice to go elsewhere and must go without if their service is disrupted." While the choice for a more reliable connection is available, it is sometimes only available at a personal cost to the student-teachers. For some, the option of a more reliable internet connection was not even available, causing major disruption to teaching and learning when the teacher and students were disconnected from each other.

The third theme is hampered classroom interaction. The physical absence between the teacher and the students made classroom interaction challenging. Student-Teacher 8 compared face-to-face classes and online ones. She said, "...teaching face-to-face classes has more interaction, which provides more opportunities to discuss everything than online classes." She concluded that there was less opportunity to discuss in the latter. Student-Teacher 9 made the same observation. He said, "...Students... are less comfortable contributing verbally to class discussion." While both Student-Teacher 8 and Student-Teacher 9 observed reduced opportunities and willingness for discussion in online classes, Student-Teacher 1 experienced the challenges of explaining lessons or assignments to younger students. He said: "Teaching remotely is challenging, especially when they are younger students. It is tough when they do not understand. I have to show slowly how the assignment should be done." He discovered that with younger students, physical absence made it challenging for him to explain assignments to those who did not understand the expected tasks. Students struggled to feel connected with the teacher via computer screens. Similarly, Student-Teacher 3 reported that she "...couldn't interact with students effectively" because she could not communicate with them "directly". This problem was also experienced by other student-teachers:

Student-teacher 4: ...Although I can communicate with my students online, it is not as effective as I have them face-to-face. ...I could not get to know them personally as I could have them in the classroom.

Student-teacher 7: I believe my interaction with my students may significantly influence learning and interest in their studies. ...I could not interact with them and help them with their assignment individually.

Student-teacher 3: ...I struggle with effective communication. I could not do face-to-face activities, which were supposed to be more effective for them.

As shown by the statements of the student-teachers above, one of the biggest challenges with online learning is the replacement of face-to-face interaction with screen-to-screen interaction, which the student-teachers found restrictive in many ways.

The fourth theme is difficult classroom management, which is closely related to the above theme, hampered interaction. The student-teachers had difficulty encouraging student engagement, since they could not observe the reactions of all students at the same time. They struggle to manage the learners' behaviors because the student-teachers could not control the environment of the students, which could have been managed much more efficiently in a face-to-face class. Student-Teacher 1 described the difficulty: "It is rather difficult to manage the online classroom for the younger students. They often got distracted by the surrounding things. Most of the learning environment at home is not conducive for learning." In his observation, his inability to control the student's environment made teaching difficult, especially when there was a lot of distraction at home or wherever the student was physically located. Student-Teacher 7 agreed. She said she "...had a hard time handling the misbehaved students." For Student-Teacher 2, there was a heaven-and-earth difference in managing "...a real physical classroom where [she has] control over what was happening in the classroom."

The fifth theme is the lack of preparedness for online teaching. Not having the appropriate training to prepare for online classes, the student-teachers found it challenging to plan and implement meaningful online lessons. Student-Teacher 1 described his problem: "I struggle in making the lesson plan that attractive and think about what would be the best activity that would fit in an online class." He understood the need to make the lesson attractive and to keep the students engaged, but how that could be achieved was difficult for him. Along the same note, Student-Teacher 5 recognized the need to plan a class that encouraged interaction. She said: "I need to be creative to keep the students interacting with the classes. ...in Online Teaching, I experience disconnection from students. I need to be more active and entirely focused while teaching." The nature of online learning is very isolating. Extended lack of contact with others could lead to fatigue. Student-Teacher 3 recognized this and felt that class activities should encourage students "...to remain present, focused, and energized during a class session." Other student-teachers reported similar struggles. Student-Teacher 4 said that he spent "more time preparing the lessons and activities for online teaching. The lesson has to be well-prepared because it needs to integrate with online teaching." Student-Teacher 7 and Student-Teacher 8 faced the same problem. Student Teacher 7 said she had to make "...many preparations for the lessons" while Student-Teacher 8 said it "took a huge...time to learn and be confident in implementing [teaching]."

A summary of the themes under challenges is reported in Table 1.

Table 1. *Summary of Findings of Challenges*

Themes	Code	Explanation
Technological Skills	Lack of skills	<ul style="list-style-type: none"> • little familiarity with the required technology • new online tools and applications to learn
Internet Connection	Erratic and Unstable Connection	<ul style="list-style-type: none"> • disruptive disconnection • time-consuming to reconnect and re-explained
Classroom Interaction	Hampered interaction	<ul style="list-style-type: none"> • harder to communicate effectively • takes more time to explain, especially to younger students • face-to-face interaction replaced by screen-to-screen
Classroom Management	Lack of control	<ul style="list-style-type: none"> • student environment can't be controlled • difficult to address misbehavior
Preparedness for online teaching	Lack of preparedness	<ul style="list-style-type: none"> • not knowing how to plan for online classes • difficulty in planning engaging online activities

In the category of strategies for dealing with the challenges, three themes were identified. The first one was the strong support received during the internship. Student-Teacher 5 explained:

... doing an internship during the pandemic is hard. Things are going up and down due to the Covid situation. It is quite pressuring both the students and teachers and the student's teachers. However, my teacher and supervisor have been there for me, encouraging and helping me with difficult issues.

Student-Teacher 5 acknowledged the negative impact of the pandemic on her internship experience and expressed appreciation for the steady support in the form of encouragement and help with difficult issues from both her cooperating teacher and the internship supervisor. Similarly, Student-Teacher 6 highlighted the help she received from her cooperating teacher. She explained: "...talking with my homeroom instructor [the cooperating teacher] helped me deal with the difficulties. She provided me with several ideas for my class and activities that I could plan for. As a result, being prepared made it easier for me to handle stress." For Student-Teacher 6, it was the

support and guidance of her cooperating teacher that made it easier for her to be prepared, and when she was prepared, she could handle stress better. Student-Teacher 7 had a similar experience. She detailed: "Furthermore, many reliable websites are teaching that my homeroom teacher suggested I look for, such as materials, videos, and activities. It helped me to be able to prepare well, and students understood the lesson and enjoyed doing the exercises." Just like Student-Teacher 6, Student-Teacher 7 found the guidance of her cooperating teacher very helpful in enabling her to prepare well for her classes.

The second theme is the willingness to learn. Even though the student-teachers were not prepared to teach online, and the process of learning was challenging, they were willing to learn and work hard to do well in their internship. Student-Teacher 6 described her experience:

Moreover, student-teachers must search for more resources online or prepare to use different apps or the web. For example, [my university] uses only zoom and Teams, but when we arrived, they used Google Meetings and Line. We didn't know how to use those well. Therefore, it was a bit less effective when we first taught.

Student-Teacher 6 pointed to the importance of searching for more resources online and being prepared to use different applications. She was unfamiliar with the platform used by the school where she was doing her internship, but eventually, she became skillful despite the difficult start. Student-Teacher 7 reported a similar approach:

The meaningful learning experiences I have during my teaching would be learning something new that I have never tried before. For example, at [the] school, teachers will use Google Classroom, an online tool to set up the assignments and grade students' works, and it is a handy tool for online teaching. Furthermore, many reliable websites teach that my homeroom teacher suggested I look for, such as materials, videos, and activities. It helped me to prepare well, and students understood the lesson and enjoyed doing the exercises.

Student-Teacher 7 learned to use online tools she had never used before and learned it well. For her, it was a meaningful learning experience. Some of them did not only learn new things but improved their effectiveness in certain areas. Student-Teacher 3 "... gained communication, interpersonal, problem-solving, management, and ethical skills during [her] teaching. She said, "I also create more effective online activities, games, and quizzes for their teaching." Student-Teacher 3 responded well to the demand of online teaching by improving her skills in many areas. Likewise, when Student-Teacher 2 realized that students could only see her face in online teaching, she learned to explain things in different ways. She narrated, "...I used many illustrations to explain one topic. I used pictures, flashcards, and video clips to clarify the topic since the students could only see my face. I also used many illustrations to make it easier for students with all levels to understand." The challenges of online teaching inspired her to find different ways and resources to help her students understand.

The third theme is the positive response to the difficulty. Despite the challenges, the student-teachers looked at them as an opportunity to improve themselves by learning new skills. Several of the student-teachers showed a positive attitude towards the challenges of online teaching. For Student-Teacher 3, the challenging online teaching helped improve her skills. She said, "... I gained communication, interpersonal, problem-solving, management.... skills during my teaching. I also create more effective online activities, games, and quizzes for their teaching." Student-Teacher 5 and Student-Teacher 7 echoed the same positive attitude. Student-Teacher 5 acknowledged that it was hard to teach online, but there were advantages. She said, " However, due to the pandemic, I got a chance to experience face-to-face and online teaching." While Student-Teacher 5 credited the pandemic for being able to experience both onsite and online teaching, Student-Teacher 7

appreciated the opportunity to learn novel ways of doing things. She said, "The meaningful learning experiences I have during my teaching would be learning something new that I have never tried before." A summary of the themes under the strategies to deal with challenges is reported in Table 2.

Table 2. *Summary of the Themes of Strategies to Deal with Challenges*

Themes	Code	Explanation
Support	Guidance and Assistance	<ul style="list-style-type: none"> • guidance and assistance from the cooperating teachers • encouragement from the internship supervisor
Willingness to Learn	Learning New Things	<ul style="list-style-type: none"> • learning how to use new online tools • learning how to teach online
Positive Response	Learning opportunity	<ul style="list-style-type: none"> • appreciate the learning of new things • challenges lead to improvement

Discussion

The findings of the study concur with those of other studies regarding the challenges with online teaching—lack of technological skills (Basilaia & Kvavadze, 2020); unstable internet connection (Capacio et al., 2021); hampered interaction (Albrahim, 2020); difficult classroom management (Capacio et al., 2021), and lack of preparation for online teaching (Evagorou and Nisiforou, 2020; Gonzalez-Calvo et al., 2020). The findings from this study can guide teacher-trainers and curriculum developers in designing a program that can better prepare students to teach effectively in both face-to-face and screen-to-screen settings.

In dealing with the challenging online teaching, strong support received from the cooperating teacher and the internship supervisor was a big help. For some of them, the help they received was instrumental in helping them to be better prepared, which led to reduced stress. This echoes the observation of Iradel, Perez & Quinco-Cadosales (2021). The student-teachers' willingness to learn new things and positive response to challenging situations were two manifestations of GRIT—growth mindset, resilience, integrity and tenacity (Iradel, Perez & Quinco-Cadosales (2021). This finding can guide cooperating teachers and internship coordinator in their efforts to provide strong support to student-teachers in challenging situations.

Recommendations

A careful examination of the challenges student-teachers faced in online learning and their coping strategies showed that teacher-training programs or a well-designed curriculum can minimize unnecessary challenges. The following are recommended to teacher-training programs and those involve in the supervision of student-teachers in their internship:

- To include the following in the curricular revision of the teacher-training program:
 - Methods that prioritize engagement in online classes
 - Development of robust technology and IT skills
- To ensure adequate preparation for online teaching by making online teaching as part of the requirements for all the methods courses.

- To raise the awareness of the cooperating teachers regarding the impact of their supervision and guidance on the student-teachers.
- To encourage teachers and teacher-educators to adopt a student-centered approach to encourage students to collaborate with others, share ideas, and continue their online learning.

Limitations and Implications for Future Research

As a qualitative study, this research had some limitations. First, the student-teachers may be limited by circumstances or state of mind to reflect deeply on their online internship. Second, the student-teachers may not be willing to talk about certain parts of their experiences. Finally, the findings of this study cannot be generalized to other similar entities.

There are at least two implications for future research. First, the study on coping mechanisms can be expanded to include more participants. Such an investigation might lead to new themes. Second, the characteristics of encouraging cooperating teachers can be investigated to identify the attributes of empowering cooperating teachers. The result of the study could enable the internship supervisor to assign student-teachers to the appropriate cooperating teachers.

Conclusion

This study examined student-teachers' experiences with teaching internships during the COVID-19 pandemic. The experiences shared provide valuable perspectives on the challenges they faced and their coping strategies. This study observed that the student-teachers succeeded in their internship despite the unprecedented difficulty in the teaching internship. Ultimately, their challenges turned into a blessing when student-teachers allowed challenges to strengthen their resilience and the determination to survive and thrive in online teaching.

References

- [1] Albrahim, F. A. (2020). Online teaching skills and competencies. *TOJET: The Turkish Online Journal of Educational Technology*, 19(1), 9–20.
- [2] Anderson & Stillman (2011). Student Teaching for a Specialized View of Professional Practice? Opportunities to Learn in and for Urban, High-Needs Schools. *Journal of Teacher Education* 62(5):446-464. DOI:10.1177/0022487111412052.
- [3] Anderson, L. (2020). 'Smiles are infectious': What a school principal in China learned from going remote. EdSurge. Retrieved from <https://www.edsurge.com/news/2020-03-20-smiles-are-infectious-what-a-school-principal-in-china-learned-from-going-remote>.
- [4] Basilaia, G., & Kvavadze, D. (2020). Transition to online education in schools during a SARS-CoV-2 coronavirus (COVID-19) pandemic in Georgia. *Pedagogical Research*, 5(4), 10. <https://doi.org/10.29333/pr/7937>.
- [5] Capacio, L. J. A., Celesio, G. A. & Naparan, G. B. (2021). Teachers' experiences in online teaching and learning modality. *EduLine: Journal of Education and Learning Motivation*, 1(1), 59 - 75.
- [6] Evagorou, M., & Nisiforou, E. (2020). "Engaging Pre-service Teachers in an Online STEM Fair during COVID-19." *Journal of Technology and Teacher Education*, 28(2), 179-186.
- [7] Farnell T., Skledar Matijević A., Ninoslav Šćukanec N., Schmidt S. (2021). *The Impact of COVID-19 on Higher Education: A Review of Emerging Evidence*. European Union. Available online at: http://www.guninetwork.org/files/neset-ar4-2020_full-report.pdf.
- [8] González-Calvo, G., Varea, V., & Martínez-Álvarez, L. (2020). 'I feel, therefore I am': Unpacking preservice physical education teachers' emotions. *Sport, Education and Society*, 25(5), 543–555. <https://doi.org/10.1080/13573322.2019.1620202>.
- [9] Greve, S., Weber, K. E., Brandes, B., & Maier, J. (2020). Development of pre-service teachers' teaching performance in physical education during a long-term internship. *German Journal of Exercise and Sport Research*, 1-11. <https://doi.org/10.1007/s12662-020-00651-0>.

- [10]Gustafson, B.J., & Rowell, P.M. (1995): Elementary preservice teachers: constructing conceptions about learning science, teaching science and the nature of science. *International Journal of Science Education*, 17, 589–605.
- [11]Iradel, C.M., Perez, N.B. & Quinco-Cadosales, M.N. (2021). The lived experience of teaching interns during the Covid-19 Pandemic. *Journal of Research, Policy & Practice of Teachers and Teacher Education*, 11(2), 74-87. <https://doi.org/10.37134/jrpptte.vol11.2.6.2021>.
- [12]Johnson, A. V., La Paro, J., & Crosby, D. A. (2017). Early practicum experiences: Preservice early childhood students' perceptions and sense of efficacy. *Early Childhood Education Journal*, 45, 229–236.
- [13]Kim, J. (2020). "Learning and teaching online during Covid-19: Experiences of pre-service teachers in an early childhood education practicum." *International Journal of Early Childhood*, 52(2), 145-158.
- [14]Ila Velle, L., Newman, S., Montgomery, C., & Hyatt, D. (2020). Initial teacher education in England and the Covid-19 pandemic: Challenges and opportunities. *Journal of Education for Teaching*. <https://doi.org/10.1080/02607476.2020.1803051>.
- [15]Marcum-Dietrich, N. I., Stunkard, C., Krauss, Z., & Kerlin, S. (2020). Uncharted WATERS: Sustaining a Meaningful Student Teaching Experience Amidst a Global Pandemic via an Online STEM Curriculum. *Current Issues in Middle Level Education*, 25(3).
- [16]Morgan, H. (2020). Best practices for implementing remote learning during a pandemic. *The Clearing House: A Journal of Educational Strategies, Issues and Ideas*, 93(3), 135–141
- [17]National Association for the Education of Young Children (NAEYC). (2009). NAEYC standards for early childhood professional preparation, position statement. Retrieved from <https://www.naeyc.org/files/naeyc/file/positions/ProfPrepStandards09.pdf>.
- [18]Osman, M. E. (2020). "Global impact of COVID-19 on education systems: the emergency remote teaching at Sultan Qaboos University." *Journal of Education for Teaching*, 1-9.
- [19]Quinco-Cadosales, M. N. (2018). What aspects in student teaching program helped the elementary student teachers? *International Journal of Current Research*, 10 (4) 6792 - 67905.
- [20]Sahu, P (2020). Closure of universities due to Coronavirus Disease 2019 (COVID-19): impact on education and mental health of students and academic staff., 12 (4) (2020), pp. 1-6.
- [21]Sepulveda-Escobar, P., & Morrison, A. (2020). "Online teaching placement during the COVID19 pandemic in Chile: challenges and opportunities." *European Journal of Teacher Education*, 43(4), 587-607.
- [22]Snelling, J., & D. Fingal. (2020). 10 Strategies for online learning during a coronavirus outbreak. *International Society for Technology in Education*. Retrieved from <https://www.iste.org/explore/10-strategies-online-learning-during-coronavirus-outbreak>.
- [23]Singh, S., Dixit, A., Joshi, G. (2020). "Is compulsive social media use amid COVID-19 pandemic addictive behavior or coping mechanism? *Asian Journal of Psychiatry*, 54 (2020), Article 102290, 10.1016/j.ajp.2020.102290.
- [24]UNESCO (2020b). UNESCO Rallies International Organizations, Civil Society and Private Sector Partners in a Broad Coalition to Ensure #LearningNeverStops. UNESCO. <https://en.unesco.org/news/unesco-rallies-international-organizations-civil-society-and-private-sector-partners-broad>.
- [25]Wajdi, M. B. N., Kuswandi, I., Al Faruq, U., Zuhijra, Z., Khairudin, K., & Khoiriyah, K. (2020). Education Policy Overcome Coronavirus, A Study of Indonesians. *Journal of Education and Technology*, 3, 96-106. <https://doi.org/10.29062/edu.v3i2.42>.
- [26]Xue, E., Li, J., & Xu, L. (2020). Online education action for defeating COVID-19 in China: An analysis of the system, mechanism and mode. *Educational Philosophy and Theory*. <https://doi.org/10.1080/00131857.2020.1821188>.

A Latent Class Analysis on the Behavior of De La Salle University – Dasmariñas's Students in Online Classes

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Abstract: Numerous studies are conducted to observe the learning behaviors of the students and associate them with their academic performance. However, the transition from a traditional learning environment into an online class setup leads to an adjustment in the behavior of the students. This study attempted to prove if the students' behavior using Latent Class Analysis (LCA) affects their academic performance through ANOVA. LCA was used to classify the students' learning behavior and determine the optimal fitting using Bayesian Information Criterion (BIC). The study selected the De La Salle University-Dasmariñas' college students who were enrolled in the 2nd Semester A.Y. 2020-2021. Results revealed that the optimal fit model for students' behavior during an online class is a five-class model. The behavioral classes formed influence the student's GPA, and most students with multiple learning behaviors achieved high grades. Out of the student's behavior considered, Collaboration, Interpersonal Skills, Responsibility, and Perseverance played a vital role in students learning during an online class. Moreover, the respondents lacked initiative in an online class setup.

Keywords: *learning behavior, student's academic performance, online class, latent class analysis*

Introduction and Literature Review

Whether it is face-to-face or online setting, the behavior of each student may be determined depending on their interaction and learning environment. The interaction between students and teachers through a process of learning generally takes place in an environment called a Classroom. Specifically, a student's classroom learning Behavior refers to how the student takes action in response to a scenario, such as the exchange of knowledge or attitude between students and teachers inside the learning environment mentioned.

Howard County Public School System or HCPSS, a school district that manages all public schools in Howard County, Maryland U.S.A., emphasized three statements about learning Behavior:

1. "Learning Behaviors are learned actions that enable students to access learning and interact with others productively in the community".
2. Learning behaviors can be developed inside and outside of school environment; lastly,
3. Learning behaviors helps the student to have a better "understanding and managing emotions, establishing and maintaining positive relationships, and making responsible decisions are essential life skills". (HCPSS Official Website).

Some people observe positive behaviors and associate these behaviors with a particular phenomenon that is significant to a person or a standard of living. In educational institutions, academic performance and achievement are important things among students since it assesses the knowledge that they gained throughout the learning process. Thus, people examined the learning behaviors of the students and sought to determine if they affected the student's academic performance (DeVries et al. 2018; Kassarnig et al. 2018; Estacio & Raga 2017)

However, the whole setup of the classroom education that students are experiencing has changed into an online learning approach. The transition from a traditional learning environment into a virtual online class leads to an adjustment in the student's behavior (Cragg et al., 2008). Behavioral patterns of a student learner can be associated with online learning (Khaldi & Haddiuoi 2012; Kang 2020). In line with this, the researchers of this study attempted to prove if the student's behavior affects their academic performance considering the online classroom environment of the student.

The student's behavior had some variations relative to a particular interaction or situation. Thus, it cannot be directly measured or quantified and is an unobserved variable. One way to measure

the unobserved samples is using Latent Class analysis LCA. Latent Class Analysis is a statistical procedure that is used to determine the latent class or the unobserved variable by identifying qualitatively different subgroups within populations that share certain outward characteristics (Hagenaars & McCutcheon, 2002; as cited in Collins, L. M., & Lanza, S. T., 2010). Subgroups are referred to as latent groups (or classes). It focuses on the person-centered approach, which is based on the person's responses. In line with this, the researchers decided to use LCA since the study deals with the student's behavior and the researchers need to determine it using the indicators.

Student learning behavior will be the latent classes considered in the study. Since learning behavior is an unobserved variable that cannot be directly measured, indicators are needed to determine the student's learning behaviors. The five learning behaviors of HCPSS named Interpersonal Skill, Responsibility, Perseverance, Collaboration, and Initiative will be integrated into online learning and online class setting, and these will be used as the categorical variables for the Latent Class Analysis. The researcher will observe the effect of students' behavioral classes on the general academic performance of the students.

Methodology

Research Design

The researchers utilized a descriptive research design to qualitatively collect data from the observed sample and analyze it using a quantitative method or procedure. It intends to determine the related or associated details on classifying the learning behavior of the students. The respondents of the study are the seven college students from the DLSU-D who were enrolled in the Second Semester of the school year 2020-2021. The sample was selected using purposive sampling. The researchers used this sampling technique since gathering data from the respondents is more convenient since physical communication is not allowed due to the pandemic.

Research Procedure

The researchers constructed an online survey form divided into two parts: the demographic profile and the questionnaire for the behavior of the students in online classes. It is also included in the first part of the grade point average or their general academic performance in the second Semester of the school year 2020-2021. The students chose among the given options for each item of learning behaviors that best describes them in an online class. The survey questionnaire was created in Microsoft Forms, and the link to the form was sent to the respondents of the study. The researchers complied with the data privacy act and followed the rules and regulations of the ethics committee when the online survey form was distributed. The researchers used two statistical software to address the problems of the study. First is the RStudio, which is to identify the latent class behavior of the students and the optimal fitting model of the student's performance based on their behavior. Lastly, the researchers used SPSS to determine the descriptive statistics of the demographic profile and the effects of the latent class of the behavior on the student's general academic performance. The calculated results taken from the students determined the latent class of the indicators that affect their behaviors in an online class.

Data Gathering and Statistical Analysis

Latent Class Analysis (LCA) was used to interpret the data or the results of this study. LCA was implemented since the researchers cannot directly measure the learning behavior of the students. Also, to measure this, it is necessary to have some indicators to identify the behavior of the respondents. Through this analysis, the researchers could determine the set of patterns the respondents answered on the questionnaire. LCA was used to identify the latent class models for the indicators that affect the behavior of the students in online classes using statistical software. The latent class model in this study is the learning behavior of the students, while the indicators are demonstrating interpersonal skills, demonstrating responsibility, demonstrating perseverance,

demonstrating collaboration, and demonstrating initiative based on the HCPSS Five Learning Behavior. Using the questionnaire or survey form, the researchers gathered their responses into a categorical variable to detect the latent groups of the respondents. Based on statistical theory, individuals' scores on a set of indicator variables are driven by their class membership. In this study, the respondents were grouped according to their behaviors in online class using the conditional probability for each category.

The analysis procedure is done using Statistical Packages for Social Sciences (SPSS) and RStudio software. In order to determine the optimal fitting model, two criteria must be observed. They are called Akaike Information Criterion (AIC) and Bayesian Information Criterion (BIC). The software will determine the AIC and BIC of the data. The smaller values will indicate a better model fit. This study will use AIC and BIC for the optimal fitting model of the data.

Analysis of Variance (ANOVA) is used to determine the effects of the latent class of the behavior on the student's general academic performance. According to Kenton (2021), ANOVA is a statistical analysis tool that determines the influence that independent variables have on the dependent variable. Its test allows a comparison of more than two groups simultaneously to determine whether a relationship exists between them. In this study, the student's general academic performance will be tested for a significant difference between the optimal fit class models.

Findings and Result

Student's Age

Most of the students who answered the survey are 19 to 21 years old, corresponding to 75.7% of the total number of respondents. Specifically, 21-year-old students have the highest frequency among the age group (28.7%), followed by 20-year-old (27.7%) and 19-year-old (19.3%) students. These are the expected age range among all college students within the university. On the other hand, the least number of respondents answered is 24 years old and above (0.3-0.9%), considering that most of the students in this age group are already graduates or working.

Table 1. *Frequency Distribution Table of Students' Age*

Age	Frequency	Percent (%)
18	8	2.7
19	58	19.3
20	83	27.7
21	86	28.7
22	56	18.7
23	6	2.0
24	1	0.3
26	1	0.3
29	1	0.3
Total	300	100.0

Student's Sex

Table 2. *Frequency Distribution Table of Students' Sex*

Sex	Frequency	Percent (%)
Female	190	63.3
Male	106	35.3
Prefer not to say	4	1.3
Total	300	100.0

Sixty-three percent of the respondents are female, the greatest number of respondents as shown in the table above. Male students have a percentage of 35.3, while the least number of respondents prefer not to say their sex in the survey questionnaire, 1.3% of the total number of respondents.

Student's Graded Point Average (GPA)

The researcher examined the Graded point average or GPA of the Students as an indicator of their academic excellence or, hypothetically, the results of their academic behavior in online classes. The university follows the Grade point scale from 4.00 to 1.00, as observed in table 3.

Table 3. *Grading System Reference of De La Salle University - Dasmariñas*

Range	Equivalent	Remark
98 - 100	4.00	PASSED
95 - 97	3.75	PASSED
92 - 94	3.50	PASSED
89 - 91	3.25	PASSED
86 - 88	3.00	PASSED
83 - 85	2.75	PASSED
80 - 82	2.50	PASSED
77 - 79	2.25	PASSED
74 - 76	2.00	PASSED
71 - 73	1.75	PASSED
68 - 70	1.50	PASSED
64 - 67	1.25	PASSED
60 - 63	1.00	PASSED
BELOW - 60	0.00	FAILED

The following are the descriptive statistics of the GPA of all the respondents for the 2nd Semester of the Academic Year 2020-2021 after conducting the survey.

Table 4. *Frequency Distribution of Students according to Graded Point Average Interval for the 2nd Semester, A.Y. 2020-2021*

GPA Range	Frequency	Percent
1.00 to 1.50	2	0.67%
1.51 to 2.00	5	1.67%
2.01 to 2.50	14	4.67%
2.51 to 3.00	33	11.00%
3.01 to 3.50	91	30.33%
3.51 to 4.00	155	51.67%
Total	300	100%
Mean	3.3999	
Std. Deviation	0.48506	

Table 4 shows that there are no missing data with a sample size of 300 respondents. This also implies that the sample size of the given data set is acceptable in testing the Latent Class Analysis. The Graded Point Average (GPA) has a mean average of 3.40 with a standard deviation of 0.4851. Figure 1

shows the Boxplot that distributes the data points on the GPA of the respondents. The blue box in the graph includes 50% of the dataset arrays from 3.21 to 3.75, with an interquartile range of 0.54. The graph has a median around the score of 3.53. The Highest GPA that the student achieved was exactly 4.00, while the lowest GPA among the students who responded to the survey was 1.04. The range from lowest to highest GPA corresponds to the value of 2.96. Notice that there are some outliers in the data set (figure 1), but since it is less than 10% of the sample respondents, the researchers still considered those data points.

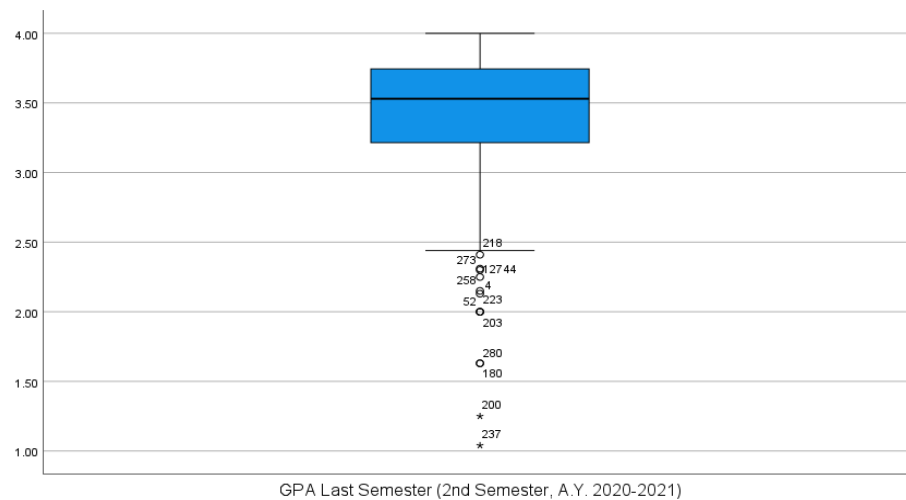


Figure 1. Boxplot for Graded Point Average (GPA) of the students

Optimal Fit Model for Behavior of Students in Online Classes

The results of LCA for behavior are presented in Table 3.1. It shows the Akaike Information Criterion (AIC) and the Bayesian Information Criterion (BIC) for each class model. The model with the lowest AIC and BIC value was used as the best model for the classes. These are the most reliable indicators in determining the number of latent classes. The results indicate that the smallest AIC is a 9-class model, while on BIC, the smallest is a 5-class model (7706.565 and 8361.005, respectively).

In accordance with Niels (2015), aiming for a small number of classes makes the model still adequate for the data but also limited. Additionally, different solutions can be compared by AIC or BIC. BIC is preferred over AIC in latent class models, but usually, both are used. A smaller BIC is better than a bigger BIC.

Moreover, a study by Henry de-Graft Acquah (2009) stated that AIC performs well in small samples but is inconsistent and does not improve in performance in large samples whilst BIC in contrast is consistent and improves in performance in large sample sizes. With this, the five-class model was a suitable model for the behavior of the students in online classes. This result conforms with the study of Collins and Lanza (2010) that BIC with lower values signifies better models that are fit if two models with different numbers of classes are explored.

Table 5. Summary of LCA Criteria in each Class Model of Behavior of Students

MODEL	AIC	BIC
5-CLASS	7790.623	8361.005
6-CLASS	7777.535	8462.734
7-CLASS	7741.753	8541.770
8-CLASS	7744.309	8659.144
9-CLASS	7706.565	8736.217

Latent Class Analysis for Behavior of Students in Online Classes

This part discusses the behavior of the students who participated in the study. A total of 300 students were divided into different classes based on the result of the AIC and BIC.

After finding the optimal fit class model for the behavior of students, the next step in the process is to determine the class probabilities and label each class. The class probabilities of the five-class model are in Table 3.2 below. For class 1, the class probability (last row) is 0.0414, indicating that 4.14% of the students were classified as Class 1. For class 2, the class probability is 0.3179, which indicates that 31.79% of students were classified as Class 2. For class 3, the class probability is 0.2850, which indicates that 28.50% of students were classified as Class 3. For class 4, the class probability is 0.0753, which indicates that 7.53% of students were classified as Class 4. Lastly, for class 5, the class probability is 0.2804, which indicates that 28.04% of students were classified as Class 5.

Table 6. *Conditional Probabilities and Latent Class Probability on the Behavior of Students Scale for the 5-Class model*

Item Code	Statement	Class 1	Class 2	Class 3	Class 4	Class 5
Q1AIS	I share my situation or opinion to classmates concerning my perceived difficulties.	0.1227	0.000	1.0000	0.5300	0.0000
Q1BR	I accept and understand the situation.	0.0783	0.1343	0.0000	0.0961	0.1432
Q1CP	I strategize to solve the problems.	0.5585	0.1659	0.0000	0.0968	0.2027
Q1DC	I ask help from my teachers or classmates who are knowledgeable about the subject matter.	0.0000	0.4481	0.0000	0.2771	0.4875
Q1EIN	I seek ways to improve my current situation.	0.2405	0.2517	0.0000	0.0000	0.1665
Q2AIS	I ask questions from my instructors to better understand the topic	0.0800	0.0667	0.0000	1.0000	0.0602
Q2BR	I follow the oral and written directions/ instructions	0.0000	0.4090	0.2924	0.0000	0.2741
Q2CP	I accomplish my tasks despite the difficulties	0.3216	0.2202	0.2105	0.0000	0.2616
Q2DC	I ask or share my ideas with my classmates to discuss and better understand the given tasks or requirements	0.5983	0.2936	0.4737	0.0000	0.3091
Q2EIN	I begin working in my tasks without being prompted	0.0000	0.0105	0.0234	0.0000	0.0951
Q3AIS	I interact positively with my classmates to have better outputs.	0.0000	0.2495	0.1988	0.5407	0.3091
Q3BR	I participate actively in the learning process with my group mates.	0.0000	0.2069	0.2573	0.2762	0.1787
Q3CP	I accept the opinions of others and learn from their feedback.	1.0000	0.1871	0.0761	0.1831	0.0605
Q3DC	I do the assigned task and work cooperatively with my group.	0.0000	0.2831	0.3976	0.0000	0.3685
Q3EIN	I select appropriate tools or strategies and discuss it with my group.	0.0000	0.0734	0.0702	0.0000	0.0832
Q4AIS	I respect my teacher's opinions about the lessons.	0.4906	0.0000	0.1626	0.2652	0.3212
Q4BR	I follow online classroom rules and regulations implemented by my teachers.	0.0000	1.0000	0.4678	0.2055	0.0000

Q4CP	I ask my teachers if there is something I do not understand.	0.2697	0.0000	0.0772	0.2651	0.2622
Q4DC	I participate when my teachers ask us to work in group or after class.	0.0796	0.0000	0.2924	0.2642	0.3451
Q4EIN	I take risks in disclosing my opinion regarding the lesson/topic	0.1601	0.0000	0.0000	0.0000	0.0714
Q5AIS	I encourage and motivate my classmates to study the lessons.	0.4022	0.0555	0.1053	0.5622	0.0477
Q5BR	I accomplish my work immediately to help them with their difficulties.	0.0000	0.1731	0.0702	0.1977	0.0716
Q5CP	I show patience in helping or solving their problems.	0.3203	0.2178	0.1403	0.1416	0.167
Q5DC	I work with them through chat and calls so that they can better understand the lessons.	0.0865	0.4487	0.6069	0.0542	0.6541
Q5EIN	I check my classmates if they are fine or doing well.	0.1909	0.1049	0.0774	0.0443	0.0596
Q6AIS	I watch video tutorials and recordings about the lessons together with them.	0.0000	0.103	0.0936	0.4659	0.1308
Q6BR	I collaborate with them to manage our time effectively and complete the required academic tasks.	0.1155	0.5182	0.4864	0.4505	0.1785
Q6CP	I try to find new learning strategies with my classmates despite many failed attempts	0.4798	0.1154	0.0000	0.0446	0.0479
Q6DC	I ask and acknowledge others' ideas and opinions related to the topic	0.2467	0.169	0.2914	0.039	0.4284
Q6EIN	I seek to improve my work outputs by asking their ideas or comments	0.158	0.0944	0.1286	0.0000	0.2144
Conditional Probability		0.0414	0.3179	0.2850	0.0753	0.2804

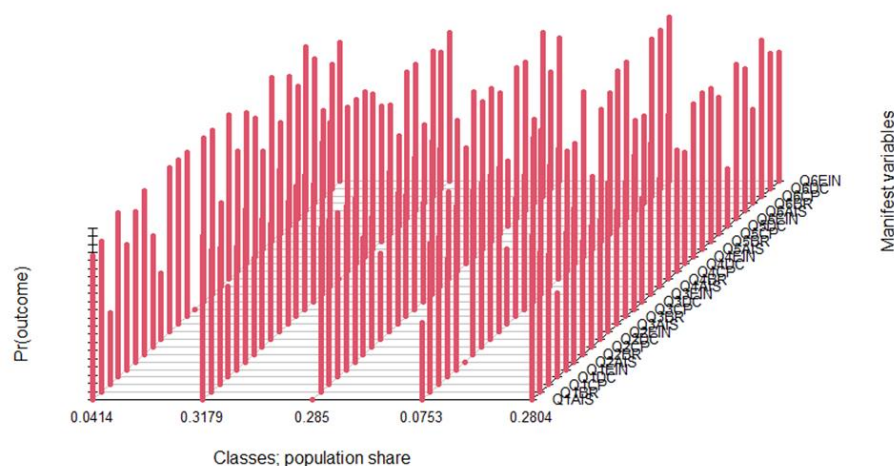


Figure 2. Distribution of Conditional Probabilities of Each Item for the 2-class Model for Behavior of Students in Online Classes

Both Table 6 and Figure 2 present the conditional probability of students in each class for individual items and options. For the items Q1AIS, Q1BR, Q1CP, Q1DC, and Q1EIN, the conditional

probability for Class 1 students responding to the first cell in Table 3.2 is 0.1227, indicating that 12.27% of students in Class 1 chose 'I share my situation or opinion to classmates concerning my perceived difficulties.' Similarly, the conditional probability for Class 1 students responding to the second and third cell is 0.0783 and 0.5583, respectively, indicating that 7.83% and 55.85% of students under Class 1 chose 'I accept and understand the situation.' The other is 'I strategize to solve the problems.' In addition, the conditional probability for Class 1 responding to the fourth cell is 0, indicating that 0% of the students under Class 1 chose 'I ask help from my teachers or classmates who are knowledgeable about the subject matter.' The conditional probability for Class 1 students responding to the fifth cell in Table 3.2 is 0.0800, indicating that 8% of students in Class 1 chose 'I seek ways to improve my current situation'. The probability in each category for individual indicators can be used to assign a label to each class. From the distribution of conditional probability presented in Table 9 and Figure 8, Class 1 students, if their teachers incur academic difficulties during online classes, tended to have 'Perseverance' as a behavior since this behavior obtained the highest probability for each category (Q1AIS to Q1EIN).

For the items Q2AIS, Q2BR, Q2CP, Q2DC, and Q2EIN under Class 1, the highest probability is 0.5983, corresponding to the Q2DC item. This means that 59.83% of the students chose the item 'I ask or share my ideas with my classmates to discuss and better understand the given tasks or requirements.' Similarly, the conditional probability for Class 1 students responding to item Q2AIS is 0.08, indicating that 8% of the students chose the item 'I ask questions from my instructors to better understand the topic.' Class 1 students, after online classes, when my teachers assign academic tasks/requirements or assessments, tended to have 'Collaboration' as a behavior since this behavior obtained the highest probability for each category (Q2AIS to Q2EIN).

For the items Q3AIS, Q3BR, Q3CP, Q3DC, and Q3EIN, the conditional probability for Class 1 students responding to Q3CP in Table 3.2 is 1, indicating that 100% of students in Class 1 chose 'I accept opinions of others and learn from their feedback.' Class 1 students, during online classes, when they need to work with others or in groups with their classmates, tended to have 'Perseverance' as a behavior since this behavior obtained the highest probability for each category (Q3AIS to Q3EIN).

For the items Q4AIS, Q4BR, Q4CP, Q4DC, and Q4EIN under Class 1, the highest probability is 0.4906, corresponding to the Q4AIS item. This means that 49.06% of the students chose the item 'I respect my teacher's opinions about the lessons.' Similarly, the lowest conditional probability for Class 1 students responding to the item Q4DC is 0.0796, which indicates that 7.96% of the students chose the item 'I participate when my teachers ask us to work in group or after class.' In addition, the conditional probability for Class 1 responding to item Q4CP is 0.2697, indicating that 26.97% of the students under Class 1 chose 'I ask my teachers if there is something I do not understand.' Also, the conditional probability for Class 1 responding to item Q4EIN is 0.1601, indicating that 16.01% of the students under Class 1 chose 'I take risks in disclosing my opinion regarding the lesson/topic.' Class 1 students, during online classes, when my teachers discuss their lessons, tended to have 'Interpersonal Skill' as a behavior since this behavior obtained the highest probability for each category (Q4AIS to Q4EIN).

For the items Q5AIS, Q5BR, Q5CP, Q5DC, and Q5EIN under Class1, the highest probability is 0.4022, corresponding to Q5AIS item. This means that 40.22% of the students chose the item 'I encourage and motivate my classmates to study the lessons.' Similarly, the lowest conditional probability for Class 1 students responding to item Q5DC is 0.0865, which indicates that 8.65% of the students chose the item 'I work with them through chat and calls so that they can better understand the lessons.' Class 1 students, after online classes, when my classmates encountered difficulty in our subject matters, tended to have 'Interpersonal Skill' as a behavior since this behavior obtained the highest probability for each category (Q5AIS to Q5EIN).

For the items Q6.1, Q6.2, Q6.3, Q6.4, and Q6.5, the conditional probability for Class 1 students responding to Q6EIN in Table 3.2 is 0.1580, indicating that 15.80% of students in Class 1 chose 'I seek to improve my work outputs by asking their ideas or comments.' Similarly, the conditional probability for Class 1 students responding to Q6CP is 0.4798, indicating that 47.98% of students under Class 1

chose 'I try to find new learning strategies with my classmates despite many failed attempts.' In addition, the conditional probability for Class 1 responding to the Q6BR is 0.1155, indicating that 11.55% of the students under Class 1 chose 'I collaborate with them to manage our time effectively and complete the required academic tasks.' Also, the conditional probability for Class 1 responding to item Q6DC is 0.2467, indicating that 24.67% of the students under Class 1 chose 'I ask and acknowledge others' ideas and opinions related to the topic.' Class 1 students, after online classes, when they study with their classmates, tended to have perseverance as a behavior since this behavior obtained the highest probability for each category (Q6AIS to Q6EIN). Among all the indicators under Class 1, the highest probabilities are under the "Collaboration, Perseverance, and Interpersonal Skills." Thus, Class 1 is labeled as the "Collaboration, Perseverance, and Interpersonal Skills" behavior group.

For Class 2 probabilities, it can be noticed in Table 3.2 that Q1DC obtained the highest conditional probabilities for the different indicators, Q2BR, Q3DC, Q4BR, Q5DC, and Q6BR, with probabilities 0.4481, 0.4090, 0.2831, 1, 0.4487 and 0.5182 respectively. These probabilities are under 'Collaboration,' 'Responsibility,' 'Collaboration,' 'Responsibility,' 'Collaboration,' and 'Responsibility.' Thus, Class 2 was labeled as the "Collaboration and Responsibility" group.

For Class 3 probabilities, it can be noticed in Table 3.2 that Q1AIS obtained the highest conditional probabilities for the different indicators, Q2DC, Q3DC, Q4BR, Q5DC, and Q6BR with probabilities 1, 0.4737, 0.3976, 0.4678, 0.6069, and 0.4864 respectively. These probabilities are under 'Interpersonal Skill,' 'Collaboration,' 'Collaboration,' 'Responsibility,' 'Collaboration' and 'Responsibility.' Thus, Class 3 was labeled as the "Interpersonal Skill, Collaboration and Responsibility" group

Class 4 tended to have the behavior of 'Interpersonal Skills' since it obtained the highest conditional probabilities. The items Q1AIS, Q2AIS, Q3AIS, Q4AIS, Q5AIS, and Q6AIS obtained the highest probabilities of 0.5300, 1, 0.5407, 0.2652, 0.5622, and 0.4659, respectively. Thus, Class 4 was labeled as an "Interpersonal Skill" group.

The last class in the model, Class 5, tended to have the behavior of 'Collaboration' since it obtained the highest conditional probabilities. The items Q1DC, Q2DC, Q3DC, Q4DC, Q5DC, and Q6DC obtained the highest probabilities of 0.4875, 0.3091, 0.3685, 0.3451, 0.6541, and 0.4284, respectively. These items are labeled under the 'Collaboration' groups. Table 10 shows the summarized Conditional probability of each Behavioral class.

Table 7. Conditional Probability of the Behavioral Classes

Class no.	Behavioral Classes	Conditional Probability
1	Collaboration, Perseverance and Interpersonal Skills group	0.0414
2	Collaboration and Responsibility group	0.3179
3	Interpersonal Skills, Collaboration and Responsibility group	0.2850
4	Interpersonal Skills group	0.0753
5	Collaboration group	0.2804
Total		1.000

The study conducted by Mak-van der Vossen, M. C., van Mook, W. N. K. A., Kors, J. M., van Wieringen, W. N., Peerdeman, S. M., Croiset, G., & Kusurkar, R. A. (2016) in identifying the behavioral patterns of medical students showed a different outcome. Based on their results, they identified a 3-Class model, namely: Class 1 (43%) was labeled as "Poor reliability," class 2 (20%) was labeled as "Poor reliability and poor insight," and class 3 (37%) was labeled as "Poor reliability, poor insight, and poor adaptability."

Student's Behavioral Class and its effect on the General Academic performance

The table below summarizes the descriptive statistics of the General Academic Performance, or GPA, in relation to the student's behavioral class, using the result gathered from the LCA.

Table 8. *Descriptive Statistics of Student's General Academic Performance for the 5-Class model of the Student's Behavior*

Class No.	Behavioral Classes	N	Mean	Std. Deviation
1	Collaboration, perseverance, and Interpersonal Skills group	101	3.3960	.47317
2	Collaboration and Responsibility group	78	3.4842	.38710
3	Interpersonal Skills, Collaboration and Responsibility group	61	3.4679	.36399
4	Interpersonal Skills group	40	3.3513	.57693
5	Collaboration group	20	2.9810	.76267
Total		300	3.3999	.48506

Table 8 shows the mean score of Student's General Academic Performance in response to the student's class behavior has an average of 3.40 with a standard deviation of 0.4851. Most of the respondents belong to Class 1, with 101 students demonstrating Collaboration, Perseverance, and Interpersonal Skill behavior. Next to the highest frequency belongs Class 2, with Collaborative and Responsible behavior having 78 students. It was followed by Class 3, consisting of 61 students who expressed Interpersonal Skills, Collaborative and Responsible behavior. Class 4, with 40 students, demonstrates Interpersonal Skills. Lastly, the lowest number of respondents, 20 students belonging to Class 5, have Collaborative behavior.

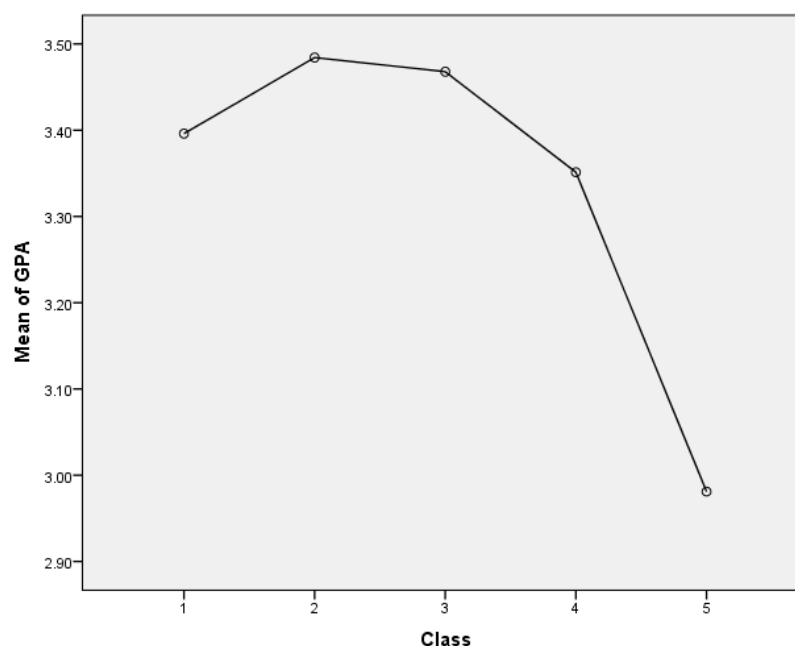


Figure 3. *Mean Plot of Student's General Academic Performance for the 5-Class model of the Student's Behavior*

The graph shows the highest GPA among the student classes belongs to Class 2, which corresponds to the mean score of 3.50. This is followed by Class 3 with a mean score of 3.47, Class 1 with 3.40, and Class 4 with a mean of 3.3513 GPA. The lowest GPA corresponding to the value of 2.99 belongs to Class 5. Classes 1, 2, and 3 have two or more behaviors, while Class 4 and 5 have only one

behavior. This implies that Students in Classes with multiple behaviors tend to get a higher GPA than those with one specific behavior.

To statistically determine the effect of the five classes obtained from the LCA on the General Academic Performance of the Students serving GPA on its basis, the researchers conducted an Analysis of Variance (ANOVA) to check the mean differences, which indicates influences from one sample group to another. The researchers assumed that:

H_o : there are no statistically significant differences between sample means.

H_a : there are statistically significant differences between sample means.

Table 9. ANOVA of Behavioral Classes in relation to the GPA of the Students

	Sum of Squares	df	Mean Squares	F	Sig.
Between Groups	4.442	4	1.111	4.971	0.001
Within Groups	65.909	295	.233		
Total	70.351	299			

Table 10. Multiple Comparisons of Behavioral Classes in relation to the GPA of the Students using Tukey HSD

Behavioral Classes		Mean Difference	Std. Error	Sig.	95% Confidence Interval	
(I) Group	(J) Group				Lower Bound	Upper Bound
Class 1 - Collaboration, Perseverance, and Interpersonal Skills group	Class 2	-.088	.071	.729	-.284	.107
	Class 3	-.072	.077	.882	-.282	.139
	Class 4	.045	.088	.987	-.198	.287
	Class 5	.415*	.116	.004	.098	.733
Class 2- Collaboration and Responsibility group	Class 1	.088	.071	.729	-.107	.284
	Class 3	.016	.081	1.000	-.205	.238
	Class 4	.133	.092	.598	-.119	.385
	Class 5	.503*	.118	.000	.178	.828
Class 3 -Interpersonal Skills, Collaboration and Responsibility group	Class 1	.072	.077	.882	-.139	.282
	Class 2	-.016	.081	1.000	-.238	.205
	Class 4	.117	.097	.744	-.147	.381
	Class 5	.487*	.122	.001	.152	.821
Class 4 - Interpersonal Skills group	Class 1	-.045	.088	.987	-.287	.198
	Class 2	-.133	.092	.598	-.385	.119
	Class 3	-.117	.096	.744	-.381	.147
	Class 5	.370*	.129	.036	.015	.726
Class 5 - Collaboration group	Class 1	-.415*	.116	.004	-.733	-.098
	Class 2	-.503*	.118	.000	-.828	-.178
	Class 3	-.487*	.122	.001	-.821	-.153
	Class 4	-.370*	.129	.036	-.726	-.015

*. The mean difference is significant at the 0.05 level.

Table 10 shows that the p-value (Sig.) is less than 0.05. Thus, it rejects the null hypothesis, indicating statistically significant differences between the behavioral classes and the GPA of the Students. This implies that the Behavioral Class influences the Student's General Academic performance.

In addition, table 11 shows the multiple comparisons of mean GPA using the Tukey post hoc test since the ANOVA results are statistically significant. As expected, the GPA scores of the students belonging to Class 5 (2.99 ± 0.8) were significantly different compared to the GPA of other student classes (Class 1, 2, 3, and 4), since it is the lowest GPA among the classes. There was a decrease of 0.42 ± 0.12 in relation to Class 1 students' GPA (3.40 ± 0.5), a decrease of 0.50 ± 0.12 in relation to Class 2 students' GPA (3.48 ± 0.4), a decrease of 0.49 ± 0.12 in relation to Class 3 student's GPA (3.47 ± 0.4), and a decrease of 0.37 ± 0.12 in relation to Class 4 student's GPA (3.35 ± 0.6). This implies that students in Class 5 only demonstrate collaborative behavior and need to improve their academic performance by performing another learning behavior.

The result of ANOVA confirms the research article of DeVries et al. (2018), where they assumed that academic achievement (which can measure using GPA) could be linked to student behavior. It also supports the study of Kassarnig et al. (2018) of distinguishing student traits and behaviors in relation to academic performance using ANOVA. Multiple behaviors in latent student classes in relation to academic performance support the study of Estacio & Raga (2017), whereas they also obtained varied result in correlating students' activity and their academic performance.

Table 11. *Summary of Learning Behaviors and Statistical Results per Student Classes*

Learning Behaviors	Class 1	Class 2	Class 3	Class 4	Class 5
Interpersonal Skill	✓		✓	✓	
Responsibility		✓	✓		
Collaboration	✓	✓	✓		✓
Perseverance	✓				
Initiative					
Statistical Results	Class 1	Class 2	Class 3	Class 4	Class 5
N	101	78	61	40	20
Mean	3.396	3.4842	3.4679	3.3513	2.981
Std. deviation	0.47317	0.3871	0.36399	0.57693	0.76267
ANOVA	Significant	Significant	Significant	Significant	Significant
Statistically Significant to	Class 5	Class 5	Class 5	Class 5	all classes
Mean Difference	0.42	0.5	0.49	0.37	

Overall, the researchers identified the behaviors of students using LCA in relation to general academic performance. Most of the student's behavioral classes (Class 1, 2, 3, and 5) exhibit Collaborative behavior, which implies its vital role among the students in online learning. It can be associated with the Online Collaborative Learning Theory of Dr. Harasim (2012), which encourages students to solve problems online collaboratively. The second common behavior in students' behavioral classes is demonstrating Interpersonal Skills, which confirms the claim of Wubbels et al. 2006, as cited in Zandvliet et al. 2014 that the behavior is significant for the student's development which is affected by environmental factors during online classes. The third common behavior is responsibility. Class 2 and Class 3 exhibit Responsible behavior, which is also the highest mean GPA among the student's behavioral classes. It implies that students who follow instructions are more likely

to have good academic performance. Perseverance can only be found in Class 1, with the highest frequency among the student groups. The student that demonstrates this behavior supports the statement of Pilgrim (2014) that perseverant students perceive failure in a particular situation as a positive learning experience and seek ways and solutions until the learning goal is attained. The situation mentioned may refer to the student's struggles in online classes, which they are still learning diligently despite experiencing adjustments in the new learning environment. Notice that none of the student behavioral classes are initiative during an online class. This indicates that the students should exercise their Initiative behavior to control their learning agenda (Ally 2004, as cited in Power et al 2017).

Discussion

The study's findings revealed that most of the students who participated in the study were 19 to 21 years old and 63% were female. Based on the results, the five-class model was suitable for the study since it has the lowest BIC value. Each class was labeled as Class 1 as the Collaboration, Perseverance and Interpersonal Skills group, Class 2 as Collaboration and Responsibility group, Class 3 as Interpersonal Skills, Collaboration and Responsibility group, Class 4 as the Interpersonal Skills group, and Class 5 as the collaboration group. Among these groups, Class 1 got the highest number of 101 respondents, meaning that most of the students belong to this group. On the other hand, on the effect of the latent class of the behavior on the student's general academic performance, it was revealed that there is a significant difference between the behavioral classes and the GPA of the students.

Limitations and Implications

From the results of the study, the following recommendations were formulated by the researcher:

1. For the Lasallian students, the researchers recommend improving their initiative behavior in an online learning setup by having self-confidence and self-belief so that they could ask more questions if they really don't understand the lesson. They can also try to volunteer to lead the prayer or participate more often during their online class.
2. The DLSU-D Faculty Members should think of some activities or programs that could help the students bring up their initiative behavior in online learning by making group work activities and letting the students rate their teammates on how helpful they were at getting the tasks completed. They can also acknowledge the students' effort in their assessments or activities because it may have positive results on their academic performance. For example, if the student gets a perfect score or sees the student's effort, the faculty members can simply praise their work.
3. The DLSU-D Administrator should create a monthly assessment of the behavior and performance of the students in this setup. They can also conduct a game to know the strengths and weaknesses of the students before the start of the Semester and a sharing session at the end of the Semester. They can use Kahoot or any online platform that would engage the students. Through this, they will be able to determine the applicable activities for improving the students.
4. For future researchers, they can conduct the same study with an additional number of behavioral patterns observed in the students. They can have a larger sample size of respondents since it is necessary to attain higher latent class groups (6-class, 7-class, etc.) and become suitable for the model expressing different behaviors per group. Also, they can conduct the same study but in a larger group like college schools or universities in Dasmariñas.

Conclusion

Considering the study, the following conclusions were drawn by the researcher:

- 1.a Most of the students are from 19-21 years old, which is the common age for college students under the K-to-12 curriculum.
- 1.b The survey is heavily influenced by female students, dominating the number of male students who completed the questionnaire. Unequal groups between the sexes may lead to a different perspective and behavior in the latent classes.
- 1.c The respondents of study only reflect a small part of the whole population. This indicates that the Behavioral class of the students in the study may or may not represent the overall behavior of all college students in DLSU-D.
2. Majority of the students have a good GPA which implies excellence on their academic performances.
3. The five-class model was the optimal fit model for the behavior of students in online classes.
4. Students express more than one behavior (usually two or more behaviors per group) when studying during online classes.
- 5.a Most of the students with multiple behaviors achieve good academic performance.
- 5.b Behavioral class formed using LCA influences the Student's General Academic performance.
- 5.c Collaboration, Interpersonal Skill Responsibility and Perseverance plays a vital role for students to learn during online class. Moreover, Students should exercise their Initiative behavior to improve their learning agenda.

References

- [1] AIC vs. BIC. (2019). The Methodology Center. Retrieved June 20, 2021, from <https://www.methodology.psu.edu/resources/AIC-vs-BIC/>
- [2] Acquah, D.-G. H. (2017). The effect of outliers on the performance of Akaike Information Criterion (AIC) and Bayesian information criterion (BIC) in selection of an asymmetric price relationship. *Russian Journal of Agricultural and Socio-Economic Sciences*, 65(5), 32–37. <https://doi.org/10.18551/rjoas.2017-05.05>
- [3] Chakrabarti, A., & Ghosh, J. K. (2011). AIC, BIC and recent advances in Model Selection. *Philosophy of Statistics*, 583–605. <https://doi.org/10.1016/b978-0-444-51862-0.50018-6>
- [4] Chakraborty P, Mittal P, Gupta MS, Yadav S, Arora A. (2020, December 17). Opinion of students on online education during the COVID-19 pandemic. Wiley Online Library. Retrieved June 17, 2021, from <https://onlinelibrary.wiley.com/doi/10.1002/hbe2.240>
- [5] Chon YV, Shin T. Profile of second language learners' metacognitive awareness and academic motivation for successful listening: A latent class analysis. *Learning and Individual Differences*. 2019;70:62–75. doi:10.1016/j.lindif.2019.01.007
- [6] Collins, L. M., & Lanza, S. T. (2010). *Latent class and latent transition analysis: With applications in the social, behavioral, and Health Sciences*. Wiley.
- [7] Cragg, B., Dunning, J., & Ellis, J. (2008). Teacher and Student Behaviors in Face-to-Face and Online Courses: Dealing with Complex Concepts. *JOURNAL OF DISTANCE EDUCATION*, 22(3), 115–128. Retrieved from <https://eric.ed.gov/?id=EJ812568>.
- [8] DepEd amends S.Y. 2020-2021 calendar to provide learning interventions. (2021, March 3). Department of Education. Retrieved June 11, 2021, from <https://www.deped.gov.ph/2021/03/03/deped-amends-sy-2020-2021-calendar-to-provide-learning-interventions/>
- [9] DeVries JM, Rathmann K, Gebhardt M. (2018). How Does Social Behavior Relate to Both Grades and Achievement Scores? *Frontiers in Psychology*. Retrieved June 18, 2021, from doi:10.3389/fpsyg.2018.00857
- [10] El Haddioui I, Khaldi M. Learner Behavior Analysis on an Online Learning Platform. (2012). *International Journal of Emerging Technologies in Learning (IJET)*. Retrieved June 17, 2021, from

- https://www.researchgate.net/publication/233969490_Learner_Behavior_Analysis_on_an_Online_Learning_Platform. doi:10.3991/ijet.v7i2.1932
- [11]Estacio RR, Raga Jr RC. (2017). Analyzing students online learning behavior in blended courses using Moodle. *Asian Association of Open Universities Journal*. Retrieved June 17, 2021, from doi:10.1108/aaouj-01-2017-0016
- [12]Evans-Polce R, Lanza S, Maggs J. (2016) Heterogeneity of alcohol, tobacco, and other substance use behaviors in U.S. college students: A latent class analysis. *Addictive Behaviors*. Retrieved June 19, 2021, from doi:10.1016/j.addbeh.2015.10.010
- [13]Goodlad, K., Westerngard, L., & Hillstrom, J. (2018). Comparing faculty and student perception of academic performance ... Retrieved May 27, 2022, from https://www.researchgate.net/publication/324511844_Comparing_Faculty_and_Student_Perception_of_Academic_Performance_Classroom_Behavior_and_Social_Interactions_in_Learning_Communities
- [14]Gordon W. (2020, June 17). *Classroom Management in an Online Environment*. TeachHUB. <https://www.teachhub.com/classroom-management/2020/05/classroom-management-in-an-online-environment/>
- [15]Grace-Martin K. (2020, February 19). *What Is Latent Class Analysis?*. The Analysis Factor. <https://www.theanalysisfactor.com/what-is-latent-class-analysis/>
- [16]Grades. (2018) Office of the University Registrar :: De La Salle University - Dasmariñas. Retrieved July 17, 2021, from <https://www.dlsud.edu.ph/registrar/grades.htm>
- [17]Grading System in the Philippines. Philippines Grading System. Retrieved June 17, 2021, from <https://www.scholaro.com/pro/Countries/Philippines/Grading-System>
- [18]Harasim L. (2018, May 25). *About Online Collaborative Learning*. ONLINE COLLABORATIVE LEARNING THEORY. <https://lindaharasim.com/online-collaborative-learning/>
- [19]Hasa. (2019, December 8). *What is the Difference Between Persistence and Perseverance*. Pediaa.Com. <https://pediaa.com/what-is-the-difference-between-persistence-and-perseverance/>
- [20]Kang IG. (2021). *Heterogeneity of Learners' Behavioral Patterns of Watching Videos and Completing Assessments in Massive Open Online Courses (MOOCs): A Latent Class Analysis*. The International Review of Research in Open and Distributed Learning. <http://www.irrodl.org/index.php/irrodl/article/view/4645>. doi:10.19173/irrodl.v21i4.4645
- [21]Kang YJ, Kim D-H. (2021). Pre-clerkship students' perception and learning behavior of online classes during coronavirus disease 2019 pandemic. *Korean Journal of Medical Education*. 33(2):125–131. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8169375/>. doi:10.3946/kjme.2021.194
- [22]Kassarnig, V., Mones, E., Bjerre-Nielsen, A., Sapiezynski, P., Dreyer & Lassen, D., & Lehmann, S. (2018). Academic performance and behavioral patterns. *EPJ Data Science*, 7(1). <https://doi.org/10.1140/epjds/s13688-018-0138-8>
- [23]Kent State University. (2022, April 4). *SPSS tutorials: Independent samples T test*. LibGuides. Retrieved April 17, 2022, from <https://libguides.library.kent.edu/spss/independentttest#:~:text=The%20Independent%20Samples%20t%20Test%20compares%20the%20means%20of%20two,Test%20is%20a%20parametric%20test.>
- [24]Kenton W. (2021, May 19). *How Analysis of Variance (ANOVA) Works*. Investopedia. <https://www.investopedia.com/terms/a/anova.asp>
- [25]Kinsey J. (2021, April 14). *Introduction to Student Persistence: Strategies and Factors for Student Success*. Collegis Education - Higher Education Revenue Growth Management. <https://collegiseducation.com/news/programs-and-course-content/introduction-to-student-persistence/>

- [26]Kruk M. (2019). *Assessing the Effectiveness of Virtual Technologies in Foreign and Second Language Instruction*. Advances in Linguistics and Communication Studies. doi:10.4018/978-1-5225-7286-2
- [27]Kumar VV, Tankha G. (2021). Nurturing Spiritual Intelligence in the Classroom. *IGI Global*. <https://www.igi-global.com/chapter/nurturing-spiritual-intelligence-in-the-classroom/274178>
- [28]Law EH, Harrington R. (2016). A Primer on Latent Class Analysis. *ISPOR*. <https://www.ispor.org/publications/journals/value-outcomes-spotlight/abstract/november-december-2016/a-primer-on-latent-class-analysis>
- [29]Learning Behaviors. HCPSS. <https://www.hcpss.org/academics/learning-behaviors/>
- [30]Liang K, Zhang Y, He Y, Zhou Y, Tan W, Li X. (2017). Online Behavior Analysis-Based Student Profile for Intelligent E-Learning. *Journal of Electrical and Computer Engineering*. 1–7. doi:10.1155/2017/9720396
- [31]Mak-van der Vossen MC, van Mook WNKA, Kors JM, van Wieringen WN, Peerdeman SM, Croiset G, Kusurkar RA. (2016). Distinguishing Three Unprofessional Behavior Profiles of Medical Students Using Latent Class Analysis. *Academic Medicine*. 91(9):1276–1283. doi:10.1097/acm.0000000000001206
- [32]Padamkar P. (2021, March 30). What is SPSS?: Features, Types, and Statistical Methods Of SPSS. EDUCBA. <https://www.educba.com/what-is-spss/>
- [33]Picciano AG. (2017). *Theories and Frameworks for Online Education: Seeking an Integrated Model*. Online Learning. 21(3). doi:10.24059/olj.v21i3.1225
- [34]Pilgrim, T. (2014, January 18). Student perseverance. eduflow. Retrieved December 7, 2021, from <https://eduflow.wordpress.com/2014/01/16/student-perseverance/>
- [35]Power R, Mohamed A, Cristol D, Palalas A. (2017, October 30). Six Learning Theories. *Go to the cover page of IAmLearning: Mobilizing and Supporting Educator Practice*. <https://iamlearning.pressbooks.com/chapter/six-learning-theories/>
- [36]Purje R, Purnell K. (2020, November 17). Students using Responsibility Theory and their 'powerhouse' to maximise learning and wellbeing. *Education Review*. <https://www.educationreview.com.au/2020/11/students-using-responsibility-theory-and-their-powerhouse-to-maximise-learning-and-wellbeing/>
- [37]Rhalmi M. (2020, November 18). Learning Theories: Cognitivism. *My English Pages*. <https://www.myenglishpages.com/blog/description-of-cognitivism/>
- [38]Santos RR. Personal development. Quezon City, Philippines: Rex Book Store; 2016.
- [39]Statistical & Qualitative Data Analysis Software: About R and RStudio. (2020, June 15) LibGuides. Retrieved July 17, 2021, from <https://libguides.library.kent.edu/statconsulting/r>
- [40]Stephanie. (2021, April 20). Akaike's Information Criterion: Definition, Formulas. *Statistics How To*. Retrieved June 17, 2021, from <https://www.statisticshowto.com/akaikes-information-criterion/>
- [41]Thibodeaux, W. (2020, June 5). What is classroom behavior? Synonym. Retrieved May 27, 2022, from <https://classroom.synonym.com/classroom-behavior-6303858.html>
- [42]Underwood Z. (2016, September). Connectivism: A Learning Theory for Today's Academic Advising. NACADA. <https://nacada.ksu.edu/Resources/Academic-Advising-Today/View-Articles/Connectivism-A-Learning-Theory-for-Todays-Academic-Advising.aspx>
- [43]Weinstein, B. (2022, February 19). The relationship between behavior & academics. BehaviorFlip's Blog. Retrieved June 4, 2022, from <https://blog.behaviorflip.com/the-relationship-between-behavior-academics/>
- [44]What is Bayesian Information Criterion (BIC)? (2019, January 16).Medium. Retrieved June 17, 2021, from <https://medium.com/@analyttica/what-is-bayesian-information-criterion-bic-b3396a894be6>
- [45]What is Learning Behaviour? Northampton Centre for Learning Behaviour. Retrieved June 20, 2021, from . <http://www.ncflb.com/aboutus/learningbehaviour/>

APPENDIX B: SAMPLE CERTIFICATE OF CONSENT

I have read the entire information sheet (or have been read to me) and I voluntarily agree to participate in the study. I had enough time to ask further questions about the possible benefits and consequences of joining in the study and all had been answered to my satisfaction. I also understand that I may ask additional questions at any time. Further, I understand that I have the right to withdraw at any moment in this survey without justifying my decision to do so and without affecting my medical care.


Respondent Code Number:

Name of Witness	Signature of Witness	Date of Signature
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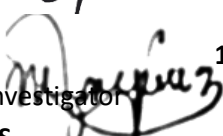
Name of Witness	Signature of Witness	Date of Signature
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I certify that I have completely explained to the above individual the nature and purpose of the survey, potential benefits and disagreeable discomforts in participating. Also, I have answered all the participant's questions and concerns and have witnessed the above signature.

CHELSEY D. DELA CRUZ

Name of Investigator	Signature of Investigator 	Date of Signature
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11/17/2021**MARY JANE C. PEREZ**

Name of Investigator	Signature of Investigator 	Date of Signature
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11/17/2021**APPENDIX C: SAMPLE LETTER TO VALIDATORS****December 11, 2021****Mr. Siegfried F. Gamueda**

Psychologist

Psyche Solution Psychological Services

Dear Mr. Gamueda,

Greetings in St. La Salle!

We, Chelsey Dela Cruz and Mary Jane Perez, students from DLSU-D that are currently taking up Bachelor of Science Major in Applied Mathematics and working on ungraduated thesis entitled "A Latent Class Analysis on the Behavior of De La Salle University - Dasmariñas's Students in Online Classes". The main objectives of the study include:

1. Determine the demographic profile of the respondents.
2. Determine the general academic performance of students in the second Semester of school year 2020-2021.
3. Determine the optimal fitting Latent Class Model of students' performance based on their behavior
4. Determine the latent classes of online behavior of the respondents.
5. Determine the effect of the latent class of the behavior in the general academic performance of the students.

October 25-26, 2022

The researchers work entails administration of a survey form that would determine latent classes of online behavior of the respondents. The survey form was is divided into two parts. The first part is the demographic profile of the students which consists of their age, gender, and college. It is also included in the first part the grade point average or their general academic performance in the second Semester of the school year 2020-2021. The second part is the questionnaire for the behavior of the students in online class. The questionnaire was made by the researchers based on the report card about the 5 learning behaviors of Howard County School Public School or HCPSS. The students will choose among the given options for each item of learning behaviors that best describes them in online class.

Recognizing your expertise in this area of study, the researchers would to like to request for your assistance by evaluating the survey form the researcher intending to adopt taken from HCPSS and other researches. The researcher believes that your comments and suggestions would greatly contribute to the success of this endeavour.

We are looking forward to your favourable response. Thank you, and have a good day!

Sincerely,

Chelsey D. dela Cruz

What Needs to be Considered in an Online Class: Thematic Analysis of Students' Engagement and Satisfaction in Online Learning

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Abstract: Schools resorted to online learning modalities during the COVID-19 pandemic, altering the teaching-learning process and how students take part in online courses. Many works and published papers corroborate the interplay between students' engagement and satisfaction. This study focused on six recent publications from 2019 to 2022 and underwent a thematic analysis approach. Topic relevance, which the research question matches with empirical investigations and publication time frame, are among the criteria for choosing eligible articles. Five themes emerged from the six papers that are all factors contributing to students' engagement and satisfaction and were presented in a spider web illustration. These are (1) student factors, (2) support, (3) varied interactions, (4) technological factors, and (5) pedagogies. This article concludes several factors can help students be engaged and satisfied in varied online courses, and they are all interrelated. This study is critical for students, teachers, educational administrators, and stakeholders to pursue online classes or select different efficient modalities that can augment student engagement, satisfaction, or operational move. The teaching-learning process must complement students' and teachers' needs in postulating quality education, even in the middle of the pandemic.

Keywords: *online learning, students' engagement, students' satisfaction, technology*

Introduction and Literature Review

The Novel Coronavirus, widely known as the Corona Virus Disease (COVID-19), has taken over the world and halted significant and minor human activities, from businesses and travels to schools. People from different parts of the world, from different walks of life, are greatly affected by this pandemic. One of the deeply wedged ventures in education. From the typical face-to-face classroom setting to a wholly online mode of teaching. The pandemic forced students and teachers to attempt different teaching methods to continue the teaching-learning process while minimizing the spread of the virus and maintaining safety health protocols set by the government. The online modality poses threats to students and teachers alike. With students, it is not only the change of learning modality but also the experience and their engagement and satisfaction with the mode and pedagogies. Initial reports imply that remote instruction has been a poor alternative for many students for in-person learning (Domina et al., 2021). However, Mukhtar et al. (2020) found that online learning methodologies promote student-centered learning and are simple to administer in a lockdown circumstance. Hoi et al. (2021) believe that online learning is an efficient strategy for learning from persistent data streams in numerous real-world applications. The only thing needed is that the adoption of online education channels has been hampered by the knowledge and convenience of offline techniques and a lack of demand for online teaching platforms (Nambiar, 2020). In a teaching-learning process, a face-to-face classroom arrangement can give teachers and students real-time updates on the course quality, execution, and interaction. A teacher can notice students' body language in a classroom setting. These non-verbal indications allow the teacher to make quick adjustments in their teaching method to meet the students' requirements (Nambiar, 2020). The effectivity of online learning carried out positive outputs since it only needs online study but is inefficient because the costs suffer more in terms of technology, teaching strategies, academic performance, engagement, and satisfaction (Bahasoan et al., 2020). Several works of literature would

suffice to question the factors contributing to students' engagement and satisfaction in online learning.

Transitioning from a face-to-face to an online class burdens teachers and students alike. The challenges in choosing a better and more effective platform to deliver instruction and provide technology and training are part of the difficulties experienced by educators and students. In some parts of Southeast Asia, e-learning challenges the underprivileged and those who cannot afford technology, or worse, those living in far-flung areas with no electricity (Asvial et al., 2021). There have been societal inequalities as we shifted to online modality, including internet connection, dire attention to class, and even delivery of instructions (Hall et al., 2020). The interaction between teachers and students in an online class makes all the difference. Lee's (2021) study showed more progress in exploratory talk than in argumentation. An online class' analytical teaching strategies are vital (Wiley & Hott, 2020). As teachers build relationships with students in a face-to-face (F2F) class, relationship building in an online class is still fundamental. Martin (2019) mentioned that it would lower satisfaction levels without proper training and elements for how teachers build relationships with students. Feedbacking also contributes significantly to a student's progress (Lee, 2021). Further, with increasing online workloads, though it provides flexibility, teachers need to set restrictions while teaching online to continue to deliver job fulfillment and practical teaching (Davis et al., 2019).

Online learning offers a variety of lectures delivered by a lecturer. Instructions can be synchronous, where participants interact simultaneously, such as through video conferencing. Asynchronous instruction is where participants intermingle in time spaces in time-separated communication such as e-mail, google form, posted lecture notes, and social media platforms (Simamora, 2020). Kennedy (2020) posits that the interaction perspective on student engagement in online learning falls into three types: Learner-instructor interaction, learner-learner interaction, and learner-content interaction. With engagements in online learning comes satisfaction. Students face various hurdles while studying online, including the positive and negative effects of online learning, economic situation, and anxiety during online learning (Simamora, 2020). The government needs to consider and plan the threat to user data security, the transition from face-to-face classes to online learning, capacity, and objectives.

Students' satisfaction correlates with their performance in class (Keržič, 2021). Student satisfaction with online learning developed as a compilation of student issues. Student assumptions about the duration and place of online learning, self-motivation, and the participation of others, such as fellow students and the teacher, are the key features of these concerns. Student satisfaction is determined by aligning these dimensions' demands with the student's overall educational and life motivations for attending the course (Landrum et al., 2021). It related this idea to Alqurashi's (2019) study that student satisfaction is one of the most critical factors in evaluating online courses and observed learning is a good measure of learning. As defined by Francescucci and Rohani's (2019) study, behavioral engagement showed that online learning modality and face-to-face learning delivered the same level of student engagement and performance. There are differences in delivering the class in different modalities, even class activities and approaches. How engaged the students are matters in the teaching pedagogies. Students' engagement and performance increased (Purinton & Burke, 2019).

This study irons out the idea of an ideal online class where students are engaged and participate in class. The teaching-learning process is effective even with the change from face-to-face to online classes. There are still possibilities that even post-pandemic, some institutions are planning to continue online classes as either their primary mode of instruction or just an option. Nonetheless, this study can help school administrators, teachers, and students adjust expectations and set prospects and learning and teaching styles accordingly.

Student Engagement

The study of Khalid (2019) on 'Students' identities and their relationships with their engagement in an online learning community' yielded a more significant impact on students' engagement in online communities with students' identities. The study involved 151 computer education courses under Special Education Program, Sports and Recreation Program, and Teaching English as a Second Language (TESL) program. The research instrument was administered via Google Forms and was sent to students through an e-forum on Weebly. The questionnaire used a five-point Likert scale where respondents can choose their concurrence with concepts that embody their professional, learner, and community member identities. 81.45% is the return rate of the questionnaire online, and the data were coded and analyzed using Statistical Package for Social Science (SPSS). The researcher also used frequency distribution, percentages, means, and standard deviation to explain the participants' demographics and perceptions of the e-forum. Since the study needs correlation between independent and dependent variables, the researcher also used Pearson product-moment correlation analysis to determine possible relationships between variables.

Students' prior knowledge of online communities, motivation to take part in online communities, and commitment to the online community are part of the professional identities of the respondents. Most of the respondents had partaken in online learning groups. However, some students voiced that they must learn new skills when taking part in an online forum.

Further, motivation from students was propelled by intrinsic and extrinsic motivations. Intrinsic motivation because they see online platforms as support for their learning, but extrinsic because of the need for mutual motivation from the instructors. In learner identities, students are engaged because they see online interaction as their opportunity to enhance their computer-related skills and as part of their professional development. Thus, they are more engaged if there are interactions with peers and lecturers. Students engage in community member identities because their members actively engage in the class. Interaction means learning from their classmates, where they share and communicate openly, like comments and suggestions. This research is crucial because it shows how understanding the many parts of identities can assist stakeholders in creating effective online communities by considering these factors.

A clear understanding of the learners' identities can better understand the students' engagement in an online learning setting. Part of this understanding is how student situation affects online learning. In the study of Abou-Khalil et al. (2021) on 'Emergency Online Learning in Low-Resource Settings: Effective Student Engagement Strategies', the study identified engagement strategies for higher education students perceived to be effective. The study involved 313 students in emergency online learning in a low-resource setting. A sequential mixed method research design was used to create the questionnaire. The questionnaire was from the literature review and interviews with ten teachers and ten students to extract varied engagement strategies in emergency online learning in a low-resource setting. The final questionnaire included 43 questions, with respondent demographic questions plus two open-ended questions for data triangulation, administered research questionnaire through Google Form in English. Researchers employed parametric inferential statistics—ANOVA and Pearson's correlation coefficient. The study found that the perceived effectiveness of student-content and student-instructor strategies is higher than that of student-student engagement strategies. The student-student engagement strategies use a group chat and collaborative projects using online tools, which are perceived as effective compared to class group work, peer review, icebreaker discussions, and LMS profile completion. Student-teacher engagement strategies, allotting time for question and answer, providing announcements, and some features where students can interact- forums and group chats- were effective strategies. The least perceived effectiveness is showing the instructor's face during class. Screen sharing during online class was the

most effective engagement strategy for student-content engagement strategies, among others. Providing summaries and uploading the recorded class online, permitting screenshots and video recording, and presenting concepts, ideas, and reports in different formats were also influential. As part of the correlational analysis of this study, researchers found out that the perception of student-teacher and student-content engagement strategies correlation is weak, and the use of a computer to take online classes. Compared to students who did not use a computer, those who did found more successful student-teacher engagement techniques and student-content strategies. The study acclaims that instructors and institutions implementing emergency online learning in low-resource settings must recognize their students' goals and motivations to adjust their engagement approaches.

The level of students' engagement in an online class is not limited to what is in the classroom or what the teachers, students, and contents can offer. Other factors can also influence students' engagement. The study of Farrell and Brunton (2020) can confirm the idea on a 'Balancing Act: A Window into Online Student Engagement Experiences.' This article discusses a qualitative study examining online student involvement in a higher education institution. The study was participated by 24 online adult students. The data were collected through two semi-structured interviews and participant-generated learning portfolio entries on their learning experience. Interviews were conducted using the Adobe Connect classroom.

Participants submitted five learning portfolios with visual and written reflections. The researchers adopted the iterative model of data collection and analysis. The researchers also used data-led thematic analysis and contained numerous coding series, themes generation, and improved themes. The findings of this study captured the students' online learning experiences related to their engagement in the online class. Five themes emerged from the study: peer community, module support, studying while balancing life commitments, confidence, and learning approach. In peer community, students appreciated the support, comfort, and sense of community generated by peers in these informal study groups, which met face to face, online, and on WhatsApp. The groups or peer communities were formed in either informal or formal settings, where they can get support and tutors, which give them a sense of belongingness in the program. The second is a peer community fragment, the module support. Students value engagement by getting enough support from module tutors for synchronous and asynchronous discussions. Engaging in tutorials was critical to learning, sociability, and module development. Tutorials gave consolation, allowed students to communicate with one another, and clarified complex topics and theories.

Module support provided encouragement and guidance among students. The third theme is studying while balancing life commitments, which showed the most perplexing facet of being an online student. Life responsibilities like family and work gave their toll on students. Participants are under much pressure to balance competing obligations while still finding time to study and complete assignments. Because students are already short on time, issues like illness have a cascading effect on their ability to stay on pace with their academics. Thus, this harms students' engagement in online learning. The fourth theme is confidence. This theme revolves around the students' expressions of insecurity, anxiety, trepidation, and uncertainty. The study found out that students grew their confidence as the module proceeded. Positive feedback and positive results gave them reassurance and validation and empowered them to overcome self-doubt. After addressing and conquering their perceived academic deficiencies, some individuals gained confidence in their academic capabilities and felt well equipped for future study. All four themes are related to the fifth theme, their learning approaches. Participants indicated their learning styles, which provides a deep look into their study methods and when, where, and how they studied. The research found that students developed unique techniques to help them understand lessons, ideas, and concepts from traditional tactics like reading, annotating, and note-taking to contemporary approaches like watching YouTube videos, online articles, and podcasts. The results show that the structural influence of life load affects the

development of a successful online student. This research does not just provide acumens on essential themes for online student engagement for future studies. However, it is also beneficial for individuals who assist, teach and develop online courses to be aware of the psychosocial and structural elements influencing online student participation.

Student Satisfaction

Lu's (2020) study on 'Online Learning: The Meanings of Students' Engagement' tackled students' engagement and satisfaction. Though student satisfaction can be related to student engagement in online learning, several factors would lead to the students' contentment in an online class. This study aims to investigate the levels of student involvement among first year and senior-year students and the relationship between engagement and satisfaction. The research was an archive quantitative data mining study that used data from the National Survey of Student Engagement (NSSE), a system of interconnected surveys that has been given every year since 1999. The engagement indicators in the NSSE encompassed four core themes: academic challenge, learning with peers, experiences with faculty, and campus environment. Higher-order learning skills, contemplative and integrative learning, learning strategies, and quantitative reasoning are the four subcategories. Academic challenge assesses institutions' emphasis on student motivation and high expectations.

Learning with Peers evaluates students' motivation to learn both independently and with others, either through collaborative learning or with interactions with various people. The effectiveness of a student's relationships with peers, instructors, and staff is measured by Campus Environment, divided into two categories: quality of interactions and supportive environment. Student teachers' Interaction and Effective Teaching Practices fall under the experiences with faculty category, which examines how students engage with faculty in and out of the classroom. Sixty-four students participated in the study, where 22 were first-year students and 42 were seniors. With student engagement results, researchers correlated students' satisfaction with the course. The study generated no significant difference between first- and fourth-year students in student engagement. Also, researchers found out that the academic challenge theme had a solid relationship with student satisfaction. This study was conducted to also grasp information on the attrition rates of the students during the online learning modality. There are interventions made by the university where senior students benefit. The result of the study is that senior students have a marginally more significant satisfaction rate.

Furthermore, the study discovered that among the 17 engagement variables, only the academic challenge theme does not associate with students' satisfaction. It is commonly known that successful online learning is predicated on learners taking charge of their learning. Students adaptively regulate their cognitive and metacognitive activities during learning. Thus, the findings of this study reinforce the idea that good course design affects student satisfaction and engagement.

Crafting a course design online requires much effort and aspects to consider. The relationship between students' engagement and satisfaction is connected, as confirmed by Muzammil et al. (2020) in their study on 'Investigating Student Satisfaction in Online Learning: The Role of Student Interaction and Engagement in Distance Learning University'. The study's goal was to examine student interaction's impact on student satisfaction and engagement in online learning. The study was conducted in an open and distance learning university in Indonesia. Out of the 124,041 enrolled online in the Faculty of Economics, only 4,305 students responded, and researchers used simple random sampling. The research instrument examined student satisfaction in online learning through student engagement and interaction. Thus, questions were engrossed in interaction of students with other students, the interaction of students to tutor, and the interaction of students with content and were answered by the respondents using a 5-point Likert scale. They also used online to give the questionnaire to the respondents for easier retrieval of data from the system. The study found that

the interaction suggests good predictors of engagement, and student engagement is a good conjecture of student satisfaction. According to the findings, students' engagement is strengthened when they become more active in online learning through interaction among peers, involvement with instructors, and interaction with content. This relationship will cause student satisfaction. The researchers anchored these findings to the idea that student involvement seeks to offer students positive learning experiences, such as discourse in collaborative workgroups, performing presentations and conversations, sharing materials, completing tasks, and incorporating case studies with feedback. The outcomes of this study posit that, when students learn online, they have fewer opportunities to interact with other learners, such as other students, instructors, or content.

Consequently, the conclusions of this study were supposed to show that online learning was being implemented more effectively. The primary finding is that interaction is crucial to student happiness. As a result, we must work to improve the online learning system so that students can engage more effectively. Some facets of online learning can be aspects and determinants of students' satisfaction, especially in the course structure per se. Basuonoy et al. (2020) set this claim in their study on 'The Factors Affecting Student Satisfaction with Online Education during the COVID-19 Pandemic: An Empirical Study of an Emerging Muslim Country. The research determines how the COVID-19 pandemic affected students' satisfaction with online learning. Two hundred eighty respondents who are undergraduate students in business schools in Cairo, Egypt took part in the study. The questionnaire is a self-report type where respondents can answer questions based on their opinions and attitudes on their satisfaction with online education during the COVID-19 pandemic using a 5-point Likert scale. The questionnaire was divided into two parts: a sociodemographic of the respondents and the second one on the factors of students' satisfaction with online education. The questionnaire included 12 variables encapsulated in 53 items. These factors were satisfaction, Internet, platform, course structure, stress, workload, class time, loss of interest, motivation, self-motivation, participation, and exam and research. The data collected was treated using descriptive statistics, t-independent sample tests, and OLS regression. The study results showed that internet availability, connection, and speed have an extensive and favorable impact on student contentment; they boost student satisfaction.

Furthermore, the system significantly and negatively affects student satisfaction, implying that students are dissatisfied with the school platform. It could be because of the platform's highly intricate system and inadequacy of technical know-how, or it could be due to the system being disrupted by unanticipated user tension. Students are satisfied with the duration of the online class time and believe that it goes fast since class time has a significant and positive impact on student satisfaction. Moreover, a lack of engagement has a significant and negative impact on student satisfaction, implying that students are contented with and enthusiastic about the approach and techniques of teaching online courses. Also, part of the findings of this study is that motivation has a positive effect on students' satisfaction, plus recording videos, teacher teaching, and feedbacking motivate students, which improves satisfaction. Students are delighted with having an online final exam evaluation since online assessment significantly and positively affects their satisfaction. However, self-motivation harmed students' satisfaction, based on respondents' answers. Researchers concluded that Egyptian colleges use synchronous teaching methods across several platforms. According to the answers, virtual sessions and real-time teleconference classes are the most popular way of modality.

Findings

Six recent studies were part of this study, three studies on student engagement and three studies focused on student satisfaction with online learning modality as the common denominator. This study found five themes that answer what factors affect students' engagement and satisfaction in online learning. The themes are (1) student factors, (2) support, (3) varied interactions, (4)

technological factors, and (5) pedagogies. Student factors include the personal life of the students and their approach to learning. Support embraces students' assistance from the school, teaching, and non-teaching staff, peers, and family. Varied interactions comprise online students' interactions and connections with others, like teachers, peers, study groups, and others. Technological factors include internet issues and online platform features. Pedagogies are all about teachers' strategies, contents and materials, and feedbacking styles.

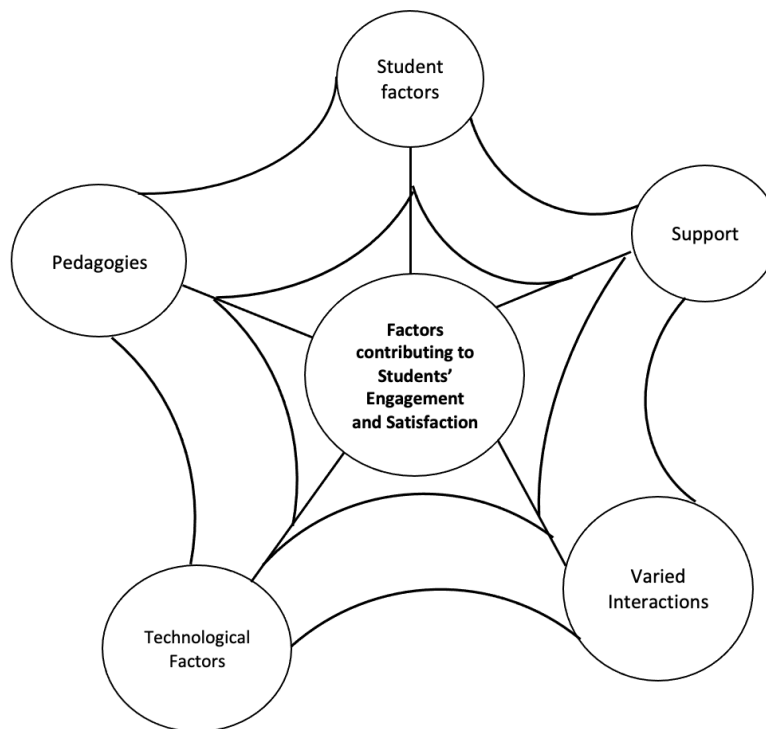


Figure 1: Spider-web illustration of the five themes

Figure 1 shows the interrelationship of the five themes as factors that affect students' engagement and satisfaction. These factors are related to each other. It speaks of the students' actual experiences that would either increase their online class engagement or spike their overall satisfaction in online learning.

Discussion

Student engagement and student satisfaction come together as they are interrelated. Indicators of student engagement highlight essential features of the learning system that can help students understand better and achieve better outcomes, such as retention and accomplishment (Paulsen & McCormick, 2020). Five themes emerged in the thematic analysis of the six publications focused on students' engagement and satisfaction. The first theme is student factors which encompass students' learning styles, motivation, commitment, personal responsibilities, students' capacity, and students' drive to learn, even if classes were delivered online. Blieck et al. (2019) confirm that students' drive and productivity have an essential push to engagement and satisfaction in learning. The second theme that emerged is 'support.' Ikhsan et al. (2019) mentioned that various support systems could enhance students' engagement and satisfaction, whether technical, peer, instructor, or school based. Support involves collaboration between students online or face-to-face, study groups, class rules that do not complicate things, and students' relationships with school staff, instructors, and classmates. The third theme is varied interaction, including online interactions, like group chats, class interactions with classmates and instructors, and open communication. Although interactions in class, study groups, and in-person social events enhanced online students' sense of

community, online instructors perceived their role in fostering community as restricted to the classroom (Berry, 2019). The fourth theme is technological factors, which incorporate internet issues, platform features, and other technology-based utilities that aid students' learning and increase engagement and satisfaction. However, internet issues like connection and speed pull students' engagement and satisfaction, as online learning requires more connectivity speed and availability. This result confirms the study by Abdulmajeed (2020) that IT infrastructure can make or break the online learning experience of students. The last one is pedagogies, which involve teachers' teaching strategies, feedbacking, contents, and instructors' involvement in an online class. The study of Berry (2019) corroborates the need for professional development of teachers in online pedagogy as it is vital to students' engagement and satisfaction in online learning.

Conclusion

During the pandemic, online learning has emerged as a viable alternative to conventional learning. Most students had never taken an online class before. Thus, student engagement and satisfaction are essential as it helps them do more and make the teaching-learning process effective. This study discovered various factors that impact students' engagement and satisfaction. Internal and external factors contributing to students' engagement and satisfaction are encapsulated in the five themes surfaced in this study. Since online classrooms lack physical interaction, online student engagement is a more significant driver of observed student learning outcomes, thus building students' satisfaction (Kucuk & Richardson, 2019). This study can guide researchers, administrators, and teachers in keeping the students engaged and satisfied to achieve higher learning turnouts. Online learning should cater to the five themes, student factors, support, varied interactions, technological factors, and pedagogies, to keep the teaching-learning experience remarkable, even online. This study also encourages stakeholders to plan operational moves to support students' and teachers' requirements in providing quality education, even as the pandemic continues.

References

- [1] Abdulmajeed, K., Joyner, D. A., & McManus, C. (2020). Challenges of online learning in Nigeria. *In Proceedings of the Seventh ACM Conference on Learning@ Scale* (pp. 417-420).
- [2] Abou-Khalil, V., Helou, S., Khalifé, E., Chen, M. A., Majumdar, R., & Ogata, H. (2021). Emergency online learning in low-resource settings: Effective student engagement strategies. *Education Sciences*, 11(1), 24.
- [3] Alqurashi, E. (2019). Predicting student satisfaction and perceived learning within online learning environments. *Distance Education*, 40(1), 133-148.
- [4] Asvial, M., Mayangsari, J., & Yudistriansyah, A. (2021). Behavioral intention of e-learning: A case study of distance learning at a junior high school in Indonesia due to the covid-19 pandemic. *International journal of technology*, 12(1), 54-64.
- [5] Bahasoan, A. N., Ayuandiani, W., Mukhram, M., & Rahmat, A. (2020). Effectiveness of online learning in pandemic COVID-19. *International journal of science, technology & management*, 1(2), 100-106.
- [6] Basuony, M. A., EmadEldeen, R., Farghaly, M., El-Bassiouny, N., & Mohamed, E. K. (2020). The factors affecting student satisfaction with online education during the COVID-19 pandemic: an empirical study of an emerging Muslim country. *Journal of Islamic Marketing*.
- [7] Berry, S. (2019). Faculty Perspectives on Online Learning: The Instructor's Role in Creating Community. *Online Learning*, 23(4), 181-191.
- [8] Berry, S. (2019). Professional development for online faculty: instructors' perspectives on cultivating technical, pedagogical and content knowledge in a distance program. *Journal of Computing in Higher Education*, 31(1), 121-136.

- [9] Blicek, Y., Kauwenberghs, K., Zhu, C., Struyven, K., Pynoo, B., & DePryck, K. (2019). Investigating the relationship between success factors and student participation in online and blended learning in adult education. *Journal of Computer Assisted Learning*, 35(4), 476-490.
- [10] Braun, V., & Clarke, V. (2019). Reflecting on reflexive thematic analysis. *Qualitative Research in Sport, Exercise and Health*, 11(4), 589-597.
- [11] Davis, N. L., Gough, M., & Taylor, L. L. (2019). Online teaching: advantages, obstacles and tools for getting it right. *Journal of Teaching in Travel & Tourism*, 19(3), 256-263.
- [12] Domina, T., Renzulli, L., Murray, B., Garza, A. N., & Perez, L. (2021). Remote or removed: Predicting successful engagement with online learning during COVID-19. *Socius*, 7, 2378023120988200.
- [13] Farrell, O., & Brunton, J. (2020). A balancing act: a window into online student engagement experiences. *International Journal of Educational Technology in Higher Education*, 17(1), 1-19.
- [14] Francescucci, A., & Rohani, L. (2019). Exclusively synchronous online (VIRI) learning: The impact on student performance and engagement outcomes. *Journal of Marketing Education*, 41(1), 60-69.
- [15] Hall, J., Roman, C., Jovel-Arias, C., & Young, C. (2020). Pre-service teachers examine digital equity amidst schools' COVID-19 responses. *Journal of Technology and Teacher Education*, 28(2), 435-442.
- [16] Hoi, S. C., Sahoo, D., Lu, J., & Zhao, P. (2021). Online learning: A comprehensive survey. *Neurocomputing*, 459, 249-289.
- [17] Ikhsan, R. B., Saraswati, L. A., Muchardie, B. G., & Susilo, A. (2019). The determinants of students' perceived learning outcomes and satisfaction in BINUS online learning. In *2019 5th International Conference on New Media Studies (COMMEDIA)* (pp. 68-73). IEEE.
- [18] Kennedy, G. (2020). What is student engagement in online learning... and how do I know when it is there. *Melbourne CSHE Discussion Papers*, 1-6.
- [19] Keržič, D., Alex, J. K., Pamela Balbontín Alvarado, R., Bezerra, D. D. S., Cheraghi, M., Dobrowolska, B., ... & Aristovnik, A. (2021). Academic student satisfaction and perceived performance in the e-learning environment during the COVID-19 pandemic: Evidence across ten countries. *PloS one*, 16(10), e0258807.
- [20] Khalid, F. (2019). Students' Identities and its Relationships with their Engagement in an Online Learning Community. *International Journal of Emerging Technologies in Learning*, 14(5).
- [21] Kucuk, S., & Richardson, J. C. (2019). A Structural Equation Model of Predictors of Online Learners' Engagement and Satisfaction. *Online Learning*, 23(2), 196-216.
- [22] Landrum, B., Bannister, J., Garza, G., & Rhame, S. (2021). A class of one: Students' satisfaction with online learning. *Journal of Education for Business*, 96(2), 82-88.
- [23] Lee, A. V. Y. (2021). Determining Quality and Distribution of Ideas in Online Classroom Talk using Learning Analytics and Machine Learning. *Educational Technology & Society*, 24(1), 236-249.
- [24] Lu, H. (2020). Online learning: The meanings of student engagement. *Education Journal*, 9(3), 73-79.
- [25] Martin, J. (2019). Building relationships and increasing engagement in the virtual classroom: Practical tools for the online instructor. *Journal of Educators Online*, 16(1), n1.
- [26] Mukhtar, K., Javed, K., Arooj, M., & Sethi, A. (2020). Advantages, Limitations and Recommendations for online learning during COVID-19 pandemic era. *Pakistan journal of medical sciences*, 36(COVID19-S4), S27.
- [27] Muzammil, M., Sutawijaya, A., & Harsasi, M. (2020). Investigating student satisfaction in online learning: the role of student interaction and engagement in distance learning university. *Turkish Online Journal of Distance Education*, 21(Special Issue-IODL), 88-96.
- [28] Nambiar, D. (2020). The impact of online learning during COVID-19: students' and teachers' perspective. *The International Journal of Indian Psychology*, 8(2), 783-793.

- [29]Paulsen, J., & McCormick, A. C. (2020). Reassessing disparities in online learner student engagement in higher education. *Educational Researcher*, 49(1), 20-29.
- [30]Purinton, E., & Burke, M. (2019). Student engagement and fun: evidence from the field. *Business Education Innovation Journal*, 11(2), 133-138.
- [31]Simamora, R. M. (2020). The Challenges of online learning during the COVID-19 pandemic: An essay analysis of performing arts education students. *Studies in Learning and Teaching*, 1(2), 86-103.
- [32]Wiley, K. K., & Hott, K. (2020). Lost in Translation? Critical Pedagogy in the Online Classroom. *The Journal of Nonprofit Education and Leadership*, 10(3).

The Impact of Flipped Classroom Model on Students' English Speaking Fluency and Accuracy in an EFL University Classroom in Indonesia

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Abstract: In a traditional learning style, students have more input than output in the classroom. On the contrary, a flipped classroom model emphasizes more output in the classroom and input done by the students in preparation for the learning activities that would be done in class. Several research have been done on flipped classroom models in EFL classrooms with different demographics and language acquisition focuses. This paper is a case study qualitative research that investigates how a flipped classroom can optimize university EFL students' speaking skills, particularly on fluency and accuracy, by using qualitative content analysis. This paper also uses questionnaires to investigate students' satisfaction in learning English through a flipped classroom model. The correlation between students' satisfaction and their achievements is then analyzed. The subjects are 12 students of General English 4 class at a university in Indonesia. This research will demonstrate that the flipped classroom model determines students' satisfaction in learning, consequently resulting in their speaking fluency and accuracy.

Keywords: *EFL, English speaking, flipped classroom, teaching method, learning method*

Introduction and Literature Review

General Introduction

A flipped classroom model is the opposite of a traditional classroom setting. While a traditional classroom model refers to teachers delivering their lectures inside the classroom (Limniou et al., 2018), a flipped classroom model implements having the students learn the lessons outside class to focus on learning activities inside the classroom. According to Rhodes & DeLozier (2016), flipped classrooms "refer to the practice of assigning lectures outside of class and devoting class time to a variety of learning activities." The activities inside the classroom are done to have student-centered learning, and the teacher is a guide or facilitator.

In an English as a Foreign Language (EFL) classroom, speaking, reading, writing, listening, grammar, and vocabulary words in English are taught. Students are encouraged to practice English for them to grow in their language acquisition. This paper focuses on the impact of a flipped-classroom model on EFL adult learners' English-speaking fluency and accuracy.

Statement of the Problem

English is a foreign language in Indonesia, and the language is often taught for students to pass an exam such as a national exam. Hence, lecturing is heavily used inside the EFL classroom for students to absorb as much information as possible for an exam. While this method has been useful to a certain degree, there must be a more effective way to help students grow in their English-speaking skills.

Purpose of the Study

The purpose of this paper is to provide evidence that using a flipped classroom model is crucial in developing students' English-speaking skills to encourage EFL teachers to utilize the flipped classroom model in their classrooms.

Research Question and Objectives

This paper is based on the following research question: Does a flipped classroom model help students optimize their speaking skills? Two related questions will also be investigated: Are students

satisfied with learning English speaking through a flipped classroom model? And does satisfaction of learning through a flipped classroom model consequently help students optimize their speaking skills, specifically fluency and accuracy? This paper aims to determine the impact of a flipped classroom model on Indonesian adult EFL students' learning satisfaction and English-speaking fluency and accuracy.

Importance and Significance

An investigation through empirical study needs to be done to determine whether a flipped classroom model affects students' English-speaking acquisition and to determine the correlation between the satisfaction of students and their achievements. In addition, it is expected that this study will bring awareness to EFL teachers of the use of a flipped classroom model in their teaching method and style.

Literature Review

Listening, writing, reading, and speaking are important for language acquisition. However, speaking skill is crucial for communication. To connect with others, English language learners must learn to speak English fluently and accurately. According to Taufik and Widyastuti Purbani (2019,), "Speaking skill is considered as a crucial skill for English foreign language learners" (p. xx). Though it may take time for English language learners to be fully fluent and accurate, the practice of speaking English will help them reach their goals one day at a time. Yet, in many Indonesian classrooms, "most of the teachers encourage their students to develop other skills required for facing the national examination. As a result, the students have a very poor speaking performance" (Taufik & Purbani, 2019). It becomes a concern when students focus on learning English only to pass an exam. The research done by Taufik and Purbani is on how a flipped classroom helped high school students in a private vocational school in East Lombok, Indonesia, improved their speaking skills over time. The research used qualitative method by observing and taking pictures, and quantitative method to gather and analyze the English-speaking test scores to find out the growth of these students' speaking skills. As a result, most of the students' speaking skills improved from a very poor level to sufficient and very good levels. No students were found at a very poor level. Another research done by Heryana, Mobit, and Ridwan (2022) showed that

"The use of flipped classrooms could help students collaborate with each other between group members in formulating problem-solving provided by the teacher and can use class time to be more effective. In addition, flipped classrooms make the learning process easier to use, effective and useful."

Hence, a flipped classroom model helps students learn English not only for an exam but also to develop a skill that will be useful for them inside and outside the classroom. In addition, it will help them connect to the society outside Indonesia as well. Although students are mostly trained to study English for an exam traditionally (Taufik & Purbani, 2019), the flipped classroom model has started to become more popular over time (Afrilyasanti, Cahyono, & Astuti, 2017).

In terms of the perception of students towards the flipped classroom model, research done by Afrilyasanti, Cahyono, and Astuti (2017) showed that "The students found the activities applied in the flipped classroom model helped them write better." In addition, the research showed that the students find the use of a flipped classroom model meaningful to their learning and helpful in developing their English writing ability.

The three research focused on the flipped classroom model on high school EFL students' language acquisition. The first two research showed the impact of the flipped classroom model on students' achievements, and the third one showed the effect of the flipped classroom model on students' satisfaction in class. All three research showed that the flipped classroom model impacts EFL students' learning.

Although those studies proved the impact of the flipped classroom model on students' achievements, speaking skills, and satisfaction, their respondents were students of secondary schools.

Therefore, it must not be taken for granted that the model will work as well with college students unless the research is done. One difference between high school students and college students is described by Howard Johnston (2010) as follows:

“High school teachers monitor student work and offer assistance if they see someone struggling with the material. In college, students are expected to monitor their understanding and seek help when needed. In short, in post secondary education, students assume the major responsibility for their own learning.”

This statement supports the idea that the flipped classroom model may also be effective for college students. The students would monitor their understanding of the subject by studying and practicing at home, and the teacher would create a class environment to facilitate students' participation in various classroom activities, implementing what they have learned at home.

Methodology

Type of Research

This paper is qualitative research that investigates the impact of the flipped classroom model in an Indonesian EFL classroom at the university level on the satisfaction of the students and their achievement in the class, particularly on speaking fluency and accuracy.

Population and Sample

The participants of this paper are 12 EFL students that took General English 4 at Universitas Klabat, Indonesia, of which six are male, and six are female. Their ages are between 19-24. These students have taken General English 3 prior to taking General English 4. All of the students' first language is Bahasa Indonesia.

Instruments

The researcher unitized two research instruments. First, the researcher used eight questions in a survey in a Google Form, focusing on the students' satisfaction in participating in flipped classroom model (see Appendix A). The survey, available both in Bahasa Indonesia and in English, was uploaded to Google Classroom so that the respondents could complete it online. Second, this research used the students' final speaking exam of General English 4 to evaluate their fluency and accuracy in English speaking. The speaking exam was recorded using the voice note application on the phone, which the researcher could replay several times to ensure the accuracy of the evaluation.

Data Collection

The participants opened the survey on Google Form. The students were given the freedom to choose between the two forms. The survey was conducted a day prior to the final speaking exam to ensure that their answers to the survey questions were not influenced by their achievement, whether good or bad. If they took the survey after achieving high scores in their exam, there would be a bias in the correlation between their satisfaction and achievement. For example, students might have said that they were satisfied not because they participated in the flipped classroom model but because of their good grades.

The final speaking exam was in the format of a structured interview. Questions were asked by the teacher (see Appendix B) based on the theme of the lessons the students had learned in class. Students did not know the questions prior to the exam. The three themes were: Agreeing or Disagreeing, Offering Options, and Giving a Recommendation. Each student was interviewed individually in the classroom. The rest of the students would wait outside the classroom. The teacher recorded the answers without notifying the students in case it would make them more nervous. After the set of questions was answered, the teacher informed the student about the recording and asked for their consent to use their recording for this research after explaining the study. All students gave their consent willingly.

Data Analysis Procedure

Google Forms automatically collects the data from the survey and makes a summary of the answers. The data was then made into pie charts and row charts to compare the results. The survey was taken before the participating students took their final exam. Based on this, it is assumed that their final grades did not bias them to express their satisfaction with the flipped classroom model.

The researcher, the teacher of General English 4, gave scores to the participants right at the end of the speaking exam. The interviews were recorded so the researcher could ensure her evaluation's validity. The analysis focused on only two aspects of English speaking: grammar accuracy and speaking fluency. For accuracy, one grammar mistake results in a deduction of one point. For fluency, a 5-second pause means one point of deduction from the total point.

Results and Findings

Results on Students' Satisfaction

The results of the survey are shown in the following charts. The pie charts use percentages to show the different frequencies of the students' answers, while the row charts show the number of frequencies of each solution. Among the five options given on the survey's first question, only two were chosen by the students. The result of the first question showed that 4 (33.3%) students enjoyed the class while eight students (66.7%) students really enjoyed the class, as seen in Figure 1.

Figure 1 *How Much the Students Enjoy a Flipped Classroom Class*

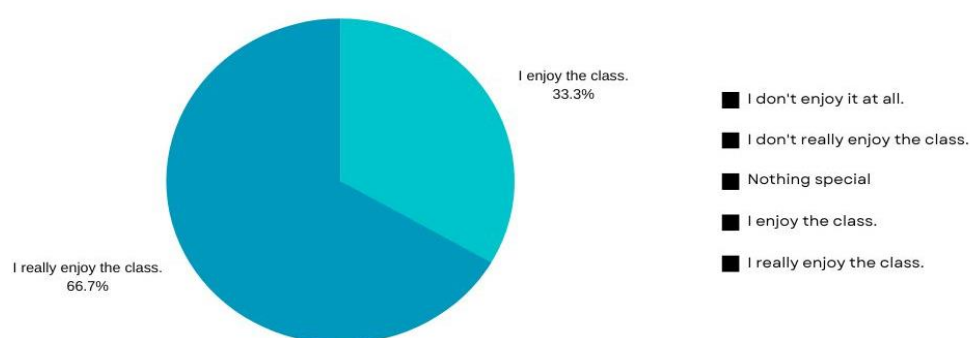


Figure 1. *How Much the Students Enjoy a Flipped Classroom Class*

For the second question, 10 (83.3 %) students understood most things, one student (8.3%) understood everything, and another student (8.3) understood some things in class. The results can be seen in Figure 2.

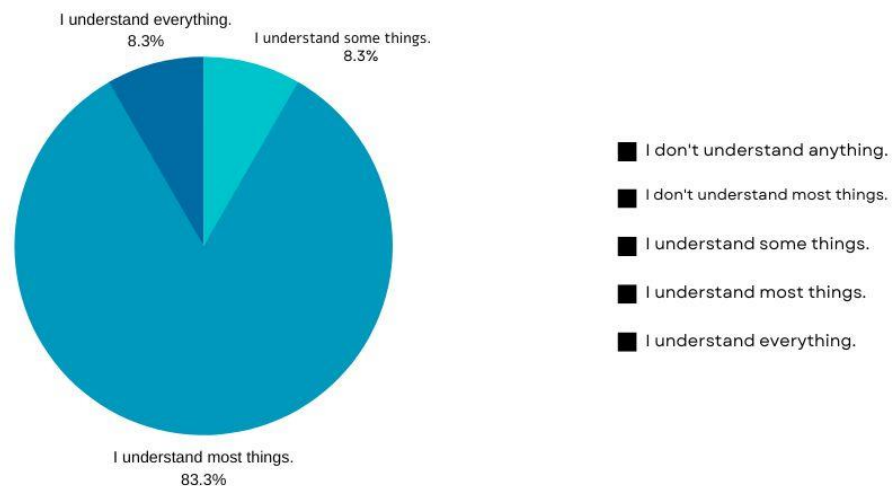


Figure 2. *How Much the Students Understand the Lessons in Class*

In the third question, the results showed that 8 (28.6%) students chose to practice by partners/groups as one of the three activities they enjoyed the most, 6 (21.4%) chose presentations as well as listening activities, and four students (14.3%) chose debate and practicing (drills) on the whiteboard. The results are shown in Figure 3.

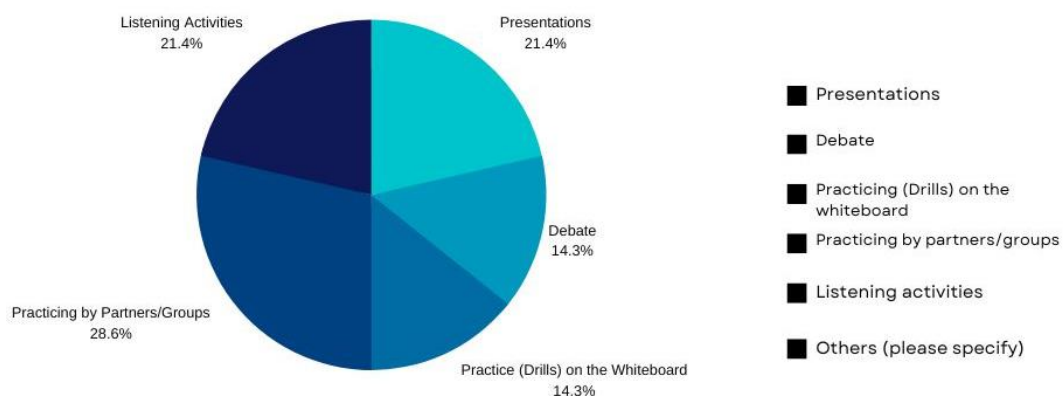


Figure 3. *Activities the Students Enjoy the Most*

The results in the fourth question showed that 6 (26.1%) students chose to listen and practice by partners/groups as one of the three activities they find most helpful, 5 (21.7%) students chose presentations, 3 (13%) decided to debate, 2 (8.7%) chose practice (drills) on the whiteboard, and 1 (4.3%) chose others and identified it as the speaking exam. The results are shown in Figure 4 below.

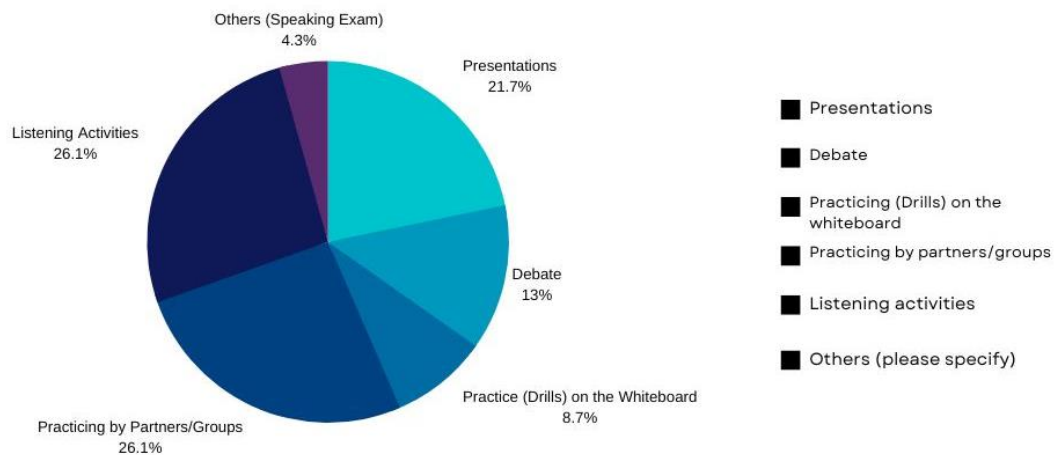


Figure 4. Activities the Students Find the Most Helpful

The results of the fifth question showed that 11 (91.7%) students enjoy using most of the time in class doing work and reading the lesson at home, while 1 (8.3%) student does not enjoy that model of class. The results are shown in Figure 5.

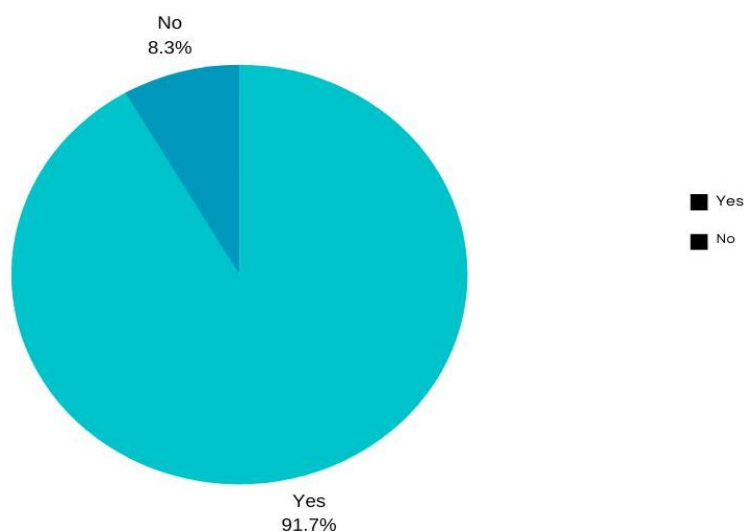


Figure 5. Students' Perception of the Flipped Classroom Model Part 1

The results for the sixth question showed that 5 (41.7%) students wrote "helpful and effective" as their reason for their answer to the fifth question or why they like the flipped classroom model, 2 (16.7%) students wrote "easier to understand", one (8.3%) student wrote "better focus", another wrote "it trains me to study independently", another student wrote "it's better", another wrote "we can discuss with our teacher as our guide", and one wrote "prefer lesson in class and do work at home" as seen on Figure 6.

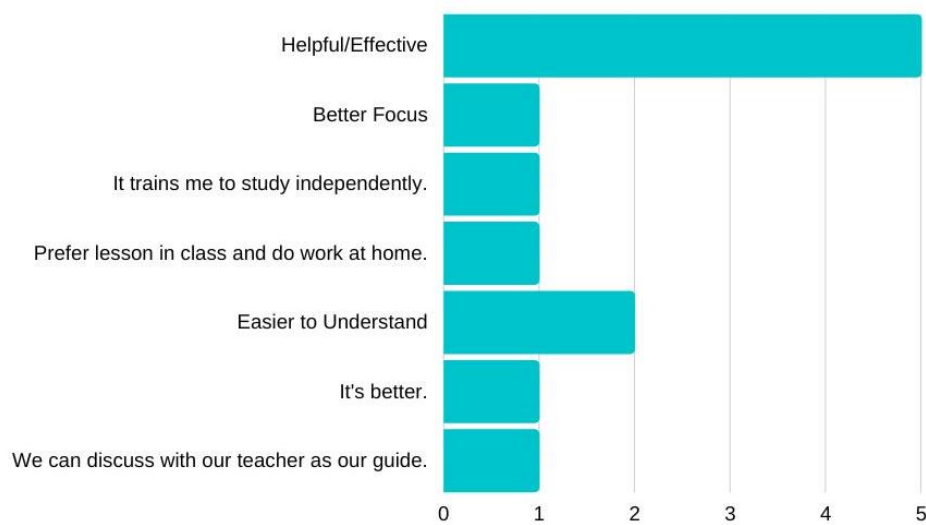


Figure 6. Reasons for Students' Perception

The results for the seventh question showed that out of the four options, only two were chosen. There were 9 (75%) students who agreed that preparing at home helps them perform well in class, while 3 (25%) of the students were neutral about it, as seen in Figure 7.

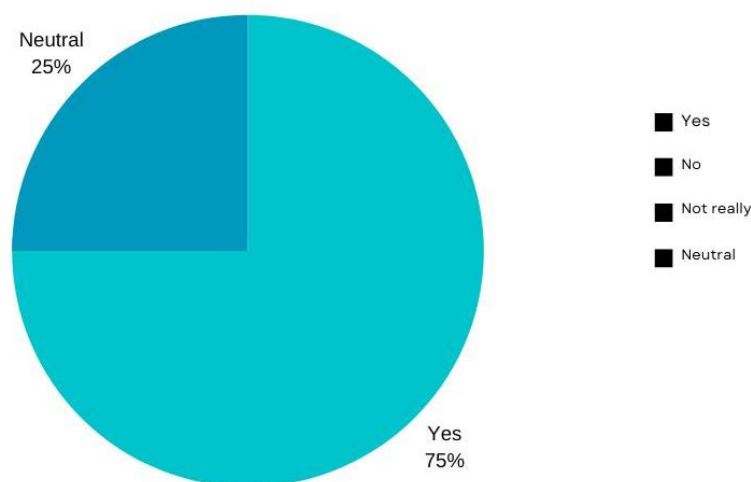


Figure 7. Students' Perception of the Flipped Classroom Model Part 2

For the last question, 6 (50%) students wrote that there is something new and helpful that they got in a flipped classroom model compared to a traditional classroom model, that being "a more active learning in class", 2 (16.7%) answered yes without any explanation, 1 (8.3%) student wrote "a more independent study", another wrote "no", and one student did not give any answer. The results can be seen in Figure 8.

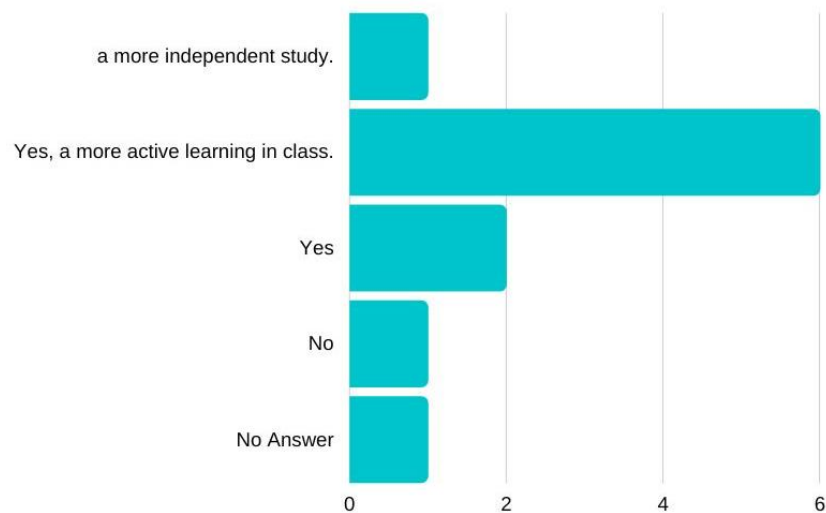


Figure 8. Students' Perception of the Flipped Classroom Model Part 3

Results on Students' Achievement

The results of the speaking exam are indicated in Table 1 and Figure 10.

Table 1 Results of Students' Speaking Exam

Aspects	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11	P12
Accuracy	49	50	46	50	50	48	50	49	46	50	50	50
Fluency	49	50	44	45	50	47	49	50	47	48	48	48

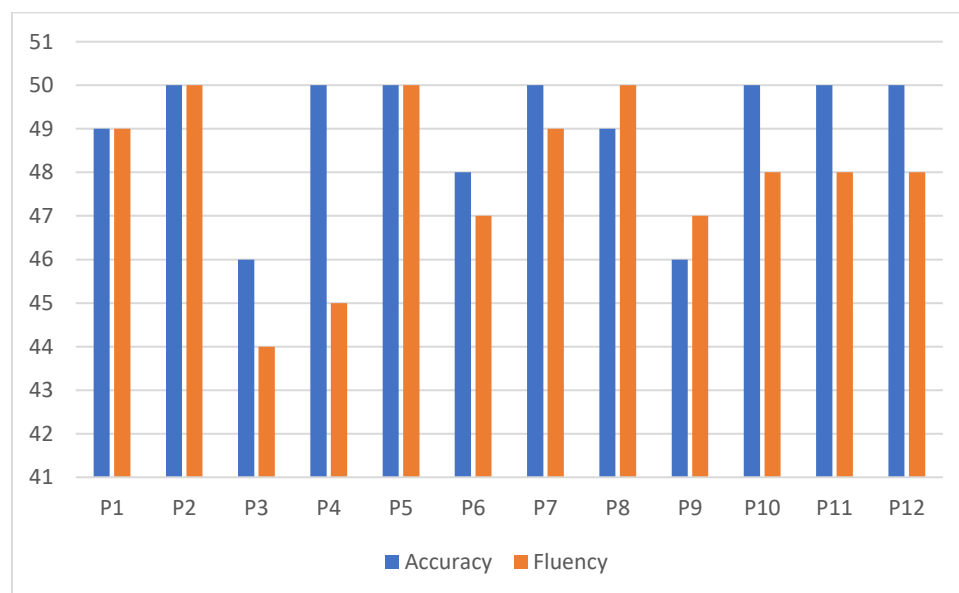


Figure 10. Results of Students' Speaking Exam (Diagram)

Findings

Figure 1 indicates that 100% of the participants enjoyed the flipped classroom model, which two-thirds enjoyed. Figure 2 shows that most participants understood more than half of the lessons covered in class. In Figure 3, listening activities and presentations are tied in votes for the most

enjoyable activity, while in figure 4, listening activities and practicing by partners/groups are linked. The results of figures 3 & 4 show that listening activities, practicing by partners/groups, and presentations are the most helpful and enjoyable activities. The fifth question shows that most of the class found the flipped classroom model to be something they enjoy having and with "helpful and effective" as the most written reason.

Regarding the students' achievements, 7 out of 12 participants got perfect scores in grammar accuracy, and two of them also earned perfect scores in speaking fluency. One participant got perfect score in fluency, although they missed one point in accuracy. Two participants got the lowest score in accuracy, which was 45/50 (90%), and one participant got the lowest score in fluency, which was 44/50 (88%). The average score for accuracy was 49/50 (98%), and for fluency was 47.9/50 (95.8%).

Discussion

The result from the survey overall shows positive feedback from the students. In the survey's first question, there wasn't a student who did not understand the lessons taught in class. This was their claim even before they took the exam. The result of their exams, as shown in figures 9 and 10, affirms their claim. This indicates that, indeed, the flipped classroom model has an impact on EFL students' learning.

Another correlation that could be found between the satisfaction and achievement of the students is how these students enjoyed three activities that have to do with a lot of speaking: Practice by partners/groups, presentations, and listening activities. As Taufik and Purbani (2019) said, "Speaking skill is considered as a crucial skill for English foreign language learners," the three most helpful and enjoyable activities all involve the speaking skill. The listening activity is not passive because students are asked to discuss after listening to the audio. Interestingly, the top three activities they enjoyed the most are the same three activities that helped them the most in their study. Hence, the activities that they are most satisfied which help them with their English speaking skills, which as a result, shows in their good performance on their speaking exam. The fifth question of the survey deals particularly with the flipped classroom model. Only one person did not enjoy the model. It is assumed that they preferred the traditional classroom model, in which students learn about the lesson in the classroom first, and the teacher is a lecturer rather than a facilitator. They must have also been the participant who answered "prefer lesson in class and do work at home" on the sixth question. Interestingly, one student got the lowest score, both in accuracy and fluency. This may correspond to the fact that in the survey, one participant preferred to have lectures in the classroom and to do homework at home. Although the survey was anonymous, it might be interesting to find out if the two results refer to the same participant. If it is true, then it confirms that students' satisfaction with the flipped classroom model contributes to their achievement in the class.

Since the survey was given to the participants a day prior to their speaking exam, it shows that the students were not affected by their final grades from the speaking exam but instead were already satisfied with the model. And since their achievements from the speaking exam are high, this shows the correlation between the students' satisfaction and their speaking achievement. Furthermore, students did not cheat in their exams because the speaking test was done individually, and the questions in the interview were not given out to them to study prior to the exam. On the sixth question, some of the answers given by the students as to why they enjoy the flipped classroom model are specific such as the flipped classroom model helps them to better focus on the learning, trains them to study independently; it makes them understand the lesson more easily; it creates a constructive interaction with the teacher in the classroom. Figure 8 indicates that these reasons are unique to the flipped classroom model because they did not experience these advantages in the traditional lecture classroom model.

Preparing at home helped these students to perform well in class activities. The reasons for students' perception in Figure 6 were not the options given by the researcher. The participants came up with those reasons. Even before the final exam, the students had discovered some advantages and

the effectiveness of the model, just like what Heryana, Mobit, and Ridwan (2022) wrote, "...flipped classrooms make the learning process easier to use, effective and useful." The students were satisfied, and they achieved.

Limitations and Implications

This research has a big room for improvement. Future similar research needs to consider the following:

1. At least one year of full observation and survey with the same group of respondents, following and tracing their progress of achievement, from the beginning to the end of the school year, in all English subjects that involve speaking as one of the main emphases.
2. A more intentional comparison between the traditional and flipped classroom models needs to be made. Students or research participants are to be exposed to both classroom models.
3. Research could also be done by comparing an English-speaking pre-test to compare it with the final Speaking test to see how much of an improvement they have made in their achievement through the flipped classroom model.

Although this research is a simple initial attempt to examine the effectiveness of the flipped classroom model for achievement in accuracy and fluency in speaking English, it may at least stimulate English teachers to consider utilizing this model to help students better develop their language skills.

Conclusion

The results of both the satisfaction survey and the English-speaking exam indicate that there is a correlation between students' satisfaction with the use of the flipped classroom model and their achievement in speaking English, both in accuracy and fluency. The satisfaction was not a result of their achievement. Instead, their achievement results from their satisfaction with the classroom model. A high level of satisfaction goes parallel with high achievement.

The students' satisfaction is related to some specific elements of the flipped classroom model that they did not find in the traditional lecture classroom model. These unique elements include independent study of the students, more active interaction with classmates in the classroom, the teacher being a facilitator, and the ability to understand the subject more easily.

References

- [1] Afrilyasanti, F., Cahyono, B.Y., Astuti, U. (2017). Indonesian EFL students' perceptions on the implementation of flipped classroom model Rida Afrilyasanti Sekolah Menengah Atas (Senior High School) Negeri 8 at Malang, Indonesia. *Journal of Language Teaching and Research*, 8(3), 476-484. <http://dx.doi.org/10.17507/jltr.0803.05>
- [2] DeLozier, S.J., Rhodes, M.G. (2017). Flipped classrooms: A review of key ideas and recommendations for practice. *Educational Psychology Review*, 29, 141–151. <https://doi.org/10.1007/s10648-015-9356-9>
- [3] Heryana, L.M., Mobit., Ridwan, I. (2022). Engaging flipped-classroom model in an Indonesian EFL grammar instruction. *Jurnal Pendidikan Bahasa*, 9(1), 1-9. <https://unimuda.e-journal.id/jurnalinteraction/article/view/1520/980>
- [4] Johnston, H. (2010). Research brief: Transition from high school to college. *Education Partnership, Inc.* <https://files.eric.ed.gov/fulltext/ED538705.pdf>
- [5] Limniou, M., Schermbrucker, I. & Lyons, M. (2018). Traditional and flipped classroom approaches delivered by two different teachers: The student perspective. *Education and Information Technologies*, 23, 797–817. <https://doi.org/10.1007/s10639-017-9636-8>

- [6] Taufik, W.J. (2020). The Implementation of flipped classroom as an attempt to improve Indonesian EFL learners' speaking performance. *Proceedings of the International Conference on Educational Research and Innovation (ICERI 2019)*.
<https://doi.org/10.2991/assehr.k.200204.028>

Appendices

Appendix A

This summer, you were introduced to the flipped classroom model of learning, which is a type of learning where you are first introduced to the lesson at your own home and then come to the class to learn by practicing, doing presentations, having peer assessments and reviews, etc.

This questionnaire is to evaluate how much the students enjoyed learning English through a flipped classroom model.

Please answer honestly.

1. How much do you enjoy the class?
 - a. I don't enjoy it at all
 - b. I don't really enjoy the class
 - c. Nothing special
 - d. I enjoy the class.
 - e. I really enjoy the class.
2. How much do you understand the lessons from this class?
 - a. I don't understand anything.
 - b. I don't understand most things.
 - c. I understand some things.
 - d. I understand most things.
 - e. I understand everything.
3. Please choose 3 activities you enjoy the most: A) Presentations - B) Debate - C) Practicing (Drills) on the white board - D) Practicing by partners/groups - E) Listening activities - F) Others (please specify)
4. Please choose 3 activities that helps you the most: A) Presentations - B) Debate - C) Practicing (Drills) on the white board - D) Practicing by partners/groups - E) Listening activities - F) Others (please specify)
5. Do you enjoy the class by 1) using most of the time in class doing work and 2) reading the lesson at home?
 - a. Yes
 - b. No
6. Please state the reason why for your answer to question #5.
7. Does preparing at home help you perform well in class?
 - a. Yes
 - b. No
 - c. Not really
 - d. Neutral
8. Is there something helpful and new in the flipped classroom model of learning that you do not get in a traditional classroom model?

Appendix B

Teacher's Notes: Questions for the Final Speaking Exam

Agree or Disagree

1. News from Instagram or from news websites/TV
 - a. Which source of news do you think is more reliable, from Instagram or from news websites and the television?
2. Follow up statement if they don't explain why: I think that (state the opposite answer from their answer) is more reliable because (state my reasons)

Interests and Options

1. I am interested in being more fluent in speaking English. What should I do?
2. What are you interested in?

Recommendations

1. I'm really hungry. I haven't eaten breakfast.
2. What about you? What are you planning to eat for lunch later?

Determining the Factors that Influence Job Satisfaction and Motivation of Foreign Teachers in Five Private Schools in Bangkok, Thailand during the Pandemic

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Abstract: Covid-19 pandemic has had significant influences on the teaching-learning process; thus, influencing teacher's motivation and job satisfaction. Hence, this paper aimed to examine the factors influencing the job satisfaction and motivation of foreign teachers in Bangkok, Thailand during the pandemic. This study used a quantitative research method with a descriptive correlational design. The purposive sampling technique was also used, with 126 respondents from five private schools in Bangkok, Thailand. A validated and reliable online survey questionnaire was used to collect the data for this study. The data collected was analyzed through mean frequencies and Pearson-r correlation. The study found that foreign teachers, despite the challenges during the pandemic, remained satisfied with job security, relationships with their colleagues, getting visa and work permits, co-teachers support, the school leadership and administration, as well as salary and allowances. The study found that salary and benefits and helping students were very motivating. Moreover, there was a significant correlation between foreign teacher's job satisfaction and motivation. The study suggests that salary increment, management and administration support, and job security significantly improve foreign teachers' job satisfaction. Lastly, salary increment and benefits, training and promotion opportunities, good working environment, and good co-worker relationship will improve foreign teachers' work motivation. These findings are relevant as they are opposed to what was expected. Despite the pandemic, the results showed that the teachers from the selected five private schools in Bangkok remained very motivated and satisfied with their jobs. This means that teachers chose resilience and grit in the face of adversities such as the covid-19 pandemic.

Keywords: *Thailand foreign teachers; job satisfaction; teacher's motivation; COVID-19 pandemic*

1. Introduction

COVID-19 is a global pandemic that has led to millions of infections and deaths (WHO, 2021). COVID-19 pandemic has affected the education sector in Thailand and globally (Vanpetch & Sattayathamrongthian, 2020). COVID-19 measures have shifted learning in the education sector from traditional to online teaching, leading to increased workload for teachers, burnout and techno stress, which have significant affects on the job satisfaction and motivation (Johannes, 2020; König et al., 2020; Mastura & Santari, 2020; Mgamal & Al-Matari, 2020; Panisoara et al., 2020; Siahaan, 2020). COVID-19 brought major disruptive or new changes in education and teaching process affected motivation and job satisfaction of teachers (Satrianingrum et al., 2021; Vanpetch & Sattayathamrongthian, 2020). In Bangkok, Thailand, the COVID-19 pandemic has sweeping implications for foreign teachers teaching in Thailand, which influenced their health, motivation, and job satisfaction (Vanpetch & Sattayathamrongthian, 2020). Therefore, this paper examines the factors influencing the job satisfaction and motivation of foreign teachers in five private schools in Bangkok, Thailand, during the COVID-19 pandemic. Specifically, this study seeks to answer the following research questions:

1. What are the key factors influencing job satisfaction and motivation of foreign teachers in Bangkok, Thailand during the pandemic?
2. Is there a significant relationship between the teachers' job satisfaction and motivation?

3. What suggestions do the teachers give that will improve job satisfaction and motivation during the pandemic?

2. Literature Review

2.1 Motivation and Job Satisfaction

Various studies have examined the motivation and job satisfaction of teachers before the pandemic to identify factors influencing teacher's motivation and satisfaction levels. For instance, Tayyar (2014) investigated the general job satisfaction and motivation of teachers in boys' secondary schools in Saudi Arabia and found that the interpersonal relationships, supervision, and social status, workload and conditions, salary and promotion, and student progress positively influenced job satisfaction of teachers. However, the findings revealed that the staff development contributed to teachers' dissatisfaction. In a study conducted in Thailand, Wang (2017) found that remuneration for teachers, better salary, organizational support, and interpersonal factors influence the motivation and job satisfaction of teachers. Similarly, Syamananda (2017) examined the factors that motivated and demotivated EFL teachers in a Thai university and found teacher's value interpersonal relationships with students and colleagues and other intrinsic motivations such as imparting knowledge and providing service to society. The result also showed that teachers are demotivated by extrinsic factors such as heavy workload and low salary, which are believed to lead to job dissatisfaction. Nawaz and Yasin (2015) also found out that the motivation and job satisfaction of teachers have more significant implications on the turnover, productivity, and performance, as well as their willingness to perform several teaching tasks. Work stress, job satisfaction, commitment, and employee motivation significantly influence teacher's performance, productivity, and wellbeing (Davidescu et al., 2020). Teachers' motivation and job satisfaction have significant effects on the academic performance and achievement of students (Asif et al., 2016). The Fredrick Hertzberg's Job Satisfaction model and Herzberg's two-factor theory of motivation suggest that workers' motivation and job satisfaction are influenced by factors outside or within the workplace setting. These factors include internal politics, job-related stress, organizational culture, and the structure of the organization (Alrawahi et al., 2020). However, the increased pressure that teachers experience when teaching more students in learning institutions combined with work-related and workplace setting challenges, as well as the considerably changing working conditions and dynamic academic needs of learners has significantly affected the motivation and job satisfaction levels of teachers (Luckner & Dorn, 2017).

2.2 COVID-19 Effect on Job Satisfaction and Motivation

In Thailand, teachers' motivation and job satisfaction have remained a significant concern due to the increasing levels of job dissatisfaction of Thai teachers and intention to leave during the pandemic. This is a concern because the COVID-19 pandemic disrupted teaching activities, increased workload and posed significant health challenges to them. For example, moving to online teaching to facilitate virtual learning has increased the workload, resulting in increased burnout, which affecting the motivation and job satisfaction levels of teachers in Thailand. Recent studies show the COVID-19 have significant impacts on teacher's job satisfaction and motivation. For instance, Verma and Priyamvada (2020) found that COVID-19 was associated with poor teaching conditions. Also, shifting to online teaching had disadvantage for some teachers because of their training and broadband (internet) while other teachers reported difficulties to set work from home. Teacher's workload and pressure significantly increased during the COVID-19 pandemic. As a result, all negatively affected motivation and job satisfaction of teachers by decreasing the motivation as well as jobs satisfaction levels of school teachers (Verma & Priyamvada, 2020).

COVID-19 negatively affected the motivation of the primary teachers (Johannes, 2020; Rasmitadila et al., 2020). COVID-19 is negatively affecting teacher's motivation and job satisfaction levels (Mastura & Santari, 2020; Siahaan, 2020). Specifically, Mastura and Santari (2020) found that the pandemic

negatively affects motivation and job satisfaction because there was no salary increment or teaching stimulus during the pandemic. Also, the pandemic caused disruptions of the teaching process, which lead to increased workload as teachers work from home to teach online. The increased workload was associated with burnout and low levels of motivation and job satisfaction of teachers during the pandemic. Siahaan (2020) also found that the adoption of online studying during the pandemic forced teachers to rethink about learning model or technique that will be used, which can work with some teachers and fails with others; thus, becoming a demotivating factor that negatively affects motivation

Moreover, changes on education and teaching process due to COVID-19 have contributed to low motivation and job satisfaction of teachers (König et al., 2020; Satrianingrum et al., 2021). For example, Satrianingrum et al. (2021) found COVID-19 changes on education and teaching process that caused introduction of online teaching and more workload for teachers without salary increment or additional benefits has contributed to low motivation and job satisfaction of teachers during the COVID-19 pandemic. König et al. (2020) found that teachers found it difficult to adapt to online teaching due to lack of adequate support from the school administration and management, as well as lack of collaboration between the parents and students, contributing to low motivation and job satisfaction of teachers.

Based on the literature review, the problems or challenges concerning teachers' motivation and job satisfaction during the pandemic include salary and benefits, job responsibilities, school leadership and administration, students, relationships with colleagues and administrators, lack of facilities and resources to run online classes, difficulties in online or hybrid delivery. For example, Abós et al. (2019) examined teachers' motivation and job satisfaction levels based on self-determination theory in Spain, and found that motivation and job satisfaction levels were significantly affecting the availability of facilities and resources for enhancing adaptive teaching outcomes, leading to improved teachers' productivity. Iqbal et al. (2016) examined the association between learner's academic performance and job satisfaction of teachers in India and found that higher student academic achievements and improved teaching quality as well as teachers' productivity and performance were associated with teachers' high job satisfaction and motivation levels. The job satisfaction of teachers was significantly associated with better teacher relationships with colleagues and administrators. Kumar (2019) evaluated how teacher's job satisfaction was impacted by compensation factors in Bangladesh, and found that salary, compensation, allowance, good working environment, job advancement and promotion, recognition, job security, as well as bonus improved the level of job satisfaction of teachers. The systematic review findings conducted by Ma'ruf et al. (2020) revealed that leadership style contributes to the motivation and job satisfaction of teachers. For example, Ma'ruf et al. (2020) study results showed that principle's leadership style and school leadership and administration have significant impacts on the teacher's job satisfaction.

Nawaz and Yasin (2015) examined the factors influencing the motivation of secondary school teachers in Bahawalpur, Pakistan, and found that less distance covered from the school, class size, availability of learning resources, work environment, working conditions (i.e., presence of staff rooms), students' positive behavior, unbiased appraisals, good and prompt salary are the main factors that influence the motivation of teachers. Ansah-Hughes (2016) assessed the factors influencing job satisfaction of teachers in Ghana, and found that better salary/pay and increased job security increased the level of job satisfaction among teachers. Toropova et al. (2021) investigated the factors influencing job satisfaction of teachers in Sweden, and found that teacher characteristics, such as relationship with administrators and colleagues or teacher cooperation, as well as school working conditions play an important role in job satisfaction of teachers. Khaliq (2018) examined the factors influencing job satisfaction of teachers in Pakistan and found that relationship with colleagues, salary, and benefits, as well as promotion, have significant impacts on teachers' job satisfaction.

Even though these studies have highlighted factors influencing motivation and job satisfaction of teachers, none of the above studies have examined the factors influencing foreign teachers' job satisfaction and motivation during the Covid-19 pandemic time in Bangkok, Thailand. Thus, leaving a literature gap that this study will fill by examining how dimensions, like include salary and benefits, job responsibilities, school leadership and administration, students, relationships with colleagues and administrators influence motivation and job satisfaction of teachers during the COVID-19 pandemic.

3. Methodology

This study was conducted using a quantitative method with descriptive correlational method, to examine the factors influencing job satisfaction and motivation of foreign teachers in five private schools in Bangkok, Thailand during the pandemic. Quantitative research methods were used to quantify the study participant's views or attitudes on the study variables to produce generalized results in a large study population, to answer the research questions and achieving the purpose. The quantitative method with descriptive survey method was chosen because it helped in the generation of numerical data that can be statistically analyzed and interpreted to provide answers to the research questions (Grag, 2018). A survey questionnaire is used to collect data in the study. The study sample size included 126 participants (foreign teachers) teaching in five private schools in Bangkok, Thailand. The participants were from five different private schools in Bangkok, Thailand, comprising 63 males and 63 females of diverse nationalities. Also, 10 participants teach in early years or kindergarten, while 68 teach in primary schools, and 48 teach in secondary school.

The survey questionnaire for data collection was designed based on the research objectives and research questions. The questionnaire included five parts. The first part was about demographics. The second part was about factors of job satisfaction, while part three included job satisfaction statements, and part four was about factors of motivation. The last part of the questionnaire included open-ended questions. The instrument was validated, piloted, and run for reliability test. Based on the reliability analysis, the value of Cronbach's Alpha is .974 for all the 103 items, which means that the research instrument is reliable. The statistical tools that were used included mean frequencies, One-Way ANOVA, and Pearson Correlation Coefficient. Specifically, frequency analysis and descriptive statistics, such as mean and standard deviation, were used to analyze the main factors influencing job satisfaction and motivation of foreign teachers in Bangkok, Thailand during the pandemic. The Pearson-r Correlation was performed to determine if there is a significant correlation between the teachers' job satisfaction and motivation.

4. Results and Discussion

RQ1. What are the main factors influencing job satisfaction and motivation of foreign teachers in Bangkok, Thailand during the pandemic?

Based on the result, the overall mean score of salary and benefits, as well as colleagues were 3.42 and 3.66, respectively². This illustrates that salary and benefits, as well as colleague relationship and support, are main factors influencing job satisfaction and motivation of foreign teachers in Bangkok, Thailand during the pandemic. The overall mean score of students, school facilities and resources, and teaching and job responsibilities were 3.67, 3.48 and 3.49, respectively³. Thus, implying that students, availability of school facilities and resources, as well as teaching responsibilities, influenced the job satisfaction and motivation of foreign teachers. These results are consistent with literature findings by Ansah-Hughes (2016), Iqbal et al. (2016), Khaliq (2018), Ma'ruf et al. (2020), Nawaz & Yasin (2015) and Toropova et al. (2021) discussed in the literature review. In summary, the literature findings found that availability of facilities and resources for enhancing adaptive teaching outcomes (Abós et al.,

² As shown in Table 1.

³ As shown in Table 1.

2019), better teacher relationships with colleagues and administrators (Iqbal et al., 2016; Toropova et al., 2021), relationship with colleagues, salary and benefits, as well as promotion have significant impacts on teachers' job satisfaction (Khaliq, 2018), principle's leadership style (Ma'ruf et al., 2020), availability of learning resources, work environment, working conditions (i.e., presence of staff rooms), students' positive behavior, unbiased appraisals, good and prompt salary (Nawaz & Yasin, 2015) were key factors influencing job satisfaction and motivation of teachers.

The overall mean of school leadership and administration was 3.45, implying that school leadership and administration influences foreign teacher's motivation and job satisfaction levels. These findings are consistent with Muga et al. (2017) results, which suggest that educational leadership has a strong impact on job satisfaction and motivation levels of teachers. Most of the factors remain satisfied except professional development ($M = 3.14$)⁴, because the participants (foreign teachers) offered diverse views on how the school leadership supports their professional development and how it impacts the overall job satisfaction. For example, some participants reported absence of opportunities for professional development, while others stated training is needed for their professional development.

Also, the participants were neither satisfied nor dissatisfied with professional development because some viewed professional development is an important factor compared to salary increment, provision of bonus, availability of resources to support online teaching, and support from school leadership and administration during the pandemic.

The mean of salary and benefits was 3.44, implying that the salary and benefits were a motivating factor that influences motivation of foreign teachers. The overall mean scores of students, teaching job and responsibilities, as well as school leadership and administration were 4.13, 3.87, and 3.53, respectively. These mean scores imply that foreign teachers found students, teaching job and responsibilities, as well as school leadership and administration very motivating. These results are consistent with literature findings by Kumar (2019), which reveals that salary, compensation, allowance, students, good working environment, job advancement and promotion, recognition, teaching job security, as well as bonus improved the level of job satisfaction and motivation of teachers. Also, the results are consistent with Khaliq (2018), who reported that school leadership and administration, as well as leadership style, have significant impacts on teacher's motivation.

RQ2. Is there a significant relationship between the teachers' job satisfaction and motivation?

The study examined if there is a significant correlation between the teachers' job satisfaction and motivation. The Pearson r Correlation analysis revealed that there was a strong, positive and significant correlation between foreign teacher's job satisfaction and motivation ($r = 0.62$, $p = .000$)⁵.

These findings show that foreign teacher's job satisfaction was related to their motivation; thus, rejecting the null hypothesis. These findings are consistent with Kian et al. (2014) literature results, which revealed that a positive and significant correlation between motivation and job satisfaction, as well as complement relationship between motivation and job satisfaction towards other organizational variables. These findings imply that foreign teacher's job satisfaction is significantly related to motivation in educational institutions during the COVID-19 pandemic.

RQ3. What suggestions do the teachers give that will improve job satisfaction and motivation during the pandemic?

⁴ As shown in Table 1.

⁵ As shown in Table 2.

The findings reveal that salary increment or salary and benefits, school management's support, training, support from the school and parents, job security, as well as parent-teacher relationships and students will ameliorate foreign teacher's job satisfaction during the pandemic. These findings were consistent with the literature findings by Mastura & Santari (2020), revealing that salary and benefits, support from school administration and management support, training, job security, as well as parent-teacher relationships enhances teacher's job satisfaction levels. Similarly, salary and benefits, promotion and awards/recognitions, student engagement, good working environment and co-workers' relationship, job security, training, work appreciation/motivation, and support from the school management/ leadership will ameliorate foreign teacher's work motivation during the pandemic. These findings were consistent with the literature findings by Mastura & Santari (2020), and Rasmitadila et. al. (2020), which reveal that provision of benefits, salary increment, adequate support from leadership, a training, promotion opportunities, good working environment, and good co-worker relationship improves teacher's motivation levels.

5. Conclusions and Recommendations

Despite the pandemic, the results showed that the teachers from the selected five private schools in Bangkok remained very motivated and satisfied with their jobs. Salary packages and benefits stood out as the main factor influencing job satisfaction and motivation. This means that the pandemic has not significantly affected enrollment, as salary packages remained motivating. It is also likely that relationships with colleagues were strengthened when the pandemic hit due to the number of meetings online teachers had to attend. Those meetings strengthened rapport and support, especially in coping with the challenges in the transitions from online to face-to-face modalities and vice versa. Among the factors influencing job satisfaction, professional development scored neutral. Perhaps it is due to school principals and administrators prioritizing quality instruction and student learning. Although online training about online or hybrid learning modalities is already considered professional development, many teachers do not view it this way. The challenges in the change in instructional delivery and supervision clouded the idea of professional development. With this, an intervention program might be proposed to help teachers improve their teaching performance and stay motivated and satisfied with their jobs.

This study is limited to five private schools in Bangkok only. Extended research focusing on dimensions of motivation and job satisfaction that are highly likely affected by the pandemic can be further researched. Also, expanding the scope to private and public schools and higher education is suggested to have more points of comparison. Moreover, more qualitative data should also be collected and thematically analyzed to find areas that can be improved and boost motivation and job satisfaction, even post-pandemic. This study's findings are relevant as they are opposed to what was expected. During the pandemic, teachers were expected to lose motivation and be less satisfied at work, especially in their delivery, whether online or hybrid. Issues with school facilities and resources, and communicating with students, colleagues, and supervisors likely affected motivation and job satisfaction negatively. However, the results of this study showed the opposite. This implies that teachers chose resilience and grit in the face of adversities, such as the COVID-19 pandemic. They continued to build good relationships with colleagues, students, and school administrators. They performed their job and responsibilities well remotely and independently. Considering how online teaching doubles the amount of work, the teachers chose to deliver quality instruction. As a result, students continued to engage in learning, and teachers were satisfied with students' performance. These findings are relevant, as they can be used to compare future research findings. If the COVID-19 pandemic did not shake teachers' motivation and job satisfaction, what will?

References

- [1] Abós, Á., Haerens, L., Sevil-Serrano, J., Morbée, S., Julián, J. A., & García-González, L. (2019). Does the Level of Motivation of Physical Education Teachers Matter in Terms of Job Satisfaction and Emotional Exhaustion? A Person-Centered Examination Based on Self-Determination Theory. *International journal of environmental research and public health*, 16(16), 2839.
- [2] Alrawahi, S., Sellgren, S. F., Altouby, S., Alwahaibi, N., & Brommels, M. (2020). The application of Herzberg's two-factor theory of motivation to job satisfaction in clinical laboratories in Omani hospitals. *Heliyon*, Volume 6, Issue 9, e04829.
- [3] Ansah –Hughes, W. (2016). Assessing the Impact of Teacher Job Satisfaction Among Teachers. *Journal of Education and Practice*, Vol.7, No.30.
- [4] Asif, I., Fakhra, A., Tahir, F., & Shabbir, A. (2016). Relationship between teachers' job satisfaction and students' academic performance. *Eurasian Journal of Educational Research*, 65, 335-344.
- [5] Davidescu, A. A. A., Apostu, S.A., Paul, A., & Casuneanu, I. (2020). Work Flexibility, Job Satisfaction, and Job Performance among Romanian Employees— Implications for Sustainable Human Resource Management. *Sustainability*, 12, 6086. doi:10.3390/su12156086.
- [6] Garg, G. (2018). *Research methodology: Methods and techniques*, New Delhi: New Age International (P) Limited, Publishers.
- [7] Iqbal, A., Aziz, F., Farooqi, T. K., & Ali, S. (2016). Relationship between teachers' job satisfaction and students' academic performance. *Eurasian Journal of Educational Research (EJER)*, 16(64), 1-35. DOI: 10.14689/ejer.2016.64.19.
- [8] Johannes, J. (2020). The impact of COVID-19 on teachers' perception at primary school. *International Journal of Research and Review*, 7(10): 498-502.
- [9] Khaliq, A. (2018). Effect of Salary, Promotion, and Relationships with Colleagues on Secondary School Teachers' Job Satisfaction. *PJERE*, 4(1), pp. 1-20.
- [10] Kian, T., Yusoff, W., & Rajah, S. (2014). Motivation for generations' cohorts: An organizational justice perspective. *International Journal of Management Sciences*, 11(2), 536–542.
- [11] König, K., Jäger-Biela, D. J., & Glutsch, N. (2020) Adapting to online teaching during COVID-19 school closure: teacher education and teacher competence effects among early career teachers in Germany. *European Journal of Teacher Education*, 43, 4, 608-622.
- [12] Kumar, D. (2019). Impact of Compensation Factors on Teachers' Job Satisfaction: An Econometric Focus. *Global Disclosure of Economics and Business*, 5(2).
- [13] Luckner, J. L., & Dorn, B. (2017). Job satisfaction of teachers of students who are deaf or hard of hearing. *The Journal of Deaf Studies and Deaf Education*, 22(3), pp. 336–34.
- [14] Ma'ruf, Z., Annisa, D., & Akmal, S.L. (2020). Teacher's Job Satisfaction: Does School Principals' Leadership Style Matter? A systematic Review. *International Journal of Scientific & Technology Research*, Volume 9, Issue 01.
- [15] Mastura, M., & Santaria, R. (2020). The Impact of the Covid-19 Pandemic on the Teaching Process for Teachers and Students. *Journal of Teacher Studies and Learning*, 3 (2), 289-295.
- [16] Mgammal, M. H., & Al-Matari, E. M. (2020). Survey data of coronavirus (COVID-19) thought concern, employees' work performance, employees background, feeling about job, work motivation, job satisfaction, psychological state of mind and family commitment in two middle east countries. *Data in brief*, 34, 106661. <https://doi.org/10.1016/j.dib.2020.106661>
- [17] Muga, O. P., Onyango, A. G., & Jackline, N. (2017). Leadership Styles Practiced by Principals in Public Secondary Schools in Siaya, Kisumu and Kajiado Counties, Kenya. *European Journal of Education Studies*, Volume 3, Issue 9. doi: 10.5281/zenodo.846450.
- [18] Nawaz, N., & Yasin, H. (2015). Determinants of motivation in teachers: A study of private secondary school's chain networks in Bahawalpur. *Journal of Education and Practice*, 4(6).

- [19]Panisoara, I. O., Lazar, I., Panisoara, G., Chirca, R., & Ursu, A. S. (2020). Motivation and Continuance Intention towards Online Instruction among Teachers during the COVID-19 Pandemic: The Mediating Effect of Burnout and Technostress. *International Journal of Environmental Research and Public Health* 17(21), 1-29.
- [20]Rasmitadila, R., Aliyyah, R. R., Rachmadtullah, R., Samsudin, A., Syaodih, E., Nurtanto, M., & Tambunan, A. R. S. (2020). The Perceptions of Primary School Teachers of Online Learning during the COVID-19 Pandemic Period: A Case Study in Indonesia. *Journal of Ethnic and Cultural Studies*, 7(2), 90-109. <http://dx.doi.org/10.29333/ejecs/388>
- [21]Satrianingrum, A. P., Prasetyo, I., Anak, P., Dini, U., & Yogyakarta, U. N. (2021). Teacher Perceptions of the Impact of the Covid-19 Pandemic on the Implementation of Online Learning in PAUD. *Journal of Early Childhood Education*, 5(1), 633–640.
- [22]Siahaan, M. (2020). The Impact of the Covid-19 Pandemic on the World of Education. *Journal of Scientific Studies (JKI)*, 1(1), 73–80.
- [23]Toropova, A., Myrberg, E., & Johansson, S. (2021) Teacher job satisfaction: the importance of school working conditions and teacher characteristics. *Educational Review*, 73(1), 71-97.
- [24]Vanpetch, Y., & Sattayathamrongthian, M. (2020). The challenge and opportunities of Thailand education due to the covid-19 pandemic: case study of Nakhon Pathom, Thailand. *E3S Web of Conferences*, 210, 18058, ITSE-2020.

Perceived Helpful Teacher Personalities by Students Learning to Speak English as a Second Language at Asia-Pacific International University

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Abstract: The study investigated the students in Asia-Pacific International University (AIU) who were learning to speak English as a second language. To select the participants the researchers used random sampling technique. There are twelve females and seven males who participate in this study. Their ages are above 18 years old. There are eleven senior students, six junior students, one sophomore student, and one Freshman. There are seventeen students come from international program and two students come from Thai program. Country of the origin of five students is Thailand, seven students are China, three students are Malaysia, and one student each from Brazil, Lao, and Sri Lanka. Due to the limitation of COVID-19, the questionnaire survey was conducted through the Internet. These students come from different majors in different faculties. All participants agreed to the use of the results of the questionnaire for research-based learning as well for publication.

In order to better determine the relationship between the perceived helpful teacher personalities and the level of the students ability to speak English, the participants filled up a questionnaire for the teacher personalities that they perceived helpful when they were learning to speak English. We also conducted the following survey on students to evaluate their oral English level.

Correlation analysis showed the relationship between perceived helpful teacher personality and level of speaking English. The three highest are Genuineness ($r = -0.47921$), Courageous ($r = -0.29011$), and Independent ($r = -0.26845$)

The result from a 5-point scale revealed that participants perceived that the teacher personality that helped them the most when they were learning to speaking English was Empathy (mean = 4.3684), Kindness (mean = 4.3158), and Forgiveness (mean = 4.3158). Least helpful teacher personalities as perceived by the participants were Serious (mean = 3.3684) and Courageous (mean = 3.8421).

Keywords: *teacher personality, speaking English as a second language, students from non-English speaking country*

Introduction

Practitioners, policymakers, and researchers have been debating what makes a good teacher for decades. There is, however, no guiding framework for determining which skills are essential for instructors. As a result, a recognized framework must be used to assess these skills, as well as summary of the existing literature on the subject. (Kim, 2018)

Many teachers in inclusive education find it challenging to teach students with emotional and behavioral issues (EBD). Many studies have been conducted to determine what distinguishes expert teachers from their less experienced counterparts. Recent research suggests that personality is a key component influencing teacher performance. The predictive relevance of teacher personality for teacher quality in teaching kids with EBD in a sample of Dutch primary school teachers was investigated in this study. Extraversion, agreeableness, conscientiousness, neuroticism, and openness to experience were used to measure personality using a self-report questionnaire based on the personality dimensions of the Five Factor Model of personality. An observation instrument, a self-efficacy questionnaire, and a nomination method were used to assess different aspects of teacher quality in teaching students with EBD. Teachers' quality in teaching students with EBD was found to be predicted by the qualities of agreeableness, conscientiousness, and openness to experience, as measured by the self-efficacy questionnaire. Overall, the self-efficacy questionnaire revealed that personality explained 35% of the variance in teacher quality in teaching kids with EBD. The findings are related to teacher education and employment. Future research directions are discussed. (Buttner, 2015)

Statement of the Problem

This correlation study specifically wants to answer the main question, what is the relationship between perceived helpful teacher personality when learning how to speak English and the level of ability in speaking English?

Theoretical Framework

Teacher personality

Kim and MacCann (2018) in their study mentioned that personality is a key which affects the student outcome. A teacher who has high a level of agreeableness can understand and encounter the various types of classroom situations. Also how teachers react and what they do in the classroom will affect the student behavior.

The purpose of this review is to show how discoveries from personality theories can aid educational psychology in developing a more detailed explanation of teacher personality's function in the educational process. Studies of teacher typologies, studies of teachers' desirable and undesirable characteristics, studies of teachers' professional behaviors and their influence on students, studies of teachers' professional identity, and studies of teacher personality within the framework of personality theories are the five groups of studies in psychology and related fields which are critically examined. Arguments in favor of personality theories are examined, as well as methodological challenges in assessing instructors' personalities that involve data collecting and research design. The findings on teachers' personalities obtained in the context of personality theories, according to the article, may currently serve as the best starting point for a more comprehensive psychological theory of teacher personality in educational psychology – especially when compared to current knowledge on small social group management and aspects of learning and development theories. (Gonc, 2017)

Teaching foreign/second languages is an inherently difficult profession, and stress levels among educators are rising over the world. Given the importance of language instructors' feelings of stress and well-being in their capacity to teach effectively, it's remarkable that this topic has gotten so little academic attention to date. Measures of the big five personality traits, the PERMA wellbeing framework (positive emotion, engagement, relationships, meaning, and accomplishments), and two types of stressors (chronic stressors, and life events/daily hassles) were acquired via eMoodie, a specially designed smartphone app, as part of a large study. Both personality and stress are

consistently linked to teacher happiness, according to the findings. Personality and stress, on the other hand, were shown to be unrelated. (MacIntyre, 2019)

Kim and Maccann (2018) used a meta-analysis to examine the connections between the Big Five personality domains (openness, conscientiousness, extraversion, agreeableness, and emotional stability) and two teacher job-related outcomes (teacher effectiveness and burnout) across 25 studies. The impact of three moderators was also examined: the type of teacher effectiveness measure, source of personality report, and the instructed educational level. Overall, the Big Five personality domains (excluding agreeableness) were positively associated with teacher effectiveness, particularly in terms of teaching ratings.

Speaking English as a second language

Lindy Woodrow (2006) in her study mentioned that as users of English as a second language, they may suffer from second language anxiety, which will weaken their oral performance. The source of anxiety is usually manifested in the interaction with native speakers, which is particularly obvious for students from China, Japan and South Korea.

Second language anxiety has a detrimental effect on speakers of English as a second language's speaking performance. This paper covers a study that looked into the definition of second-language speaking anxiety, the relationship between anxiety and second-language performance, and the most common sources of second-language worry. For the study, the second language speaking anxiety scale (SLSAS) was created. This tool supported a dual understanding of anxiety that reflected speech communication both within and outside the language learning classroom. Confirmatory factor analysis was used to validate the scale. Speaking anxiety in a second language was found to be a major predictor of oral performance in the study. Interviews were used to look at the reported reasons of anxiety. Interacting with native speakers was the most common source of concern, according to the findings. Retrieval interference and skills deficit were found to be two sorts of nervous language learners. (Woodrow, 2006)

The effects of a real and virtual public speaking setting on second language (L2) speech output were explored in this study. All of the participants were undergraduates who spoke Cantonese as their first language and English as a second. The baseline, commonly known as "Placebo TSST," required each participant to give a five-minute English speech while alone in an empty room. Each participant was randomly allocated to one of two groups: "Vivo TSST," which required members to give an impromptu speech in front of a live audience, or "VR TSST," which asked members to give a speech in a virtual environment to imitate public speaking. Participants' heart rates and self-reported state anxiety levels were considerably greater during the two TSST sessions than at the baseline. (Lo, 2018)

Because of the rapid rise of the Internet, e-learning is becoming a more popular educational paradigm. Affective modeling (regarding a learner's emotional or motivational state) has been suggested in recent studies as a factor to consider when creating learning exercises. Much research has shown that different learning emotions have a significant impact on learning outcomes. Much research in the field of language education has looked into the anxiety that comes with learning a second language, finding that worry has a negative impact on the performance of those who speak English as a second language. As a result, a key research question in the field of language education is how to reduce anxiety associated with learning a second language in order to improve learning performance. In order to help teachers reduce language-learning anxiety of individual learners in a web-based one-to-one synchronous learning environment, this study used sensor, signal processing, wireless communication, system-on-chip, and machine-learning techniques to develop an embedded human emotion recognition system based on human pulse signals for detecting three human emotions-nervousness, peace, and joy. When filtering out biased human pulse signals, the suggested emotion identification model's cross-validation accuracy rate is as high as 79.7136 percent. Furthermore, the embedded emotion detection system was used to aid the instructor's teaching in a synchronous English conversation setting by relaying fluctuations in individual learner emotions to the teacher directly during learning. The teacher can provide appropriate learning aid or guidance based

on the emotional states of individual learners in this educational experiment. The suggested embedded human emotion recognition system appears to be useful in lowering language-based anxiety, hence improving the effectiveness of English conversation sessions. (Chen, 2011)

Methodology

The study investigated the students in Asia-Pacific International University (AIU) who were learning to speak English as a second language. To select the participants the researchers used random sampling technic. There are twelve females and seven males who participate in this study. Their ages are above 18 years old. There are eleven senior students, six junior students, one sophomore student, and one Freshman. There are seventeen students who come from international program and two students who come from Thai program. The country of origin of five students is Thailand, seven students are from China, three students are from Malaysia, and one student each from Brazil, Lao, and Sri Lanka. Due to the limitation of COVID-19, the questionnaire survey was conducted through the Internet. These students come from different majors in different faculties. All participants agreed to the use of the results of the questionnaire for research-based learning as well as for publication.

In order to better determine the relationship between the perceived helpful teacher personalities and the level of ability to speak English, the participants filled up a questionnaire for the teacher personalities that they perceived that was helpful when they were learning to speak English. We also conducted the following survey on students to evaluate their oral English level.

1. Level 1 I can ask and answer simple questions. (e.g. How old are you? Where do you live? What is Your favorite food?)
2. Level 2 I can speak in full sentences on simple topics.
3. Level 3 I can speak and talk about my life and experiences.
4. Level 4 I can converse about concrete and abstract topics but do not know a lot of technical vocabulary.
5. Level 5 I converse with a firm grasp of English grammar. I make very few grammatical errors.
6. Level 6 I speak fluently and proficiently equal to a native English speaker.

Results and Discussion

The data gathered was coded and revealed the results below. The interpretation is also presented.

The correlation coefficients were derived and is shown in Table 1. Genuineness ($r = -0.47921$) has the highest correlation to the level of speaking English. It is negatively correlated which implies that those who have higher level in speaking English see it as not so helpful which is different from the perception of those who have lower level in speaking English. Those who have low level in speaking English perceived that the genuineness of their teacher helped them to learn to speak English.

Table 1. Correlation coefficient (r) between Teacher Personality and Level of Speaking English

Like a sense of humor	0.09749
Flexibility	0.101183
Kindness	0.042926
Adaptability	0.105504
Conscientiousness	-0.0401
Determination	-0.00313
Empathy	-0.12063
Forgiveness	-0.08217
Seriousness	-0.19928
Genuineness	-0.47921
Graciousness	-0.23032

Socializing. with students	-0.1748
Courageous	-0.29011
Independence	-0.26845
Passionate	-0.14275

An analysis was done to show if there was a difference in the perception on the teacher personality (serious) and the level of speaking English. Table 2 shows that the p-value is 0.785805 which is interpreted as no difference in the perception considering the level of speaking English.

Table 2. *Analysis of Variance on Level of Speaking English and Teacher Personality(Serious)*

Anova: Single Factor

SUMMARY

<i>Groups</i>	<i>Count</i>	<i>Sum</i>	<i>Average</i>
1	1	4	4
3	3	9	3
4	9	32	3.555556
5	2	7	3.5
6	4	13	3.25

ANOVA

<i>Source of Variation</i>	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>P-value</i>	<i>F crit</i>
Between Groups	1.159357	4	0.289839	0.428384	0.785805	3.11225
Within Groups	9.472222	14	0.676587			
Total	10.63158	18				

Table 3 shows that there is no difference in the perception on teacher personality (Genuineness) considering the level of speaking English. The p-value is 0.146539. Those who have a high level in speaking English and those who have a low level in speaking English agree that the genuineness of the teacher is helpful in learning how to speak English.

Table 3. *Analysis of Variance between Level of Speaking English and Teacher Personality Genuineness)*

Anova: Single Factor

SUMMARY

<i>Groups</i>	<i>Count</i>	<i>Sum</i>	<i>Average</i>
1	1	5	5
3	3	13	4.333333
4	9	41	4.555556
5	2	7	3.5
6	4	15	3.75

ANOVA

<i>Source of Variation</i>	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>P-value</i>	<i>F crit</i>
Between Groups	3.545322	4	0.88633	2.021315	0.146539	3.11225
Within Groups	6.138889	14	0.438492			
Total	9.684211	18				

Shown in Table 4 is the result of the comparison of the participants' perception on teacher personality (courageous) with respect to the level of speaking English. The p-value is 0.682204. This means that there is no difference on the perception on teacher personality (courageous) considering the level of ability in speaking English.

Table 4. *Analysis of Variance Between Level of Speaking English and Teacher Personality (Courageous)*

Anova: Single Factor

SUMMARY

<i>Groups</i>	<i>Count</i>	<i>Sum</i>	<i>Average</i>
1	1	5	5
3	2	7	3.5
4	9	36	4
5	2	7	3.5
6	4	14	3.5

ANOVA

<i>Source of Variation</i>	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>P-value</i>	<i>F crit</i>
Between Groups	2.5	4	0.625	0.580357	0.682204	3.179117
Within Groups	14	13	1.076923			
Total	16.5	17				

The students of Asia-Pacific International University were investigated on the personality of teachers, and three most promising results were obtained. These results will be presented according to their ranking: Empathy (mean = 4.3684), Kindness (mean = 4.3158), and Forgiveness (mean = 4.3158).

Empathy

According to Rogers, a humanist, empathy refers to the ability to experience the inner world of others, that is, empathy is the ability to understand other people's thoughts and emotions, think and deal with problems from the perspective of others in the process of interpersonal communication. At the same time, convey your empathy to make the other party feel accepted and understood. In practical work, teachers' empathy can better get along with students and promote the harmonious development of teacher-student relationship.

57.9 percent of the respondents strongly agreed that teachers should have empathy. Only 5.3 percent of respondents disagreed. In addition, 36.8 percent of respondents agreed, but not strongly.

Kindness

The kindness of teachers also has a key impact on students. The kindness of teachers is reflected in many aspects. For example, in behavior, if the teacher can give some necessary help when the students encounter difficulties, it will make the students feel warm and relieve their pressure.

47.4 percent of the respondents strongly agreed that teachers should be kind. 53.6 percent of respondents agreed, but not strongly. None of the respondents said that teachers should not have the personality of kindness.

Forgiveness

Teachers' forgiveness of students is a very effective means of education, and it is also one of the personality traits that teachers should have. Forgiveness can influence students more than punishment and criticism, open students' hearts, make students have trust and gratitude, and promote students to develop in a good direction. For students who make mistakes in the learning process. Teachers treating students with forgiveness is a manifestation of respect and love for students, which is easy to make students accept teachers' opinions.

42.1 percent of the respondents strongly agreed that teachers should have forgiveness. 57.9 percent of respondents agreed, but not strongly. None of the respondents said that teachers should not have the personality of forgiveness.

Serious and Courageous

Least helpful teacher personalities as perceived by the participants are Serious (mean = 3.3684) and Courageous (mean = 3.8421).

Conclusion and Recommendations

Teachers' personality has a significant impact on the learning of English as a second language. Teachers' personality characteristics affect students' learning interest and achievement. The teaching process is not only an interactive process between teachers and students, but also an emotional communication process. In class, teachers' emotions always affect students, and different emotions will have different results.

A happy mood can make students think positively and is conducive to students' learning. When the mood is poor, such as anxiety, fear, disgust and so on, it is not conducive to students' learning. If teachers have good personality, they can create a good classroom atmosphere for students' learning activities. It can be said that whether the atmosphere in the classroom is humorous or depressing depends largely on the personality of teachers, who have a great impact on students' learning behavior and learning efficiency.

Especially for students who speak English as a second language, teachers' personality will have a deeper impact on them. These students often suffer from second language anxiety, because English is not their mother tongue. Increasing their language anxiety will have an adverse impact on their oral English. At the same time, this situation will be worse if the teacher's personality is not easygoing, humorous but dull and grumpy.

In summary, the teacher's personality affects the student's study. The influence of teachers' personality has many functions, such as guidance, cohesion, and so on. Once a teacher's good personality is recognized by the students, it will arouse the students' interest in learning, so as to generate interest from recognition to imitation and even internalization. A teacher full of personality charm is like a kind of adhesive, which can tightly condense each student around him, make the students infatuated, and love to listen to his teachings, and improve his teaching efficiency. Further it will promote the harmonious development of the relationship between teachers and students.

References

- [1] Buttner, S., Pijl, S., Bijstra, J., & Bosch, E. (2015). Personality traits of expert teachers of students with behavioural problems: a review and classification of the literature. *Australian Educational Researcher* (Springer Science & Business Media B.V.), 42(4), 461–481. <https://doi.org/10.1007/s13384-015-0176-1>
- [2] Chen, C., & Lee, T. (2011). Emotion recognition and communication for reducing second-

language speaking anxiety in a web-based one-to-one synchronous learning environment. *British Journal of Educational Technology*, 42(3), 417–440. <https://doi.org/10.1111/j.1467-8535.2009.01035.x>

- [3] Kim, L. E., & MacCann, C. (2018). Instructor personality matters for student evaluations: Evidence from two subject areas at university. *British Journal of Educational Psychology*, 88(4), 584–605. <https://doi.org/10.1111/bjep.12205>
- [4] Lo, E. S.-C., Wong, A. W.-K., Law, E. Y.-S., Pang, J. K., Xin Jin, & Shiqi Chen. (2018). Effects of Stress on Second Language Speech Performance in Real and Virtual Public Speaking Environments. *Annual International Conference on Cognitive & Behavioral Psychology*, 1–11. https://doi.org/10.5176/2251-1865_CBP18.2
- [5] Kim, L. E., Klassen, R. M., & Jörg, V. (2019). A Meta-Analysis of the Effects of Teacher Personality on Teacher Effectiveness and Burnout. *Educational Psychology Review*, 31(1), 163–195. <https://doi.org/10.1007/s10648-018-9458-2>
- [6] Göncz, L. (2017). Teacher personality: a review of psychological research and guidelines for a more comprehensive theory in educational psychology. *Open Review of Educational Research*, 4(1), 75–95. <https://doi.org/10.1080/23265507.2017.1339572>
- [7] MacIntyre, P. D., Ross, J., Talbot, K., Mercer, S., Gregersen, T., & Banga, C. A. (2019). Stressors, personality and wellbeing among language teachers. *System*, 82, 26–38. <https://doi.org/10.1016/j.system.2019.02.013>
- [8] Woodrow, L. (2006). Anxiety and Speaking English as a Second Language. *RELJ Journal*, 37(3), 308–328. <https://doi.org/10.1177/0033688206071315>

Chronicles of Limited Face-to-Face Learning Among Nursing Students in Bubbled Dormitories in a Private University: A Phenomenological Study

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Abstract : Schools worldwide have closed doors in 2020 and shifted to virtual and learning online as a preventive measure against the spread of COVID-19. Studies were done in the Philippines about the challenges and impact of online classes, but none on the unique limited face-to-face classes of nursing students in bubbled dormitories. This qualitative study was conducted among fourth-year nursing students who have experienced both pre- pandemic clinical exposure and face-to-face classes and the new limited face-to-face classes inside a bubbled dormitory in a private university. A semi-structured questionnaire was answered through an online interview using video-conferencing platforms. Participants were selected through purposive sampling. Analysis of data used Collaizi method. The following main themes have emerged in this study: challenges, coping strategies, and impact. Under challenges, the results included the following sub-themes: difficulties in wearing PPE, limited time, changes and adjustments, restrictive protocols, unstable internet connection, and difficulty focusing. Under coping strategies, the sub-themes were optimism, time management, and family and friends. Under the theme of impact, the sub-themes of both positive impact (helpful and thankful) and negative impact (low confidence, anxiety, and fear) were revealed. The recommendations suggest that further study is conducted on a similar topic to further explore the lived experiences of nursing students during limited face-to-face learning in bubbled dormitories.

Keywords: *limited face-to-face learning, nursing, bubbled dormitories, phenomenological study*

Introduction

The COVID-19 pandemic has caused a tragic, unexpected, and severe disarray over the past years. Some had to be confined to family groups but separated from the rest of the world. The rise in COVID-19 cases sparked fear and panic around the world. Many people lost jobs, said premature goodbyes to loved ones, and businesses went bankrupt. Travels, social gatherings, ceremonies, parties, sporting events, and everyday activities and routines were halted. Many were not ready to face the sudden change in their lives but were left with no choice but to adapt and live according to the "new normal" (Cohut, 2021).

The Covid-19 pandemic is a 'one-of-a-kind' global shock. This phenomenon has caused simultaneous derangement in an interconnected global economy. Severe infections end in death and financial challenges. Lockdowns caused business closures, social distancing, and disruption. Layoffs and income loss due to morbidity, quarantines, unemployment, and worsening economic prospects reduce household consumption and firms' investment. (Chudik et al., 2020). The pandemic's massive disruptions in living routines has also substantially impacted people's mental health. Isolation, social distancing, and the aftermath of the outbreak, all imply a loss of vital social support and normalcy, making it difficult to cope with pandemic-related stress. (Alzueta et al., 2021).

The COVID-19 pandemic has had a massive impact on the Philippines, not only on its economic situation but also on its people, health system, and environment. There is currently only a small number of research studies looking into the effects of the pandemic on the country. Work in all government offices and private companies were strictly operated by skeletal force. Only frontline health workers, authorized government officials, and humanitarian and medical services were allowed movement (Magcale- Macandog et al., 2021).

The pandemic also significantly impacted schools, as teachers and students were forced to switch from traditional face-to-face classes to online classes and modular learning. Many schools

worldwide decided to close their doors in 2020 and shift to virtual and online learning. Much discussion centered on how long to keep the schools closed and how to reopen them safely. Many teachers, students, and even parents had difficulty adjusting to this abrupt change and many students lagged behind in their education. Polls reveal that 9 out of 10 parents were concerned that their children would fall behind in their academics because of the closure of schools and the challenges with online learning. (Rettner, 2020). It was even more difficult for medical courses like nursing, because nursing students should learn the necessary technical skills and gain experience in clinical exposure in hospitals. However, due to COVID-19 restrictions, this was not possible. According to a study conducted by Leonardsen et al. (2020), nurses require extensive technical skills in primary and tertiary health care. Patient characteristics in both tertiary and primary healthcare services have changed, posing challenges to health competence (WHO, 2010).

The Department of Health (DOH), in collaboration with the Commission on Higher Education (CHED), issued a Joint Memorandum Circular No. 2021-001, "Guidelines on the Gradual Reopening of Campuses of Higher Education Institutions for Limited Face-to-Face Classes During the COVID-19 Pandemic," to address the challenges faced by educational institutions. This memorandum discusses the gradual reopening of Higher Education Institutions (HEIs) for limited face-to-face classes, focusing on health-related degree programs such as nursing, which are critical in providing additional human resources in the healthcare system, especially during the pandemic (Gopez, 2021).

Universities and colleges have started to reopen their campuses for limited face-to-face classes for the first time. However, there are still too few research studies conducted locally about nursing students' experiences during the limited face-to-face learning in bubbled dormitories, thus the need for this study. This study will determine the challenges of nursing students and coping strategies they utilized during the limited face-to-face learning in bubbled dormitories.

Research Design

This study is qualitative research. Qualitative research aims to explore and provides deeper insights into real-world problems. This type of research can help researchers access the thoughts and feelings of research participants, enabling the development of an understanding of the meaning that people ascribe to their experiences. (Sutton & Austin, 2015)

The type of qualitative research design utilized in this study is phenomenology. Phenomenology is an approach to qualitative research that is defined as the study of structures of consciousness, as experienced from the first-person point of view. The outcomes of a phenomenological study broaden the mind, improve the ways of perceiving a phenomenon, and enable the development of foresight through the intentional study of lived experiences (Qutoshi, 2018).

Population and Sampling Technique

The sampling techniques used in this research study were purposive and random sampling. Purposive sampling is defined as non-probability sampling in which researchers rely on their judgment in choosing the population to participate in their surveys. Purposive sampling is widely used in qualitative research to identify and select information-rich cases related to the phenomenon of interest. (Palinkas et al., 2015). Inclusion criteria included students who were: (a) in the 4th year of the nursing program at Adventist University of the Philippines, Puting Kahoy, Silang, Cavite, (b) within the age bracket of 20 years or older, (c) living within bubbled dormitories, (d) who had experienced limited face-to-face classes, (e) who had limited face-to-face clinical exposure, (f) able to communicate in Filipino or English, and (g) willing to participate in the study.

There is a possibility that the use of purposive sampling in a qualitative study can cause bias because it is a non-probability sampling technique. That is why random sampling, a probability sampling technique, was used to minimize the occurrence of bias throughout the study. The random sampling method relies on a selection based on probability and a random selection, which gives each

participant an equal chance of being chosen. As a result, the final smaller sample will be more likely to represent the total population and be free from researcher bias (Qualtrics AU, 2022). The lottery method, also known as "drawing from a hat," was utilized in this study. With this method, each member of the population is allocated a number, and numbers are then chosen randomly (Thomas, 2020).

Instrumentation

The researchers used a semi-structured interview questionnaire that served as a guide, to explore the lived experiences of nursing students during the limited face-to-face learning in bubbled dormitories; the semi-structured questions included but were not limited to the following questions. In addition, follow-up questions were also used to clarify the responses from the respondents:

1. What is it like to experience limited face-to-face and limited clinical exposure compared to the pre-pandemic face-to-face and clinical exposure?
2. What was your experience as a nursing student during the limited face-to-face learning in bubbled dormitories and limited clinical exposure?
3. What are your unusual and most memorable experiences during the limited face-to-face learning and limited clinical exposure?
4. What are the challenges you have encountered during the limited face-to-face learning and limited clinical exposure?
5. In what ways were you able to cope with these challenges?
6. What word can best describe your overall experience during the limited face-to-face classes and limited clinical exposure?
7. How does your experience during limited face-to-face classes and limited clinical exposure impact your future life and career?

The data's reliability is dependent on the accuracy of the participant's perspective. Participants play an essential role in establishing credibility in qualitative studies. Before collecting the actual data, the researchers interviewed one (1) qualified participant as a pilot study to ensure that rich information was gathered from the respondents.

Data Gathering Procedures

During the study, qualified participants were interviewed until the data saturation point was achieved. When information is enough to replicate the study, data saturation is reached. The ability to obtain additional new information has been attained when further coding is no longer feasible (Fush & Ness, 2015). With all aspects of qualitative research, Burmeister and Aitken (2012) stated that far more important than the numbers is the depth of the data when analyzed. A few rich interviews or sources can have the importance of dozens of shorter interviews.

The researchers interviewed individual respondents and explained the contents of the informed consent carefully, so they would know what they were signing. After securing informed consent, the researchers explained the purpose of the study and the steps in collecting data. The respondent was also free to ask any questions or seek clarification about the study, and the researchers responded honestly. The researchers also asked the respondents for permission to use two phones as voice recorders during the face-to-face interviews. In video conferencing interviews, the researchers asked the respondents for permission to record the video conference. If respondents did not want to be seen in the video, they had the option of turning off their camera. The names of the participants were coded into numbers to protect their identity. The researchers explained that the

purpose of the audio or video recordings was to enable transcription and data analysis only. After the procedures were explained, and all respondents' questions were answered, the researchers interviewed the respondents to gather data.

The face-to-face interviews were conducted in a room where privacy was assured. Covid-19 protocols were strictly observed, providing comfort and considering the participant's preferences throughout the interview. To obtain information from the respondents, a semi-structured questionnaire was used. In cases wherein face-to-face interview was not possible due to COVID-19 restrictions, video conferencing was utilized through Zoom.

Analysis of Data

Before data analysis, the recorded audio or video of the interviews was transcribed using Microsoft Word and was stored and organized. The data then underwent analysis and was numerically coded to protect the confidentiality and privacy of the participants.

Qualitative data is often subjective, rich, and consists of in-depth information customarily presented in words; analyzing qualitative data entails reading many transcripts looking for similarities or differences, finding themes, and developing categories (Wong, 2008). The researchers used Colaizzi's (1978) Descriptive Phenomenological Method to analyze the data. Colaizzi's (1978) unique seven-step process provides a rigorous analysis, with each step staying close to the data. The result is a concise yet all-encompassing description of the phenomenon under study, validated by the participants that created it (Morrow, Rodriguez, & King, 2015). Colaizzi's (1978) method includes a seven-step process, which consists of the following:

Familiarization. The researchers familiarize themselves with the data by reading through all the participant accounts several times. After the interviews have been carefully transcribed from the recorded audio or video files, the researchers read each respondent's statements critically and repeatedly, and always try to 'read between the lines'.

Identifying significant statements. In this step, the researchers identify all statements in the accounts that directly relate to the phenomenon under investigation. After familiarization, it will be much easier for the researchers to identify significant statements related to the phenomenon.

Formulation of meanings. The researchers must carefully examine the significant statements that lead to the discovery of meanings relevant to the phenomenon. To stay close to the phenomenon as experienced, the researcher must reflexively "*bracket*" preconceptions (it is noteworthy that Colaizzi recognizes that complete bracketing is never possible).

Clustering themes. The researchers group discovered meanings into themes that appear in all accounts. Pre-suppositions must be bracketed once more, and this is crucial, in avoiding any potential influence of an existing theory.

Developing an exhaustive description. The researchers write a comprehensive description of the phenomenon that incorporates all the themes generated.

Producing the fundamental structure. The researchers condense the lengthy explanation down to a single, concise statement that encapsulates Everything, including those elements deemed crucial to the structure of the occurrence.

Seeking verification of the fundamental structure. The researcher shares the fundamental structure statement to all the participants for validation to see if it captures their knowledge and experience. The researcher goes back and makes changes in light of any feedback and the earlier steps in the analysis.

Ensuring Rigor and Trustworthiness

The researchers used triangulation in this study. This method utilized to increase the credibility and validity of research findings. It is also used to help explore and explain complex human

behaviors using various methods to offer readers a more balanced explanation (Noble & Heale, 2019). Throughout the interview, the researchers carefully observed and noted the respondents' body language, facial expressions, and behavior, as these can be very helpful in gathering data.

The rigor and trustworthiness of the study were ensured by satisfying the criteria that Lincoln and Guba (1985) established. The criteria involve credibility, transferability, dependability, and confirmability. To ensure credibility, the researcher performed member checking, or respondent validation, which involves returning the transcribed interviews to the respondents, to assess the accuracy of their statements, to validate the study results, to know the accuracy and to verify whether or not it is resonant with their experiences (Nowell et al., 2017). Secondly, the researchers provided thick descriptions of the phenomenon being studied, allowing future readers to evaluate and judge the transferability of the study (Lincoln & Guba, 1985). Thirdly, to achieve dependability, the researchers made an audit trail by explaining the research process thoroughly. The audit trail was made by discussing: how the participants were selected, how data was collected and analyzed, how the study results were obtained, and explaining the techniques used to ensure the study's credibility (Blanco, 2020). When the first three (3) criteria: credibility, transferability, and dependability, have been achieved, the confirmability of the study is also achieved (Lincoln & Guba, 1985).

Ethical Consideration

Ethical considerations should be strictly observed to protect both the researchers and respondents. An ethical approval sheet was secured from the Ethical Research Board. The researchers did their best not to cause any possible harm to any participants and always ensured their welfare. Informed consent was given by the respondents, and the contents of the consent form were explained clearly, to ensure that respondents understood everything before signing.

The purpose of the study was well-explained, including the procedures and devices such as the two phones that were used as recording devices for face-to-face interviews, or laptops that were used in video conferencing for online interviews to gather the data. When the names of the participants were coded into numbers to protect their identity, the confidentiality of the information was ensured. All the recordings and videos were used for academic purposes only.

Data collected were secured and stored in a folder with a password, so that only the researchers could only access them. This was done to ensure privacy and protect the respondents' identity. All the raw data was deleted after the study had been completed.

Results

The main themes that emerged throughout this study of nursing students in bubbled dorms in a private university were as follows: (a) challenges nursing students experienced during limited face-to-face learning in bubbled dormitories in a private university, (b) coping strategies used by nursing students during limited face-to-face learning in bubbled dormitories in a private university, and (c) the impact of limited face-to-face learning on nursing students in bubbled dormitories in a private university. Each theme included sub-themes that gave more depth and understanding to the three main themes.

Discussion

Challenges Nursing Students Experienced During Limited Face-to-Face Learning in Bubbled Dormitories in a Private University

Most people know that the pandemic created numerous challenges for the educational system. In particular, a common and urgent challenge was the total migration from classroom lectures to online learning (Bolbol et al., 2021). Three studies were conducted by Bolbol et al. (2021), Ambawati

et al. (2020), and Mahyoob (2020), they all found that their participants had trouble with online learning; mainly problems with internet connection and unstable internet. In another study conducted by Corcoran et al. (2020), it was found that the nursing students in Canada were facing a delay in their studies because of the removal of clinical practicums. Nursing students who wanted to accumulate their required clinical hours, expressed that they would risk finishing them even if it meant catching and spreading COVID, so that they could finish their Bachelor of Nursing degree on time. These students considered volunteering for pandemic-related services if it would be counted within their required clinical hours, which were vital in obtaining their degree (Corcoran et al., 2020).

When rates of COVID-19 increased, Corcoran et al. (2020) explained the concerns from both faculty and students regarding the possible restrictions and limits to travel within their country and their ability to accumulate their clinical hours. Of course, this was concerning COVID-19 transmission. This situation was similar to that of the nursing students during limited face-to-face instruction in bubbled dormitories, who experienced restrictions and limitations that affected their ability to accumulate the required clinical exposure hours and experience. With limited clinical exposure, the nursing students found difficulty in wearing the PPEs. A study done by Baptiste et al. (2020) stated that there were reports of registered nurses in many parts of the world trying to cope with the shortages of personal protective equipment (PPE) like masks, gloves, and smock gown/ coveralls.

In another study by Atay and Cura (2020), there was increasing evidence of how the use of PPE can cause physical health problems, which is yet another subtheme that was found among the nursing students, when talking about challenges in limited face-to-face learning and clinical exposure. Another subtheme that was recognized under challenges, was the difficulty of focusing during online classes. In a study done in the Philippines by Barrot et al. (2021), results showed that the most significant challenge that students faced was related to the learning environment, mainly distractions at home, limitations in finishing their requirements for classes, and difficulties in finding a place to study, and establishing a study schedule.

Difficulties in Wearing of PPE. The purpose of the study done by Atay and Cura (2020) was to examine further the physical problems nurses had faced while wearing the PPE and examine the impact of the duration of wear time. Their results showed that the challenges that the nurses experienced included: sweating while wearing surgical masks or N95s, dry hands from wearing gloves, sweating when wearing coveralls/ gowns, and difficulty with seeing while wearing goggles and face shields. With these challenges, wearing PPE for more than four hours led to the nurses having redness on the cheeks, dry mouth, redness around the nose bridge, and redness on the ears from the N95 masks. The shortage of PPE in many parts of the world was a challenge (Baptiste et al., 2020). The participants had common problems with their PPEs during their limited clinical exposure, which is explored in Table 1 below:

Table 1

Challenges Experienced by Nursing Students During their Limited Face-to-face Learning in Bubbled Dormitories (Difficulties in Wearing of PPE)

Subtheme	Informant's Code	Informant's Responses
Difficulties in Wearing of PPE	Respondent #1	"... you need to adjust, and you need to wear PPE that is, I can say it's hot inside. If you had PPE, even the room temperature is cold, it's still hot, you sweat a lot, and that's why you need to adjust."
	Respondent # 2	"And you need to conserve your drinking and eating, because you don't want to pee a lot. Because if you pee, you have to change the PPE."

Table 1

Subtheme	Informant's Code	Informant's Responses
	Respondent # 3	"...for the 1st time I wore PPE, in, I think it's in the ICU. I'm about to tell my clinical instructor that I can't breathe, because we are wearing two masks..."
	Respondent # 4	"...during that time we had to wear like masks and PPE. So, it was a little bit uncomfortable, but we were a little bit more protected."
	Respondent # 5	"First of all, I really, really dislike PPE. The N95s that we have to wear, so painful, like I was getting kind of rashes around the area where I had to wear the PPE, and my skin was like really raw and irritated."
		"...it was really difficult to hear the nurses and the doctors, because they were wearing many layers of PPE, so it was so difficult to understand them,"
		"...it's even harder to communicate when they are wearing the super thick PPE"
		"For the PPE, it was so painful, but I guess it's important to just really take care of your skin after, since the PEE really irritates your skin, and it damages your moisture barrier, leading to trans epidermal water loss,"
	Respondent # 6	"...one of the challenges I have faced is having to deal with issues with PPE, the lack of quantity within my specific size of PPE has made me have to adapt by using PPE that is not my size and also with the limited quantity we are not able to use the restroom."
	Respondent # 7	"... having to wear a head-to-toe PPE for long hours. When we were at the ICU rotation at Mediatrix. It was about six hours straight that we were inside with our PPE and that was quite an experience for me."
	Respondent # 8	"I actually had a hard time wearing the level four PPE when we had our ICU rotation because it gets so warm wearing that for me, and I get so sweaty inside."

A

common problem among the participants in relation to PPEs was how uncomfortable it was to wear. Wearing PPE is one of the many subthemes recognized among nursing students in connection to the challenges they faced in limited face-to-face instruction and limited clinical exposure.

Limited Time. Many nursing schools had to bring their clinical practicums to a halting stop due to the pandemic. In a study conducted by Agu et al. (2021) it was discovered that the sudden halt in the education of student nurses had forced nursing students to complete their training prematurely in some parts of the Caribbean. While the availability of more nurses was helpful in alleviating staffing problems this solution posed a risk of diminishing confidence in the healthcare system and causing

fears around the possibility of being treated by nurses who were not fully trained (Agug et al., 2020). Agu et al. (2020) state the inflexibility and in permitting senior nursing students to complete their clinical training which affected at least 14,000 nursing students, who were not able to complete the program within the specified time frame. The impact of the pandemic has dramatically affected the healthcare system, especially with regards to the number of nurses available and the ability levels of newly graduated nurses. Due to the fear of having a massive gap in nursing numbers, because of the lack of graduating nurses, because some nursing students needed an extra semester to make up for clinical hours, the nursing students were forced to deal with the limited two-week clinical exposure to satisfy the requirements to graduate with their Bachelor of Science in Nursing degree. The nursing students expressed their limited time as a challenge in Table 2 below:

Table 2

Challenges Experienced by Nursing Students During their Limited Face-to-face Learning in Bubbled Dormitories (Limited time)

Subtheme	Informant's Code	Informant's Responses
Limited time	Respondent #1	"But it was bad because it was really short. So, we weren't able to really practice as much as we could have if it wasn't a limited face-to-face scenario."
	Respondent # 2	"... in the clinical, when we had the clinicals, it was also shortened. So it was, again, hard to practice what you learned with the limited learning that you already had. And even with lab practices before duty was still short and also so everything was time limited. And it was challenging." "... we had less exposure in the classroom and learning in terms of like, really focusing, we also had very limited clinical experience, you know, clinical hours."
	Respondent # 3	"... during limited face to face and limited clinical exposure, from the word itself limited, we are only limited to some things, there are things we can do. And there are things we cannot do."

Table 2

Subtheme	Informant's Code	Informant's Responses
Limited time	Respondent # 4	"... during the pandemic I felt like we had the skills lab and then we had only a limited amount of time, I feel short changed."
		"I think most of it would be the time. I just want more time to have the experience and yea I think that is pretty much it. Time for the clinical exposure."
		"Inadequate. It was not enough."
	Respondent # 5	"... we didn't get to do as much as we wanted and for the time that we wanted,"
	Respondent # 6	"...it does limit the student's learning ability and also it limits the experience."
		"... I do believe that within our fourth year we only had a limited amount of time compared to what it would be like pre pandemic."
	Respondent # 7	"But since with this pandemic we are only given two days per area, which is of course it's kind of sad because we weren't able to exercise our skills or to practice our skills as nursing students."
		"...we get to introduced ourselves and then it's funny because, first day you're going to introduce yourself, and then next day you're going to terminate your relationship"
		"And also, in the limited clinical exposure. As I've said in the first question, that there's only limited experience and limited skills and limited learnings that you can."
		"I think that's the one of the challenges is the time constraint."
	Respondent # 8	"... having the limited duties at the hospital was really sad. I wanted to have more exposure in the hospital as much as I can to gain experience for taking care of patients and you know, enhance my skills in a hospital settings."

With only two weeks of clinical exposure, many of the nursing students expressed that the time was not enough. Many stated that they wanted more time to develop more skills and have exposure to the clinical settings.

Changes and Adjustments. The pandemic has made many people change and adjust to the 'new normal', especially within the educational system. The introduction to distance learning has helped in reducing the transmission of COVID-19. With the transmission of COVID-19 under control, many people found it difficult to adjust to these changes, geared towards reducing COVID-19 transmission. Almahasees et al. (2021) found that in Jordan, both the faculty and students expressed that online learning challenges are rooted in adapting to online learning. In Wuhan, China, a study conducted by Chen et al. (2021) found that the nurses felt unprepared for working with full PPE gear. They became more observant to adherence to changing protocols and required training concerning PPE use. The experience of the nursing students can be explored in Table 3 below:

Table 3

Challenges Experienced by Nursing Students During their Limited Face-to-face Learning in Bubbled Dormitories (Changes and Adjustments)

Subtheme	Informant's Code	Informant's Responses
Changes and Adjustments	Respondent #1	<p>"... having protocols about Covid, and after that limited face-to-face during pandemic times there are a lot of changes, a lot of adjustments that we need to do"</p> <p>"About face-to-face classes, it is hard, because they need to reschedule everything, especially the time that alert levels are changing from time to time."</p> <p>"So, we have to adjust and adjust."</p>
	Respondent # 2	"That one word would be adjustment for me because we all had to adjust almost every day. Even the clinical instructors, especially the students, so adjustment"
	Respondent # 3	"...was the swabbing, because before we go to duty, we have to be tested whether we have COVID or not."
	Respondent # 4	"...you need to adjust, and you need to wear PPE that is, I can say it's hot inside. If you had PPE, even the room temperature is cold, it's still hot, you sweat a lot, and that's why you need to adjust."

Table 3

Subtheme	Informant's Code	Informant's Responses
	Respondent # 5	"...we are in these times of adjustment"
	Respondent # 6	"We were required to be in different types of PPE to be able to experience this clinical exposure and that definitely was a change for me from what I was used to."
	Respondent # 7	"You get to experience different things when you had your duty. Doing that you need to adjust too, in the area, and you need to adjust during pandemic, so it is hard for us to mix that up."
	Respondent # 8	"I guess I was having a hard time adjusting to finish my requirements."

Restricted Protocols. Restrictions have almost become synonymous with COVID-19 protocols. In countries across the world, the solution to stopping the further spread of COVID-19 was implementing restrictions on traveling and moving around provinces and states (Bharati & Fakir, 2021). In AUP, students inside bubbled dormitories were not allowed to mix. In their study about COVID-19, lockdown, quarantine, social distancing, and self-isolation and mental effects on specific age groups, Bryant et al. (2021) found that young adults (18-34 years old) felt moderate mental distress compared to any other age group. Table 4 will illustrate how each respondent felt about the restrictions they faced while in bubbled dormitories.

Table 4

Challenges Experienced by Nursing Students During their Limited Face-to-face Learning in Bubbled Dormitories (Restrictive Protocols)

Subtheme	Informant's Code	Informant's Responses
Restrictive Protocols	Respondent #1	"...during your shift, and following the rules, being quarantined after you had your clinical exposure."
	Respondent # 2	"You need to follow protocols like when you get home, you get to be quarantined during your clinical duties."
		"...we were only allowed to mingle with people in our dorm, we are not allowed to mingle with people from other dormitories."

Table 4

Subtheme	Informant's Code	Informant's Responses
	Respondent # 3	<p>"...the swabbing, because before we go to duty, we have to be tested whether we have COVID or not</p> <p>"And during the clinical exposure in naman, we were only allowed to stay inside our room to quarantine and not go out at all."</p>
	Respondent # 4	"In a bubbled dormitory, of course it is very restrictive. We don't have a lot of freedom."
	Respondent # 5	<p>"...we are just not allowed to be in a lot of places, so that's restrictive, especially when you are studying in the same place all the time, in your dorm"</p> <p>"For limited clinical exposure in the bubble dormitories, we had to stay here for three weeks. So, it was kind of suffocating."</p>
	Respondent # 6	"... because it's expected but we had to stay inside for so long it was pretty restrictive, it felt like it was a prison."
	Respondent # 7	<p>"For the bubble dormitories it doesn't feel right, because you are treated, I don't like to say it, you are treated like a prisoner"</p> <p>"I didn't like being separated from my fellow classmates. You know, when we're inside in campus, we are segregated, and we can't go neighboring..."</p>
	Respondent # 8	"We are being strict, restricted or not now allowed to have a gathering with our fellow students, especially with the girls."

As seen above, all the nursing students had negative responses towards restrictions in bubbled dormitories during their limited face-to-face learning and limited clinical exposure, with two respondents expressing that they felt like prisoners because of the restrictions.

Unstable Internet Connection. As mentioned before, studies conducted by Bolbol et al. (2021), Ambawati et al. (2020), and Mahyoob (2020); all found that their participants had trouble with internet connection and unstable internet, when it came to online distance learning. Internet instability is nothing new in the Philippines. However, with the pandemic and introduction of online distance learning, the internet became another obstacle in the adequate delivery of education. In Table 5, it can be seen that out of the 8 participants, 5 expressed unstable internet connection as a challenge:

Table 5

Challenges Experienced by Nursing Students During their Limited Face-to-face Learning in Bubbled Dormitories (Unstable Internet Connection)

Subtheme	Informant's Code	Informant's Responses
Unstable Internet Connection	Respondent # 2	"It was really stressful sometimes, because internet connection was a was like one of the biggest issues we have, especially that we were all in the same dorm and using the same internet, so it was really slow sometimes."
	Respondent # 3	"When we're talking about learning, I think one of the challenges was of course, unstable internet because we use online platforms, we have to be online all the time.."
	Respondent # 5	"I'd say one of the major challenges that I faced during this limited face to face learning would be having to deal with unstable internet connections having to deal with unstable internet connections of the clinical instructors themselves"
	Respondent # 6	"...there are things that are out of my control when it comes to these challenges, like the lack of PPE and also just having a bad internet connection."
	Respondent # 8	"...then big challenges being here at AUP is sometimes there's internet connection problems"

Hard to focus. The online learning space was a new environment for many students who had to transition from the classroom to the living room or bedroom. In a study conducted by Barrot et al. (2021), in the Philippines, it was found that the most significant challenge for college students was related to the studying and learning environment they had at home. In an article published by The Minnesota Daily, Carlson (2020) states that the switch from classroom lectures to online lectures at home came with many distractions for many students. Carlson (2020) found that some students found it hard to keep focused in their homes. Their mental capacity and ability were decreased because they could not go out or talk to others. Some students stated that their family members were a distraction when they had to move back home for online classes. Others found that social media was a significant

distraction since lectures were already online. In Table 6 below, the nursing student's statements shed more light on the subtheme of 'concentration as a challenge':

Coping

Table 6

Challenges Experienced by Nursing Students During their Limited Face-to-face Learning in Bubbled Dormitories (Hard to focus)

Subtheme	Informant's Code	Informant's Responses
Hard to focus	Respondent #1	"Also, it's hard to focus sometimes since there are a lot of distractions,"
	Respondent # 2	"I think it's because we were online, it was hard to focus was hard to really learn everything and try to master it."
	Respondent # 3	"I'd say it's just kind of hard to focus, doing assignments and stuff when it's all online and the deadlines are all online."
	Respondent # 5	"Not just that, since we are sharing the room with a lot of other people, sometimes it's hard to find peace and quiet and privacy, if that is your study method."
	Respondent # 6	"It's so easy to be distracted with the bed that's next to you,"
	Respondent # 7	"And then I'm getting distracted to you know the online class, sometimes I could not focus..."

Strategies Used by Nursing Students During Limited Face-to-Face Learning in Bubbled Dormitories in a Private University

People dealt with the challenges that emerged during the pandemic, in different ways. Carr and Pudrovskia (2007) define coping strategies as cognitive and behavioral tactics utilized to manage critical conditions and distressing demands. In the Philippine study done by Barrot et al. (2021), it was found that some of the coping strategies college students used were: optimism, time management, seeking counsel, and disclosing with family and friends about their issues. Among the subthemes found during this study, nursing students mentioned using optimism, time management, and family and friends to cope with their challenges.

Optimism. Optimism is an attitude of the mind that is characterized by confidence and hope for success (Scott, 2020). Costa-Font (2020) states that optimism is a coping mechanism to deal with challenges; in this case anxiety rooted in a pandemic's uncertainty. Table 7 shows the statements of nursing students referring to optimism as a coping strategy that was utilized during their limited face-to-face classes and limited clinical exposure.

Table 7

Coping Strategies by Nursing Students During their Limited Face-to-face Learning in Bubbled Dormitories (Optimism)

Subtheme	Informant's Code	Informant's Responses
Optimism	Respondent #1	"I think (umm), you need to accept the fact that (umm) you need to be dedicated to yourself in doing that. You need to be (aah) mentally ready, because if you are not ready psychologically, it is hard for you."
	Respondent # 2	"You get sad sometimes and it really affects your studies. That's why what I do is I tend to be optimistic."
	Respondent # 3	"One of the things that I really did during these times was to be optimistic, and to have a more positive outlook because when you think about the future, and uncertainties going on, you get relief."
	Respondent # 4	"I just can't do anything about it, but just try my best when I get there."
	Respondent # 5	<p>"...it was a blessing to be able to just do the skills and just interact with patients there after we haven't done it for two years. So, although it's not ideal, I'm still extremely grateful for the time that we had."</p> <p>"... we didn't have that much time, and this was the best that we can possibly do under our circumstances. So, we were able to taste at least what the real clinical feel will feel like or what we will experience once we graduate."</p> <p>"...and will be able to make the most out of what we are given, because you know, life will always throw you a bunch of curveballs. So, the best you can so is learn to adapt and to overcome."</p>

Table 7

Subtheme	Informant's Code	Informant's Responses
	Respondent # 6	<p>"...we are in these times of adjustment and just knowing that we are still able to adapt helps me when it comes to adapting to new environments"</p> <p>"Naturally when it comes to dealing with challenges, I believe that I am an individual that is able to cope ah with challenges easily."</p>
	Respondent # 7	<p>"I think I just go with the flow. They say if you're if you'll be stressing about the time, the given time, you won't be enjoying it, so instead of you enjoying your time, you will be going to complaining about having limited time, but at least make the most out of it"</p> <p>"Just go with the flow. Enjoy. And of course, you need to be smart, and not be like, oh no I don't know what to do!"</p>
	Respondent # 8	<p>"...thinking that limited face to face and having a limited clinical exposure is better than not having any, you know, not to be able to continue on with nursing"</p> <p>"So, those are the thing that's kind of just get me through thinking that it's going to get done anyways, you know, it's going be over soon."</p> <p>"...at least we are having an experience one way or another, you know, even though it's just a limited time"</p>

Time Management. Time management was one of the most utilized coping strategies for college students to tackle the ongoing challenges in their online lectures (Barrot et al., 2021). Carlson (2020) found that one of the most common tips given to university students for staying on track is sticking to and creating a schedule. Learning time management can prevent procrastination, help an individual to work more efficiently, and create more free time (Todorov, 2017). Table 8 provides more insight into how the nursing students used time management as a coping strategy:

Table 8

Coping Strategies by Nursing Students During their Limited Face-to-face Learning in Bubbled Dormitories (Time Management)

Subtheme	Informant's Code	Informant's Responses
Time Management	Respondent #1	"I've learned that even just doing a little bit even the first day that you are assigned the assignment, it's really helpful, and it will cascade, and you will be able to finish it a lot quicker"
	Respondent # 2	"Taking it day by day, whenever they give us requirements or when we have to learn something and knowing that the clinical instructors will be like will be lenient, and we'll be understanding and understand and making adjustments due to our circumstances"
	Respondent # 3	"... when we arrive at our dormitories, we still have to do our assignments because I think our duties overlapped with the activities, we had to do with our section who do not go to duty."
	Respondent # 4	"I think it's just something I accepted that I can't get as much time, and I think I am just trying to make up for it through studying more."
	Respondent # 5	"Online I kind of plan out my stuff and I perform it along time ahead of time so that when it comes to procrastination, when you are having difficulty starting things, I'd say, that what I do to help myself is I even just do a paragraph or even just start a sentence, because the hardest part is actually starting"
	Respondent # 7	"...you already have the plan in your mind since you only have two days so okay, I want to learn all the skills I want to the get all the skills that I can."
	Respondent # 8	"...you only have two days, so you are like I'll make the most of it."

Family and Friends. Friends serve as an essential source of emotional support during stressful times (Juvonen et al., 2021). Juvonen et al. (2021) say that connecting over the phone or through social media platforms with friends can help mitigate loneliness and emotional distress during isolation protocols due to the COVID-19 pandemic. The isolation of nursing students in bubbled dorms made students rely on friends, family, and social media connections to cope with their challenges. Table 9

below shows that 4 out of 8 respondents stated the following in their interviews:

Table 9

Coping Strategies of Nursing Students During their Limited Face-to-face Learning in Bubbled Dormitories (Family and Friends)

Subtheme	Informant's Code	Informant's Responses
Family and Friends	Respondent # 5	"...just being with friends while you are learning, just your normal classmates from before. It's an exciting time to be able to come together and learn about nursing."
	Respondent # 6	"I was able to cope by reaching out my follow peers to solve the problems that we're having because we are still going to our limited face to face duty in smaller groups, we still have each other to depend on when it comes to dealing with problems"
	Respondent # 7	"...you know, in a class, seeing your friends to talk with things"
	Respondent # 8	"...what had helped me during this time is actually having to talk about it. Now about my stress and anxiety with stuff going on in during school and the hospital, I got to talk about it with my friends and family, so I get to bring that out."

Impact of Limited Face-to-Face Learning on Nursing Students in Bubbled Dormitories in a Private University

The study carried out in the Philippines by Barrot et al. (2021), covered the impact of the pandemic on students' online learning challenges. They found in their results that most of the students' responses were associated with: both the teaching and learning quality, anxiety, and other mental health issues (Barrot et al., 2021). Regarding the adverse impact on teaching and learning quality, most of the comments were linked to unpreparedness in the transition to online learning, limited infrastructure, and poor internet connection (Barrot et al., 2021). Along with the adverse impact on teaching and learning quality, this study also found that the student's mental health issues, boredom, depression, and isolation they faced, negatively affected their learning capability. Even though many of the students in the study done by Barrot et al. (2021) were negative, they found that two of their respondents were positively impacted by online learning.

Positive Impact (Helpful, Thankful). Almahasees et al. (2021) found some benefits of online learning with themes including: self-learning, low costs, convenience, and flexibility. They concluded that online classes encouraged self-learning, reduced the cost of education, and allowed students to learn new experiences through the development of skills like time management and self-discipline. The study uncovered the reality that faculty and students have agreed that online education is

Table 10

Impact to Nursing Students During their Limited Face-to-face Learning in Bubbled Dormitories (Positive Impact)

Subthemes	Informant's Code	Informant's Responses
Helpful	Respondent # 1	"For that, I think it will have a great impact in my life, especially in my future career because there are advantages during that time."
	Respondent # 3	"But I also think that the new the new Yeah, the new... the new normal, the new things we did to to survive this, this pandemic you know, the simulations, the trainings that we did will somehow be helpful in preparation for our life in the future and career too."
	Respondent # 4	"I think it will impact me through trying to learn quickly when I get on the floor."
	Respondent # 5	"I guess it will just help me to deal with adversity, especially when we can't control it. Naturally these challenges because of face-to-face learning and limited clinical exposure, they left us really short on time."
		"So, in the future it will help me to appreciate what we have right now, because we will never know when it will be taken from us, and it will also help us to just roll with the punches, to adapt and to be nurses that are resourceful"
		"So, the best you can so is learn to adapt and to overcome."

practical during today's pandemic (Almahasees et al., 2021). The nursing students expressed the positive impact of limited face-to-face learning and limited clinical exposure while living in bubbled dorms in Table 10 below:

Table 10

Subthemes	Informant's Code	Informant's Responses
Helpful	Respondent # 6	"Having to go to the hospitals under the supervision of my clinical instructors provides me with a knowledge to be able to deal with this again if it were to happen again within my lifetime. I think this also helps with my stress management."
	Respondent # 7	<p>"I think it will really have a great impact because of course our courses not only based on theory or in classes, it's based on skill"</p> <p>"That's why for me I think the skills that we have right now and the face to face and the limited clinical exposure will really greatly impact your future life because you're going to do it in the future."</p>
Thankful	Respondent # 4	<p>"...is it unusual to say that I am glad that I was able to handle medication and how to take care of the patient. I really appreciated my time at the ICU because I actually felt like a real nurse.</p> <p>"...it was a blessing to be able to just do the skills and just interact with patients there after we haven't done it for two years. So, although it's not ideal, I'm still extremely grateful for the time that we had."</p>
	Respondent # 5	"It was insightful, and it was really nice to be able to go to face-to-face class because you are able to focus there since you have the guidance of the teacher and the feedback is a lot quicker since you are there in person, and communicate with the teachers immediately"

Negative Impact (Low Confidence, Anxiety and Fear). The Philippine study conducted by Barrot et al. (2021) found that many students said online learning had a negative impact on their learning ability. Corcoran et al. (2020) studied nursing students during the pandemic and found that students felt selfish and frightened about not getting to the career goals they worked so hard to obtain. The negative impact of limited face-to-face and limited clinical exposure compared to regular face-to-face classes and clinical exposure was related to low confidence, anxiety, and fear amongst nursing students. 3 out of 8 respondents expressed their thoughts in Table 11 below:

Table 11

Impact to Nursing Students During their Limited Face-to-face Learning in Bubbled Dormitories (Negative Impact)

Subthemes	Informant's Code	Informant's Responses
Low Confidence	Respondent # 2	<p>"Personally, when it comes to like, confidence as a nurse, I think it negatively impacted because we were, we had less exposure in the classroom and learning in terms of like, really focusing, we also had very limited clinical experience, you know, clinical hours."</p> <p>"So, I think when I when we're in the field, and actually we like working, that has a negative but by this experience would have had a negative experience or negative impact on the way we perform, I guess, especially in the beginning as you try to get a grip of working in a hospital."</p>
	Respondent # 8	<p>"...now I'm thinking that the thought of lacking the knowledge and not having enough experience in clinicals had lowered my confidence of being a good nurse"</p>
Anxiety and Fear	Respondent # 3	<p>"I think there is this constant anxiety and fear of the future, because we are only limited to a little exposure in the clinical field."</p>
		<p>"That is why there is this connotation that we are half baked, we are unprepared, less prepared from you know, compared to the past batches, I think that will impact my future."</p>

Conclusion

The purpose of the study is to explore the lived experiences of nursing students during limited face-to-face learning in bubbled dormitories in a private university. We interviewed a total of eight (8) nursing students using two (2) research questions, which were: 1) What are the challenges of nursing students during their limited face-to-face learning in bubbled dormitories? and 2) What are the coping strategies of nursing students during their limited face-to-face learning in bubbled dormitories? The challenges experienced by the nursing students during limited face-to-face learning in bubbled dormitories in a private university yielded six (6) subthemes, and these were: difficulties in wearing of

PPE, limited time, changes and adjustments, restrictive protocols, unstable internet connection, and difficulty in focusing. All the eight (8) respondents (100%) mentioned the first four (4) themes. Five (5) respondents (62.5%) said that they are encountering Unstable Internet Connection. Lastly, six (6) out of eight (8) respondents cited that one of their challenges was difficulty in focusing.

Furthermore, three (3) subthemes emerged for the coping strategies used by the nursing students during limited face-to-face learning in bubbled dormitories in a private university; these were: Optimism, Time Management, and Family and Friends. All eight (8) respondents (100%) used Optimism as their coping mechanism. Seven (7) respondents (87.5 %) utilized time management. On the other hand, four (4) out of eight (8) respondents (50%) found time to talk with their families and friends to cope up with their challenges.

The limited face-to-face learning in bubbled dormitories had both a positive and negative impact on the nursing students. The positive impact included Helpful and Thankful. Six (6) respondents (75%) perceived that face-to-face learning was helpful for them, especially for their future careers. Two (2) respondents (25%) said that they were thankful that they had experienced face-to-face learning and clinical exposure even though it was limited. On the other hand, the negative impacts that emerged were Low Confidence, and Anxiety and Fear. Two (2) respondents (25%) expressed that they had Low Confidence as nurses because they felt that they lacked the knowledge and clinical exposure. On the other hand, one (1) respondent (12.5%) verbalized that there is the constant Anxiety and Fear of the future; that there is the feeling of unpreparedness because of limited clinical exposure.

Based on the findings of the study, the researchers concluded that the challenges experienced by the nursing students during limited face-to-face learning in bubbled dormitories in a private university are difficulties in wearing of PPE, limited time, changes and adjustments, restrictive protocols, unstable internet connection, and difficulty in focusing.

The coping strategies nursing students used during limited face-to-face learning in bubbled dormitories in a private university are: optimism, time management, and family and friends. The limited face-to-face learning in bubbled dormitories had both positive and negative impact as perceived by the eight nursing students. Positive impact includes being Thankful and seeing the limited face-to-face learning as Helpful for their future careers. On the other hand, the negative impacts were low confidence on being a nurse and constant anxiety and fear for the future.

References

- [1] Adonis, M. (2021, April 13). *PH lags behind in acting on remote learning problems amid pandemic*. <https://newsinfo.inquirer.net/1418185/ph-lags-behind-in-acting-on-remote-learning-problems-amid-pandemic>
- [2] Agu, C.F., McFarlane-Stewart, N., Stewart, J., & Rae, T. (2021). COVID-19 pandemic effects on nursing education: looking through the lens of a developing country. *International Nursing Review*, 68(2), 153-158. <https://doi.org/10.1111/inr.12663>
- [3] Almahasees, Z., Amin, M.O., & Mohsen, K. (2021). Faculty and Students' Perceptions of Online Learning During COVID-19. *Frontiers in Education*, 6(638470). <https://doi.org/10.3389/educ.2021.638470>
- [4] Alzueta, E., Perrin, P., Baker, F. C., Caffara, S., Ramos-Usaga, D., Yuksel, D., & Arango-Lasprilla, J. C. (2021, March 1). How the COVID-19 pandemic has changed our lives: A study of psychological correlates across 59 countries. Wiley Online Library. <https://onlinelibrary.wiley.com/doi/10.1002/jclp.23082>
- [5] Ambawati, R., Khaleyla, F., Putri, E.K., Rahayu, D.A., & Wisanti. (2020). Science online learning during the covid-19 pandemic: difficulties and challenges. *Journal of Physics: Conference Series*, 1747(012007). <https://doi.org/10.1088/17426596/1747/1/012007>
- [6] Appiah, S. (2020, November 25). *Quality of Nursing Education Programme in the Philippines: Faculty members perspectives*. BMC Nursing. <https://doi.org/10.1186/s12912-020-00508-9>

- [7] Atay, S., & Cura, Ş. Ü. (2020). Problems Encountered by Nurses Due to the Use of Personal Protective Equipment During the Coronavirus Pandemic: Results of a Survey. *Wound management & prevention*, 66(10), 12–16.
- [8] Baptiste, D., Bradbury-Jones, C., Gelling, L., Jackson, D., Morin, K., Neville, S., & Smith, G.D. (2020). Life in the pandemic: Some reflections on nursing in the context of COVID-19. *Journal of Clinical Nursing*, 29(13-14), 2041-2043. <https://doi.org/10.1111/jocn.15257>
- [9] Barrot, J.S., Llenarres, I.I., & del Rosario, L.S. (2021). Students' online learning challenges during the pandemic and how they cope with them: The case of the Philippines. *Education and Information Technologies*, 26(2021), 7321-7338. [https://doi.org/10.1007/s10639-021-](https://doi.org/10.1007/s10639-021-10589-)
- [10] Bharati, T., & Fakir, A.M.S. (2021). Pandemic catch-22: The role of mobility restrictions and institutional inequalities in halting the spread of COVID-19. *Plos One*, 16(6). <https://doi.org/10.1371/journal.pone.0253348>
- [11] Blanco, C. (2020, 11 december). A Guide To Qualitative Rigor In Research. Queens University of Charlotte. <https://online.queens.edu/resources/article/guide-to-qualitative-rigor-in-research/>
- [12] Bolbol, S.A., Hamed, M.S., & Zalut, M.M. (2021). The experiences, challenges, and acceptance of e-learning as a tool for teaching during the COVID-19 pandemic among university medical staff. *Plos One*, 16(3). <https://doi.org/10.1371/journal.pone.0248758>
- [13] Bryant, R., McAleer, M., Sojli, E., & Tham W.W. (2021). COVID-19 restrictions and age-specific mental health—U.S. probability-based panel evidence. *Translational Psychiatry*, 11(418). <https://doi.org/10.1038/s41398-021-01537-x>
- [14] Cahapay, M. B., & Rotas, E. E. (2020). Difficulties in Remote Learning: Voices of Philippine University Students in the Wake of COVID-19 Crisis. *Asian Journal of Distance Education*, 15(2), 147-158. <https://doi.org/10.5281/zenodo.429983>
- [15] Carlson, F. (2020, April 10). Online class during COVID-19: boredom, distraction and procrastination. *The Minnesota Daily*. <https://mndaily.com/208161/arts-entertainment/aedistractions/>
- [16] Carr, D., & Pudrovskaya, T. (2007). Mid-Life and Late-Life Crisis. *Encyclopedia of Gerontology (Second Edition)*, 175-185. <https://doi.org/10.1016/B0-12-370870-2/00126-8>
- [17] Chen, F., Lin, X., Liu, Y., Wang, X., & Zang, Y. (2021). Dispatched nurses' experience of wearing full gear personal protective equipment to care for COVID-19 patients in China—A descriptive qualitative study. *Journal of Clinical Nursing*, 30(13-14), 2001-2014. <https://doi.org/10.1111/jocn.15753>
- [18] Chudik, A., Mohaddes, K., Pesaran, M. H., Raissi, M., & Rebucci, A. (2020, October 19). *Economic consequences of Covid-19: A Multi-country Analysis*. VOX, CEPR Policy Portal. <https://voxeu.org/article/economic-consequences-covid-19-multi-country-analysis>
- [19] Cohut, M. (2021, March 12). Global impact of the COVID-19 pandemic: 1 year on. Medical News Today. <https://www.medicalnewstoday.com/articles/global-impact-of-the-covid-19-pandemic-1-year-on>
- [20] Commission on Higher Education Department of Health. (2021). *Joint Memorandum Circular No. 2021-001, Subject: Guidelines on the Gradual Reopening of Campuses of Higher Education Institutions for Limited Face-to-Face Classes During the COVID-19 Pandemic*. <https://ched.gov.ph/wp-content/uploads/CHED-DOH-Joint-Memorandum-Circular-No.-2021-001-Guidelines-on-the-Gradual-Reopening-of-Campuses-of-Higher-Education-Institutions-for-Limited-Face-to-Face-Classes-during-the-COVID-19-Pandemic.pdf>
- [21] Corcoran, L., Dewart, G. Petrovic, K., & Thirsk, L. (2020). Nursing education in a pandemic: Academic challenges in response to COVID-19. *Nurse Education today*, 92(2020). doi: 10.1016/j.nedt.2020.104471
- [22] Costa-Font, J. (2020, November 2). *Does optimism help us during pandemic?* The London School of Economics and Political Science.

- <https://blogs.lse.ac.uk/businessreview/2020/11/02/does-optimism-help-us- during-a-pandemic/>
- [23] Fusch, P., & Ness, L. (2015). *Are We There Yet? Data Saturation in Qualitative Research*. The Qualitative Report. <https://cpb-use1.wpmucdn.com/sites.nova.edu/dist/a/4/files/2015/09/fusch1.pdf>
- [24] Gopez, J. M. W. (2021). Cautious and gradual reopening of limited face-to-face classes in Philippine tertiary schools. *Journal of Public Health*, 43(2), e356–e357. <https://doi.org/10.1093/pubmed/fdab060>
- [25] House of Representatives of the Philippine Congress. (2002) *Republic Act No. 9173: An Act Providing for a More Responsive Nursing Profession, Repealing for the Purpose Republic Act No. 7164, Otherwise Known as "The Philippine Act of 1991" and for Other Purposes*. <https://www.prc.gov.ph/uploaded/documents/NURSING%20LAW.PDF>
- [26] Juvonen, J., Lessard, L.M., & Schacter, H.L. (2021). Connecting electronically with friends to cope with isolation during COVID-19 pandemic. *Sage Journals*, 38(6), 1782-1799. <https://doi.org/10.1177/0265407521998459>
- [27] Leonardsen, A. L., Blågestad, I. K., Brynhildsen, S., Olsen, R., Gunheim-Hatland, L., Gregersen, A. G., Kvarsnes, A. H., Hansen, W. C., Andreassen, H. M., Martinsen, M., Hansen, M., Hjelmeland, I., & Grøndahl, V. A. (2020). Nurses' perspectives on technical skill requirements in primary and tertiary healthcare services. *Nursing open*, 7(5), 1424–1430. <https://doi.org/10.1002/nop2.513>
- [28] Lincoln, Y. S., Guba, E. G., & SAGE Publishing. (1985). *Naturalistic Inquiry* [E-book]. SAGE Publications. Geraadpleegd op 20 januari 2022, van <https://us.sagepub.com/en-us/nam/naturalistic-inquiry/book842>
- [29] Magcale-Macandog, D. B., Predo, C. D., Campang, J. G., Pleto, J., Perez, M., Larida, N., Natuel, F., Quiñones, S., & Cabillon, Y. (2021). Socio-economic and environmental impacts of COVID-19 pandemic: Building resilience of the seven lakes of San Pablo city, Philippines. *Environmental Resilience and Transformation in Times of COVID-19*, 255–270. <https://doi.org/10.1016/B978-0-323-85512-9.00012-7>
- [30] Mahyoob, M. (2020). Challenges of e-Learning during the COVID-19 Pandemic Experienced by EFL Learners. *Arab World English Journal*, 11(4) 351-362. DOI: <https://dx.doi.org/10.24093/awej/vol11no4.23>
- [31] Moneymax. (2021, September 2). *Distance Learning in the Philippines: Is It the Best Method for Your Child?* <https://www.moneymax.ph/lifestyle/articles/distance-learning-philippines>
- [32] Morrow, R., Rodriguez, A. & King, N. (2015). Colaizzi's descriptive phenomenological method. *The Psychologist*, 28(8), 643-644
- [33] Noble, H., & Heale, R. (2019, July 1). Triangulation in research, with examples. *Evidence-Based Nursing*. <https://ebn.bmj.com/content/22/3/67>
- [34] Nowell, L. S., Norris, J. M., White, D. E., & Moules, N. J. (2017). Thematic Analysis: Striving to Meet the Trustworthiness Criteria. *International Journal of Qualitative Methods*. <https://doi.org/10.1177/1609406917733847>
- [35] Palinkas, L. A., Horwitz, S. M., Green, C. A., Wisdom, J. P., Duan, N., & Hoagwood, K. (2015). Purposeful Sampling for Qualitative Data Collection and Analysis in Mixed Method Implementation Research. *Administration and policy in mental health*, 42(5), 533–544. <https://doi.org/10.1007/s10488-013-0528-y>
- [36] Qualtrics AU. (2022, Apr 5). Simple Random Sampling: Definition, Examples, & How to Do It . <https://www.qualtrics.com/au/experience-management/research/simple-random-sampling/>
- [37] Qutoshi, S. (2018). *Phenomenology: A Philosophy and Method of Inquiry*. *Journal of Education and Educational Development*. <https://files.eric.ed.gov/fulltext/EJ1180603.pdf>
- [38] Republic of the Philippines Department of Education. (2021, February 24). *On the Pilot Implementation of Limited Face-to-Face Classes*.

- <https://www.deped.gov.ph/2021/02/24/on-the-pilot-implementation-of-limited-face-to-face-classes/>
- [39] Republic of the Philippines Department of Education. (2021, September 21). *DepEd to launch pilot face-to-face classes in selected 120 schools*.
<https://www.deped.gov.ph/2021/09/21/deped-to-launch-pilot-face-to-face-classes-in-selected-120-schools/>
- [40] Republic of the Philippines Department of Education. (2021, September 20). *On the approval of the pilot implementation of limited face-to-face classes in 120 schools*.
<https://www.deped.gov.ph/2021/09/20/on-the-approval-of-the-pilot-implementation-of-limited-face-to-face-classes-in-120-schools/>
- [41] Republic of the Philippines Office of the President Commission of Higher Education. (2017). *CHED Memorandum No. 15 Series of 2017, Subject: Policies, Standards and Guidelines for the Bachelor of Science in Nursing (BSN) Program*. <https://ched.gov.ph/wp-content/uploads/2017/10/CMO-15-s-2017.pdf>
- [42] Rettner, R. (2020, December 31). 10 ways COVID-19 changed the world. *Livescience*.
<https://www.livescience.com/ways-covid-19-changed-the-world-2020.html>
- [43] Scott, E. (2020, October 11). *What is Optimism?* Very Well Mind.
<https://www.verywellmind.com/the-benefits-of-optimism-3144811>
- [44] Sutton, J., & Austin, Z. (2015). Qualitative Research: Data Collection, Analysis, and Management. *The Canadian journal of hospital pharmacy*, 68(3), 226–231.
<https://doi.org/10.4212/cjhp.v68i3.1456>
- [45] Thomas, L. (2020, October 2). An introduction to simple random sampling . scribbr.
<https://www.scribbr.com/methodology/simple-random-sampling/>
- [46] Todorov, G. (2017, December 9). *The Importance of Time Management in Online Learning?* eLearning Industry. <https://elearningindustry.com/time-management-in-online-learning-importance>
- [47] Wong, L. (2008). Data analysis in qualitative research: a brief guide to using nvivo. *Malaysian family physician: the official journal of the Academy of Family Physicians of Malaysia*, 3(1), 14–20.
- [48] World Health Organization (2010). WHO Global status report on non-communicable diseases 2010 (GSR 2010). http://www.who.int/nmh/publications/ncd_report2010/en

Relationship between Intolerance of Uncertainty and COVID-19 Related Anxiety among Filipino College Students

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Abstract: College students may find themselves unable to cope with the impending worry and uncertainty around the potential outcomes of the global pandemic caused by the novel coronavirus disease. The urgent need for study is important to better understand the factors that are influencing college students. Changed versions of the Intolerance of Uncertainty Scale (IUS) and the COVID-19 Related Anxiety Scale (CRAS) were used in this cross-sectional study. 830 students from various universities in the Philippines participated. The findings revealed a high level of intolerance for uncertainty and COVID-19 related anxiety among students. Correlation analyses revealed that components of Intolerance of Uncertainty were found to have a positive association with the components of COVID-19 Related Anxiety. The results provide an understanding that IUS could be a shared element of anxiety among college students during the COVID-19 pandemic. Discussion, as well as recommendations, were considered.

Keywords: *uncertainty, anxiety, students*

1. Introduction

1.1 Background of the Problem

The uncertainty surrounding coronavirus is the hardest thing to handle, especially for students. People don't know exactly the impact or how long it will last. College students may find themselves unable to cope with the impending worry and uncertainty around the potential outcomes of the global pandemic caused by the novel coronavirus disease. And that makes it all too easy to excessively ruminate and spiral out into unbearable psychological pressure (Cao et al., 2020). The uncertainty experienced by college students during COVID-19 can have serious consequences for their success and psychological wellbeing, but studies are limited.

Management of uncertainty is important to facilitate a healthy learning environment, implying that when students do not know how to address uncertainty, learning may not take place, and their wellbeing is affected (Sollitto et al., 2017). Difficulties with uncertainty have been associated with ineffective coping, neuroticism, need for predictability, and cognitive reactions to ambiguity (Lauriola et al., 2018). Not being able to tolerate uncertainty can have serious consequences, especially for students as they start and continue to finish their courses.

Conceptually, intolerance of uncertainty (IU) is a trans-diagnostic cognitive vulnerability factor that furthers the development and maintenance of anxiety disorders and a causal mechanism of various psychological difficulties (McEvoy et al., 2019)). Intolerance of uncertainty is defined as "a cognitive bias that affects how a person perceives, interprets, and responds to uncertain situations on an emotional, and behavioral level (Dugas et al., 2005)

In addition, it was emphasized that people with elevated IU hold underlying negative core beliefs about uncertainty, and they have biased information processing in the context of ambiguity and make threatening interpretations of uncertainty (Jacoby et al., 2013)). IU was even associated with sleep problems or poor sleep quality and more severe insomnia symptoms because of persistent rumination, worries, and intrusive thoughts (Lauriola et al., 2019).

Moreover, it was explained that IU might be an important mechanism between aspects of religion and psychological disorder symptoms (Howell et al., 2019). Given these studies, IU is an important construct that could be further explored in the student population in the context of a pandemic. Recent evidence suggests a 2-factor structure underlying the IUS; 1 factor measuring a prospective aspect (i.e., desire for predictability) and the other assessing an inhibitory aspect (i.e., uncertainty paralysis) (Hong & Lee, 2015). Recent studies and the theoretical foundation of IU may suggest that the inability to manage uncertainty may lead to unnecessary consequences and could influence how students live during the time of the pandemic. Studies incorporating intolerance of uncertainty and the psychological health of students are limited.

Because there is a paucity of literature that addresses both variables, this study determines the relationship between COVID-19-related anxiety and the intolerance of uncertainty of students during the COVID-19 community quarantine in the Philippines. The current study generated three general research questions: (a) What is the level of COVID-19-related anxiety among college students? (b) What is the level of intolerance of uncertainty among college students? (c) COVID-19-related anxiety is positively associated with intolerance of uncertainty in college students.

2. Methods

2.1 Research Design

The research design used in this study was primarily a descriptive-correlational design, which was quantitative in nature. This approach analyzes the correlations between variables without the researcher influencing or changing any of the variables (Creswell & Creswell, 2018).

2.2 Population and Sampling Technique

Male (n=146) and female (n=667) college students from selected public and private higher educational institutions in the Philippines were recruited for this study during the academic year 2020-2021. According to one systematic review, recruiting participants for various health, medical, and psychosocial research studies is an arduous task (Thornton et al., 2016). This is especially true during the COVID-19 pandemic, which presents a significant challenge. As a result, a simple random sampling technique was used to approximate the population in this study for a selected region in the Philippines where adolescents live as defined by the Facebook advertisement system. Following the guidelines in the Sage Handbook of Online Research Methods (Fielding et al., 2016; Fricker, 2016), the researcher conducted an internet-based survey using the volunteer (opt-in) panel. The survey can be conducted either via the web or via e-mail, as stated in the book. The volunteer (opt-in) panels in the current study begin when students choose to take part as a result of seeing a specific invitation on a Facebook page after seeing a Facebook advertisement directing them there.

2.3 Research Instruments

In this study, questionnaires and validated research instruments were utilized. Demographic questionnaires were also used. All modified research instruments were approved for research purposes by the original authors. The reliability of the adapted and self-constructed instruments has been analyzed using Cronbach's Alpha to specifically determine the internal consistency, thus, emphasize the applicability of the items that have been used in the study. Two modified questionnaires were used, namely COVID-19 Related Anxiety Scale (CRAS-30) and Intolerance of Uncertainty Scale - Short Form (IUS-12). COVID-19 Related Anxiety Scale (CRAS-30) is a self-constructed survey designed to measure the level of apprehension in relation to the experiences of students during the COVID-19 pandemic. It is rated on a 5-point scale rated on a 5-point Likert scale that ranges from 1 (Always)–5 (Never). Described in Table 3 is the scoring and verbal interpretation of CRAS-30. Specifically, all components revealed high internal consistencies. The 7 items of cognitive manifestation revealed high internal consistency ($r = .76$) as well as the 8 items of affective

manifestation ($r = 0.78$). The 8 items of physical manifestation have high internal consistency ($r = 0.85$), and the behavioral manifestation, which has 7 items, revealed a high internal consistency ($r = 0.85$). All items were deemed to have good psychometric properties in relation to reliability and validity. Intolerance of Uncertainty Scale - Short Form (IUS-12) was used to understand the intolerance of uncertainty level of the respondents.

There were no items deleted since all items have been modified, and the medication was based on the characteristics and profile of the respondents in the current study (e.g. Uncertainty keeps me from living a peaceful life, when I am uncertain I cannot function well in my life) to for suitability and comprehensibility purposes. But the scaled response has not been modified. Psychometric properties revealed that two indicators of IUS had acceptable internal consistencies through Cronbach's alpha. The seven items from prospective IU have a good internal consistency ($r=0.75$), and the 4 items from inhibitory IU have been found to have a very good internal consistency ($r=0.72$).

2.4 Ethical Considerations

The study safeguarded the participants' identities. We tried to maintain the confidentiality of those who participated. Facebook was used exclusively to advertise and direct interested individuals to the Google form-hosted survey link. Secure data storage was accomplished using password-protected computers. The current study's procedures and activities were all approved by the Adventist University of the Philippines (AUP) ethics review board (2021-ERB-AUP-013).

2.5 Data Analysis

The sample groups were subjected to descriptive-correlational statistical analyses using IBM SPSS v26.0 in order to gain a better understanding of the study's representative samples. For the specific operations, a $P > 0.05$ level of significance was used, along with a 95% confidence interval.

2.6 Limitations

This study focused on male and female college students between the ages of 18 and 35 who were enrolled in an online flexible learning strategy at private and public Philippine higher education institutions. During the delivery of a survey, worries regarding internet connections, questions, the environment, and level of motivation may manifest as survey tiredness. Because of the severe quarantine procedures related to the COVID-19 pandemic, an online poll was conducted, which might be construed as a sample bias, given that the vast majority of college students had internet access. Students unable to use the Internet were not contacted. A cross-sectional survey as a data collection method could also be regarded as a limitation.

3. Results

3.1 Demographic analysis

There were 884 responses. Following data analysis, 830 responses were used for statistical analysis; 54 responses were discarded because of over ten missing items in the completed questionnaires. The demographic characteristics of the respondents are projected in Table 1. 18% ($n=667$) of the 830 respondents were male, while 82 percent ($n=146$) were female. In terms of school type, 61% ($n=495$) attended a private higher educational institution, while 39% ($n=318$) attended a public higher educational institution in the Philippines. The students in this study were all enrolled in a college/university that used a flexible learning approach.

Table 1. *Results by students' gender and academic year level*

Sociodemographic		N	%
Gender	Male	146	18%
	Female	667	82%
Type of School	Private	495	61%
	Public	318	39%

3.2 Descriptive Variables

As shown in Table 2, most of the students reported having a higher level of cognitive, affective, and behavioral symptoms but only a moderate level of physical symptoms of COVID-19-related anxiety, primarily related to financial concerns and academic workload. Additionally, typical students showed a high level of intolerance of uncertainty in terms of prospective and inhibitory intolerance of uncertainty.

Table 2. *Descriptive results of students' COVID-19-related anxiety and intolerance of uncertainty*

Variables	Total		Verbal Interpretation
	<i>x</i>	<i>sd</i>	
COVID-19 Related Anxiety			
Cognitive Symptoms	3.54	0.76	High
Affective Symptoms	3.72	0.72	High
Behavioral Symptoms	3.66	0.75	High
Physical Symptoms	3.30	0.81	Moderate
Intolerance of Uncertainty			
Inhibitory intolerance of uncertainty	3.82	0.73	High
Prospective intolerance of uncertainty	3.91	0.73	High

Note. 1.0-1.49 = Very Low, 1.5-2.49 = Low, 2.5-3.49 = Moderate, 3.5-4.49 = High, 4.5-5.0 = Very High

3.3 Correlation analysis between COVID-19 Related Anxiety and Intolerance of Uncertainty

Table 3. *Correlation analysis of COVID-19 related anxiety and intolerance of uncertainty*

		Cognitive	Affective	Physical	Behavioral
Inhibitory Intolerance of Uncertainty	<i>Pearson's r</i>	0.394 ***	0.436 ***	0.451 ***	0.534 ***
	<i>p-value</i>	< .001	< .001	< .001	< .001
Prospective Intolerance of Uncertainty	<i>Pearson's r</i>	0.434 ***	0.452 ***	0.484 ***	0.537 ***
	<i>p-value</i>	< .001	< .001	< .001	< .001

Note. + .29 and below = Low Degree, ± 0.30 and ± 0.49 = Moderate Degree, ± 0.50 and ± 1 = High Degree

As projected in Table 3, COVID-19-related anxiety components were positively correlated with the components of intolerance of uncertainty, with a correlation coefficient. The overall findings suggest that anxiety about COVID-19 had a significant positive influence on students' degree of intolerance of uncertainty during the pandemic.

4. Discussion

The current study focuses on the relationship between COVID-19-related anxiety and college students' intolerance of uncertainty during the pandemic.

The results of previous studies support the current findings. It has been stated that students are continually preoccupied with troubling thoughts, poor emotional control, behavioral, and physical stress. Recent research in this area has shown that they go through a range of troubling ideas during the pandemic (Betancourt, 2020; Blankstein et al., 2020; Wong et al., 2020). They were under a significant amount of cognitive load, which hindered their capacity for learning and led to poor performance, behavioral problems, and social concerns (Elmer et al., 2020). Besides this, the pandemic caused them to experience uncomfortable feelings. For example, one study found that students who were exposed to the COVID-19 pandemic reported experiencing depressive symptoms such as feelings of isolation, hopelessness, dissatisfaction, and powerlessness (Fiorenzato et al., 2021; Kecojevic et al., 2020).

Furthermore, they are pessimistic regarding their academic duties and their current financial status, both of which, if they are not well managed, can cause unfavorable effects (Betancourt, 2020; Blankstein et al., 2020). During the COVID-19 outbreak in Taiwan, the study found that participants displayed greater levels of anxiety symptoms, such as stress, anxiousness, and so on (Wong et al., 2020). Academic pressures, deteriorating interpersonal relationships, a lack of relational support, and newly identified stressors associated with the COVID-19 crisis all have the potential to adversely affect students' mental health and academic performance (Elmer et al., 2020; Gabriel et al., 2020; Restubog et al., 2020). It's possible that the numerous changes brought about by the epidemic will make people feel, behave, and think more anxiously, which may hinder their capacity to live a peaceful life.

The correlation analyses revealed an association between COVID-19-related anxiety and intolerance of uncertainty. The pandemic has upended students' lives. Many research highlighted the inevitable challenges that were faced by students during the pandemic, which resulted in anxiety-related concerns that support the current findings. In Turkey, a study revealed that COVID-19 anxiety was associated with increased intolerance of uncertainty (Bulut, 2022). The aforementioned study also draws attention to the fact that these two characteristics were new pieces of information for researchers to consider during the pandemic. (Bulut, 2022). The aforementioned study also draws attention to the fact that these two variables were new pieces of information for researchers to consider during the pandemic. Furthermore, in a different study, these two variables were identified as significant negative predictors of resiliency, which suggests that if an individual's COVID-19-related anxiety and intolerance of uncertainty are not addressed, it may affect how they would adjust during the pandemic (Duru et al., 2022). The importance of addressing intolerance of uncertainty at an earlier stage should be cared for to prevent anxiety-related concerns during the COVID-19 pandemic, given that high intolerance of uncertainty is a known risk factor for mental health problems (Andrews et al., 2021.).

5. Limitations and Implications

This study only focused on male and female college students aged 18 to 35 in private and public higher educational institutions in the Philippines who were enrolled in an online flexible learning approach. Survey fatigue may be apparent because of viable concerns about internet connections, questionnaires, the environment, and the level of motivation during the survey's administration. There was also an under-representation of male participants and because of the strict quarantine measures associated with the COVID-19 pandemic, an online survey was administered, which could be interpreted as a sampling bias given that most college students had internet access. Even though this study has its own set of methodological constraints, it may serve as a springboard to

motivate future researchers to go deeper into and explore college students' daily experiences during the COVID-19 pandemic in order to combat several difficulties that may come their way.

6. Conclusion

The findings recognizably reveal that COVID-19-related anxiety was associated with a higher level of intolerance of uncertainty in college students. The study underlined the critical responsibility of educators, mental health experts, and health authorities to provide significant intervention in the mental health difficulties, especially uncertainty and anxiety of college students during the pandemic.

References

- [1] Andrews, J., Li, M., Minihan, S., Songco, A., Fox, E., Ladouceur, C. D., Mewton, L., Moulds, M. L., Pfeifer, J., Harmelen, A.-L. Van, & Schweizer, S. (n.d.). *The effect of intolerance of uncertainty on anxiety and depression, and their symptom networks, during the COVID-19 pandemic*. <https://doi.org/10.31234/OSF.IO/GTEKH>
- [2] Betancourt, N. (2020). *Student Experiences During COVID-19 | Ithaka S+R*. 2020. <https://sr.ithaka.org/blog/student-experiences-during-covid-19/>
- [3] Blankstein, M., Frederick, J., & Wolff-Eisenberg, C. (2020). *Student Experiences During the Pandemic Pivot*. <https://doi.org/10.18665/sr.313461>
- [4] Bulut, M. B. (2022). Relationship between COVID-19 anxiety and fear of death: the mediating role of intolerance of uncertainty among a Turkish sample. *Current Psychology (New Brunswick, N.J.)*. <https://doi.org/10.1007/S12144-022-03281-X>
- [5] Cao, W., Fang, Z., Hou, G., Han, M., Xu, X., Dong, J., & Zheng, J. (2020). The psychological impact of the COVID-19 epidemic on college students in China. *Psychiatry Research*, 287, 112934. <https://doi.org/10.1016/j.psychres.2020.112934>
- [6] Creswell, J. W., & Creswell, J. D. (2018). Mixed Methods Procedures. *Research Defign: Qualitative, Quantitative, and Mixed Methods Approaches*, pg 418.
- [7] Dugas, M. J., Marchand, A., & Ladouceur, R. (2005). Further validation of a cognitive-behavioral model of generalized anxiety disorder: diagnostic and symptom specificity. *Journal of Anxiety Disorders*, 19(3), 329–343. <https://doi.org/10.1016/J.JANXDIS.2004.02.002>
- [8] Duru, Y. B., Gunal, V., Agaoglu, C. Y., & Tatli, C. (2022). The role of covid-19 anxiety and intolerance of uncertainty in predicting resilience. *Scandinavian Journal of Psychology*. <https://doi.org/10.1111/SJOP.12820>
- [9] Elmer, T., Mepham, K., & Stadtfeld, C. (2020). Students under lockdown: Comparisons of students' social networks and mental health before and during the COVID-19 crisis in Switzerland. *PLOS ONE*, 15(7), e0236337. <https://doi.org/10.1371/journal.pone.0236337>
- [10] Fielding, N. G., Lee, R. M., & Blank, G. (2016). The SAGE Handbook of Online Research Methods. In *The SAGE Handbook of Online Research Methods*. SAGE Publications Ltd. <https://doi.org/10.4135/9781473957992>
- [11] Fiorenzato, E., Zabberoni, S., Costa, A., & Cona, G. (2021). Cognitive and mental health changes and their vulnerability factors related to COVID-19 lockdown in Italy. *PLOS ONE*, 16(1), e0246204. <https://doi.org/10.1371/journal.pone.0246204>
- [12] Fricker, R. D. (2016). Sampling Methods for Online Surveys. In *The SAGE Handbook of Online Research Methods* (pp. 162–183). SAGE Publications Ltd. <https://doi.org/10.4135/9781473957992.n10>
- [13] Gabriel, A. S., Erickson, R. J., Diefendorff, J. M., & Krantz, D. (2020). When does feeling in control benefit well-being? The boundary conditions of identity commitment and self-esteem. *Journal of Vocational Behavior*, 119, 103415. <https://doi.org/10.1016/j.jvb.2020.103415>

- [14]Hong, R. Y., & Lee, S. S. M. (2015). Further clarifying prospective and inhibitory intolerance of uncertainty: Factorial and construct validity of test scores from the intolerance of uncertainty scale. *Psychological Assessment*, 27(2), 605–620.
<https://doi.org/10.1037/pas0000074>
- [15]Howell, A. N., Carleton, R. N., Horswill, S. C., Parkerson, H. A., Weeks, J. W., & Asmundson, G. J. G. (2019). Intolerance of uncertainty moderates the relations among religiosity and motives for religion, depression, and social evaluation fears. *Journal of Clinical Psychology*, 75(1), 95–115. <https://doi.org/10.1002/jclp.22691>
- [16]Jacoby, R. J., Fabricant, L. E., Leonard, R. C., Riemann, B. C., & Abramowitz, J. S. (2013). Just to be certain: Confirming the factor structure of the Intolerance of Uncertainty Scale in patients with obsessive-compulsive disorder. *Journal of Anxiety Disorders*, 27(5), 535–542.
<https://doi.org/10.1016/J.JANXDIS.2013.07.008>
- [17]Kecojevic, A., Basch, C. H., Sullivan, M., & Davi, N. K. (2020). The impact of the COVID-19 epidemic on mental health of undergraduate students in New Jersey, cross-sectional study. *PLOS ONE*, 15(9), e0239696. <https://doi.org/10.1371/journal.pone.0239696>
- [18]Lauriola, M., Carleton, R. N., Tempesta, D., Calanna, P., Socci, V., Mosca, O., Salfi, F., Gennaro, L. De, & Ferrara, M. (2019). A Correlational Analysis of the Relationships among Intolerance of Uncertainty, Anxiety Sensitivity, Subjective Sleep Quality, and Insomnia Symptoms. *International Journal of Environmental Research and Public Health*, 16(18).
<https://doi.org/10.3390/IJERPH16183253>
- [19]Lauriola, M., Mosca, O., Trentini, C., Foschi, R., Tambelli, R., & Carleton, R. N. (2018). The intolerance of uncertainty inventory: Validity and comparison of scoring methods to assess individuals screening positive for anxiety and depression. *Frontiers in Psychology*, 9(MAR).
<https://doi.org/10.3389/FPSYG.2018.00388>
- [20]McEvoy, P. M., Carleton, R. N., Correa, K., Shankman, S. A., & Shihata, S. (2019). Intolerance of Uncertainty. *The Cambridge Handbook of Anxiety and Related Disorders*, 196–226.
<https://doi.org/10.1017/9781108140416.008>
- [21]Restubog, S. L. D., Ocampo, A. C. G., & Wang, L. (2020). Taking control amidst the chaos: Emotion regulation during the COVID-19 pandemic. In *Journal of Vocational Behavior* (Vol. 119, p. 103440). Academic Press Inc. <https://doi.org/10.1016/j.jvb.2020.103440>
- [22]Sollitto, M., Brott, J., Cole, C., Gil, E., & Selim, H. (2017). Students' uncertainty management in the college classroom. <https://doi.org/10.1080/03634523.2017.1372586>, 67(1), 73–87.
<https://doi.org/10.1080/03634523.2017.1372586>
- [23]Thornton, L., Batterham, P. J., Fassnacht, D. B., Kay-Lambkin, F., Caelear, A. L., & Hunt, S. (2016). Recruiting for health, medical or psychosocial research using Facebook: Systematic review. In *Internet Interventions* (Vol. 4, pp. 72–81). Elsevier B.V.
<https://doi.org/10.1016/j.invent.2016.02.001>
- [24]Wong, L. P., Hung, C. C., Alias, H., & Lee, T. S. H. (2020). Anxiety symptoms and preventive measures during the COVID-19 outbreak in Taiwan. *BMC Psychiatry*, 20(1), 376.
<https://doi.org/10.1186/s12888-020-02786-8>

Accounting Students Perceptions towards Online Learning at Universitas Advent Indonesia during Covid-19

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Abstract: Online learning was established due to the outbreak of Covid-19 in the first quarter of 2020. The face-to-face classes were turned into online classes to avoid the spread of corona virus. This study aims to explore the different experiences and perceptions of accounting students of Universitas Advent Indonesia regarding online learning. Questionnaires were sent via email to each respondent through Google form. There were 228 students from different universities who attended the local webinar, but only 123 accounting major. The findings showed that most of the students perceived that online learning is beneficial in a way that the students were able to manage time better, obtain knowledge, and better performance (grades). On the contrary, there were several barriers that hinder the students (e.g. internet connections, etc.) and in reality, accounting students got bored with online learning. The boredom experienced by most of the students was properly handled. Thus, accounting students attuned themselves with the new method of learning.

Keywords: *online learning, Covid- 19, face-to-face, accounting major*

Introduction

In the first quarter of 2020, the world was in a panic situation brought about by the Covid 19 pandemic. Most establishments closed their business in response to the lockdown being announced by respective governments. Only indispensable industries were not fully closed. Educational institutions were compelled to close face to face school activities and shift to online learning (Alqudah et al., 2021; Ayanbode et al., 2022; Hashemi, 2021; Roy et al., 2021). Online learning made teachers and students to shift to the mode of education using internet. The shifting of physical interaction to virtual interaction curtailed the spread of the virus and was a better way of social distancing. Educational institutions must have to continue educating all students despite of the lockdown. The Indonesian government did not implement total lockdown but a strict social distancing. There was a swift transition from all offline classes to online classes. Online learning is the solution for this pandemic situation although there are certain problems encountered in administering the program. All learning activities involve the use of online tools and platforms. The use of technology empowers the learning process and at the same time enhances the learning experience of both teachers and students (Agarwal et al., 2021).

A prompt response to this kind of situation resorted to non-traditional face-to-face meeting in the classrooms. Learning process should not be stopped rather be continually done through virtual imparting of knowledge from teacher to students.

The Indonesian government subsidized all lecturers and students with a certain amount of load so the learning process could be continuously done. Some accounting students interacted enthusiastically, while others did not. Some were motivated, enjoyed and actively participated but others did not (Wei & Chou, 2020). The abrupt change has led to a general fear of a drop in the quality of education due to the loss of physical interaction (Jia et al., 2022). Some students are well-versed with computers thus making it easier for them to understand and they found themselves satisfied using the internet and computer (Wei & Chou, 2020); On the contrary there were teachers who were hesitant to go with the change due to lack of skill in computers and internet (Roy et al., 2021) .

To some extent, accounting online students encountered some difficulties during online classes. Students do not study seriously and diligently during online class. Students prefer to do some other things than to concentrate on their studies. Students who are active in the online class motivate

their own self to enjoy this type of learning. Their interest in technology-based learning helped them improve their performance (Wei & Chou, 2020). For some students, it is easy to adapt to this situation but to others, it created issues especially to the low-income family. In addition, some struggled about their internet skills thus supervision was needed from the parents or the teacher. Another concern was the connectivity of the internet (Alqudah et al., 2021). Several studies in different academic areas have been made, such areas as medical students, architectural students, education students, and dental students. However, no detailed study about the perception of accounting students towards online learning has been done. A prompt response to this kind of situation resorted to non-traditional face-to-face meeting in the classrooms.

As the teachers had no prior experience in online teaching, they were mostly unwilling to teach online during the pandemic. A major obstacle then was the teachers' inadequate skills in online teaching. Private university teachers coped with the situation relatively earlier than those in public universities because of the strong commitment of the respective administration (Roy et al., 2021). The transformation process of face-to-face teaching to online teaching where thousands of teachers and students were allowed to employ this platform. Since then, the public universities across the country have experienced online teaching as the new phenomenon during the COVID-19 pandemic where there was no prior preparation for such an emergency case (Hashemi, 2021).

The learning process should not be stopped rather continually done through virtual imparting of knowledge from teacher to students.

This study focuses on the perceptions of accounting students towards online learning, and will address the following questions:

Q1: Do online classes benefit the accounting students?

Q2: Are online classes effective and efficient for accounting students?

Q3: Are online classes a hindrance to accounting students?

Students prefer to study through online classes due to the benefits and the easy way to understand and enable individuals to perform and achieve learning goals.

Review of Related Literature

Online learning

Delivering education using the internet is known to be an e-learning, or an online learning. It is a simple and flexible way of learning and attaining goals of education. Online learning improves the quality and quantity of interaction between students and lecturers (Wei & Chou, 2020). Even while e-learning allows for ease, flexibility, and remote access to courses on the participant's schedule, they could still feel alone. Online learning is an individual act of combined engagement, thus it may appear as if they are functioning fully independently. (Fatonja, et al., 2020). Students frequently have a lot of worthwhile interactions while learning online. Online education gives the advantages of ease and flexibility in the location and schedule of their studies, and it does not hurt prepared and motivated students (Al-Amin et al., 2021). Face-to-face meetings are substituted by online virtual meetings when learning activities are conducted using online media. (Putra et al., 2020). Online learning platforms have been implemented by educational institutions to maintain the academic activity (Muthuprasad et al., 2021). Information and communication technology is used to facilitate and support the learning process known as online learning, Retnoningsih (2017).

According to the above literature, several factors can be viewed as considerations for learners' perceptions of online learning. For example, online learning provides learners a more flexible and convenient learning environment to conduct self-paced and customized learning. Furthermore, online learning improves the quality and quantity of interaction among students, instructors, and peers through synchronous and asynchronous communicational technologies. In sum, the features or advantages that learners perceive in online learning environments may include flexibility, synchronous and asynchronous interaction with peers and instructors, lack of time and place restrictions, and easy access to diverse online content and professional knowledge. Therefore, the concept of online

learning perceptions in this study refers to learners' recognition of the abovementioned features or benefits of online learning. It is proposed that the more positive learners' online learning perceptions are, the more they will perceive support and benefits from their online learning process. However, by reviewing the studies on online learning perceptions, the concept of perceptions toward online learning still needed to be confirmed and the dimensions underlying the perceptions needed to be identified. Therefore, this study tried to develop a more appropriate framework of online learning perceptions and a suitable instrument to measure learners' online learning perceptions.(Wei & Chou, 2020).

Online learning has its advantages and disadvantages. Advantages help students and lecturers make the learning process easier and flexible. In contrast, if the facilities are not appropriately prepared well by both users, then comes the hindrances and obstacle.

Perception

The process of recognizing things in the environment, such as objects, people, and symbols, is known as perception (Hermawan & Tyas, 2018). According to Hermawan & Tyas (2018), perception is the first step in an individual's processing of sensory perceptions in order to give their surroundings meaning. This demonstrates that perception is a person's reaction to what they experience in their environment, but in general, this is probably different from reality. A study made by (Alqudah et al., 2021) revealed that students were concerned about a lack of instructor-student contacts, a lack of technological support, as well as an inability to use the available online resources, which might be ethically problematic. The majority of the students who took part in this study also stated that they preferred the traditional educational model since it allowed them to interact with their teachers and classmates more effectively. Coman et al. (2020) found that obstacles such as "poor internet connection" and "lack of motivation" were among the key challenges that students faced in online learning (Coman et al., 2020). By the same token, 87.6% and 75.3% of the participants in the current study expressed that "unstable/ slow internet connection" and "lack of motivation" were the main obstacles they faced in online learning, respectively. Furthermore, "lack of instructions" and "homes are not a ready environment for online learning" were other key obstacles expressed by 78.8% and 75.6% of the participants, respectively, which is in line with previously published reports (Numan et al., 2015; Saekow, 2011, [january](#); Siritongthaworn et al., 2006). (Alqudah et al., 2021).

Despite the fundamental drawbacks of online education and the common lack of readiness of students to obtain their education online, it appears that this is the most efficient approach to deliver instruction in unusual situations like the COVID-19 epidemic. Almost half of the students who responded to the survey used in this research study indicated that their universities were ready to conduct lessons online, but the majority of students preferred face-to-face learning situations. A lack of enthusiasm, a bad internet connection, and an inadequate home setting were the three biggest obstacles to having a successful online learning experience, according to the comments of the participating students. Additionally, students' comments revealed conflicting views and attitudes regarding whether or not they believed that online learning was a useful and practical substitute.

Despite the general downsides to online learning and the students' general unpreparedness to receive their education online, online learning seems to be the most effective way of conducting teaching during exceptional circumstances like the COVID-19 pandemic. The students' responses to the survey implemented in this research study revealed that most students preferred face-to-face learning environments, despite the fact that almost half of them stated that their universities were prepared to deliver classes online. A lack of enthusiasm, a bad internet connection, and an inadequate home setting were the three biggest obstacles to having a successful online learning experience, according to the comments of the participating students. Additional comments from students revealed conflicting perspectives and attitudes regarding whether or not Jordanian colleges should adopt online learning as a viable substitute for traditional instruction. More study must be done to more accurately analyze the difficulties and problems of online learning and ultimately come up with better solutions, given the substantial research in the body of literature already available on

the subject and the students' conflicting views. Students having lower facilities, for example internet problems, living in rural areas, unskilled teachers, lower spending (because of poor economic status) tend to have a very bad perception of online classes. Besides students with lower grades, students who don't consider online classes as a good alternative and female students tended to have very bad perceptions of online class.(Hossain et al., 2021)

Challenges

Major challenges included the lack of appropriate technology, knowledge of technology use, teachers' inadequate skills in operating the system and motivating students, poor Internet facilities and high Internet costs, and absence of a calm environment at students' homes.(Roy et al., 2021) The lack of proper equipment, understanding of technology use, teachers' inability to operate the system and inspire pupils, inadequate Internet facilities, excessive Internet expenses, and the absence of a quiet environment at students' homes are some of the major problems. In this instance, it makes sense that students' academic performance would be impacted by their level of happiness (Hashemi, 2021). The lack of proper equipment, understanding of technology use, teachers' inability to operate the system and inspire pupils, inadequate Internet facilities, excessive Internet expenses, and the absence of a quiet environment at students' homes are some of the major problems.(Roy et al., 2021)

The biggest barriers to online learning in developing nations are issues with inconsistent internet and electricity, paying attention, and understanding lessons via the online platform (Al-Amin et al., 2021).

Research Methods

This research was conducted in the year 2021 for all the students who had attended the national Webinar, a joint program of Universitas Advent Indonesia, Perguruan Tinggi Advent Surya Nusantara and Universitas Klabat along with eight (8) other higher institutions. There were 141 respondents from Unai but reduced to 123 due to 18 students were not accounting majors. Questionnaires were distributed to all participants from various universities through Google form. A qualitative approach was used in analyzing data. Data were processed, analyzed, interpreted, and concluded.

Result and Discussion

Shifting from traditional methods of teaching to a non-traditional method, which is online class, students perceived this to be beneficial to manage time, obtain more knowledge, and to get better grades. Despite these perceptions, hindrances and barriers were apparent.

Online class perceived as beneficial

Accounting students found that an online class was beneficial. It allowed them to be more independent and resourceful in their classes. The following is the result of the survey made:

Online class is beneficial		
Scale	Respondents	Percentage
Very much beneficial	31	25,20
Beneficial	49	39,84
Neutral	32	26,02
Not beneficial	8	6,50
Not so beneficial	3	2,44
Total	123	100,00

As shown in Table above, there were 49 respondents (39.84%) who agreed that an online class was beneficial. Students enjoyed their classes without rushing to school and having less spending. All

activities and assignments were virtually done and submitted which allowed the students to have more time to do other things while having class; it is somewhat a “multi-task” experience. Some students use two devices, one for class one for other activities.

Can manage time effectively and efficiently

Time management is important for all accounting students. During online classes, students perceived that they could manage their time if classes were offline. Students were given the best time to learn. The following table is the result of gathered data from accounting students:

I can manage my time properly while having online class		
Scale	Respondents	Percentage
Strongly Agree	24	19,51
Agree	38	30,89
Neutral	40	32,52
Disagree	13	10,57
Strongly Disagree	8	6,50
Total	123	100,00

From the Table above, it shows the result of how students can manage their time effectively and efficiently. There were 40 (32.50%) students who didn't know if they managed their time properly, although 38 (30.89%) students agreed that they could manage their time well. Some students felt less pressure in coping with their subjects, projects, and assignments; but some were crammed and complained in meeting deadlines. Despite those deadlines, students were able to finish the courses successfully.

Perceive to obtain more learning

It is assumed that obtaining knowledge is not only from offline classes but also from online classes. Covid 19 is not a hindrance is gaining knowledge because technology helps in every way. The following table shows the result of the accounting students who perceived that they gained a lot of knowledge:

I gain a lot of knowledge through online class		
Scale	Respondents	Percentage
Strongly Agree	8	6,50
Agree	25	20,33
Neutral	63	51,22
Disagree	19	15,45
Strongly Disagree	8	6,50
Total	123	100,00

Based on Table above, it shows that 63 (51.22%) accounting students did not perceive that they gained knowledge. Most of the courses are computation, thus students have difficulty in catching up the topics that involve computations. Broadening knowledge was not fully attained. For students affected by their environment, online learning was not an effective way in imparting knowledge.

Perceived to get high grade

Accounting students perceived that online classes are easy and grades can be satisfying. Students were graded based on the result of all the criteria, these are attendance (camera –on),

quizzes, unit tests, mid-term test , final test and course requirements. The following table shows the result of their grades improvement:

My grades improved in online class		
Scale	Respondents	Percentage
Strongly Agree	17	13,82
Agree	56	45,53
Neutral	39	31,71
Disagree	9	7,32
Strongly Disagree	2	1,63
Total	123	100,00

Based on the Table above, the results showed that 56 (45.53%) of the accounting students agreed that their grades improved. One of the reasons for their grade improvement was that they could easily ask questions from their professors and their professors usually give quick responses. Active participation is another factor that improved their grade. Another reason is that accounting students are resourceful; with the use of technology they were able to find quick solutions to assignments. But then, not all the students were studious or diligent in their studies. There were 39 (31.71%) accounting students who didn't improve their grade. Inattentive happens, in as much as possible, students must be attentive during classes. It is an indication that they were not that attentive and there were lesser interactions among the students. There were disturbances during their classes as evidenced by their cameras being off. Internet connection was another factor of their lack of focus. Sometimes they would leave the zoom meeting room without any permission because of their poor internet connections.

Hindrances

There are issues and challenges faced during online classes. Even though it is beneficial, still, hindrances are inescapable. The following table shows the result of their learning experience during online class:

I experience hindrances in online class		
Scale	Respondents	Percentage
Strongly Agree	69	56,10
Agree	22	17,89
Neutral	23	18,70
Disagree	7	5,69
Strongly Disagree	2	1,63
Total	123	100,00

The Table above shows that there were 69 (56.10%) accounting students who strongly agree that they experienced obstacles during classes.

Boredom

Accounting students experienced boredom due to just sitting all day long in front of the computer or all day long looking at their gadgets. The following table shows their experiences:

I experienced boredom in online class		
Scale	Respondents	Percentage
Strongly Agree	51	41,46
Agree	42	34,15
Neutral	24	19,51
Disagree	3	2,44
Strongly Disagree	3	2,44
Total	123	100,00

The Table above shows that 51 (41.46%) accounting students strongly agreed that they experienced boredom. Boredom made them uninterested in their learning activities. Staying in the zoom meeting was such a situation where boredom existed.

Managed Boredom

Despite their boredom, accounting students had different ways to handle boredom. Since most of them were mature enough, they found ways to manage it. The following table shows their creative ways in handling boredom:

10. How to handle boredom caused by online classes		
		Percentage
No comment	3	
Assume a face-to-face class	5	4,07
Call a friend	3	2,44
Change place	3	2,44
Cook	1	0,81
Do other things	4	3,25
Eat	9	7,32
Exercise	11	8,94
Have a break	16	13,01
Make self-busy	2	1,63
Listen to Music	8	6,50
Play games	7	5,69
Pray	4	3,25
Read book	5	4,07
Refreshing	6	4,88
Rest	3	2,44
Self-motivation	16	13,01
Study	1	0,81
Watch	16	13,01
Total	123	100,00

The Table above shows that taking a break and self-motivation were the two highest ways to handle boredom. Having a break time for a few minutes and self-motivation (ex. study hard) eliminated their lack of interest in the class.

Conclusion

The significant transition of conventional face-to-face learning process to online learning was caused by the covid 19 pandemic. Online learning is a system that had been practiced in most universities. This system facilitated the learning process and gave enormous benefits for accounting students. It taught the students to manage time effectively and efficiently, and through online learning it was perceived that students gained knowledge. Grades improved even though hindrances and boredom were present. Hindrances and boredom encountered were managed well despite some limitations that were always present such as lack of feedback between students and teacher.

References

- [1] Agarwal, A., Bansal, K. M., Gupta, A., & Khurana, R. (2021). Online Education: a Booming Product for Institutes Post- Covid-19? *Marketing Education Review*, 31(3), 262–272. <https://doi.org/10.1080/10528008.2021.1958346>
- [2] Alam, A. (2020). Challenges and Possibilities of Online Education during Covid-1. *Preprints*, 2020060013.
- [3] Al-Amin, M., Zubayer, A. Al, Deb, B., & Hasan, M. (2021). Status of tertiary level online class in Bangladesh: students' response on preparedness, participation and classroom activities. *Heliyon*, 7(1), e05943. <https://doi.org/10.1016/j.heliyon.2021.e05943>
- [4] Alqudah, I., Barakat, M., Muflih, S. M., & Alqudah, A. (2021). Undergraduates' perceptions and attitudes towards online learning at Jordanian universities during COVID-19. *Interactive Learning Environments*, 0(0), 1–18. <https://doi.org/10.1080/10494820.2021.2018617>
- [5] Ayanbode, O. F., Fagbe, A., Owolabi, R., Oladipo, S., & Ewulo, O. R. (2022). Students' interactions, satisfaction and perceived progress in an online class: Empirical evidence from Babcock university Nigeria. *Cogent Education*, 9(1). <https://doi.org/10.1080/2331186X.2022.2060783>
- [6] Hashemi, A. (2021). Effects of COVID-19 on the academic performance of Afghan students' and their level of satisfaction with online teaching. *Cogent Arts and Humanities*, 8(1). <https://doi.org/10.1080/23311983.2021.1933684>
- [7] Hermawan, S., & Tyas, F. I. W. N. (2018). Pengaruh Nilai Intrinsik, Parental Influence, dan Persepsi Mahasiswa Dengan Pendekatan Teori Karier Anne Roe Terhadap Pemilihan Karir Sebagai Akuntan Publik Bagi Mahasiswa Akuntansi Universitas Airlangga Surabaya. *JABE (Journal of Applied Business and Economic)*, 5(2), 112–129. <https://doi.org/10.30998/jabe.v5i2.2111>
- [8] Hossain, M. E., Akter, K., & Das, S. (2021). Students' Perception of Online Class During Covid-19 Pandemic: An Ordered PROBIT Model Estimation. *International Journal of Academic Research in Progressive Education and Development*, 10(2). <https://doi.org/10.6007/ijarped/v10-i2/9685>
- [9] Jia, C., Hew, K. F., Bai, S., & Huang, W. (2022). Adaptation of a conventional flipped course to an online flipped format during the Covid-19 pandemic: Student learning performance and engagement. *Journal of Research on Technology in Education*, 54(2), 281–301. <https://doi.org/10.1080/15391523.2020.1847220>
- [10] Khan, M. A., Nabi, M. K., Khojah, M., & Tahir, M. (2021). Students' Perception towards E-Learning during COVID-19 Pandemic in India: An Empirical Study. *Sustainability*, 13(1), 57.
- [11] Muthuprasad, T., Aiswarya, S., Aditya, K. S., & Jha, G. K. (2021). Students' perception and preference for online education in India during COVID-19 pandemic. *Social Sciences & Humanities Open*, 3(1), 100101.
- [12] Narayanan, L., Pandit, M., Basu, S., Karmakar, A., Bidhan, V., Kumar, H., Brar, K. (2020). Impact of Lockdown due to COVID-19 Outbreak: Lifestyle Changes and Public Health Concerns in India. *Preprints*, 2020060129.

- [13]Singh, J., and Singh, J., (2020). COVID-19 and Its Impact on Society. *Electronic Research Journal of Social Sciences and Humanities*, 2(1), 168-172.
- [14]Putra, P., Liriwati, F. Y., Tahrim, T., Syafrudin, S., & Aslan, A. (2020). The Students Learning from Home Experiences during Covid-19 School Closures Policy In Indonesia. *Jurnal Iqra': Kajian Ilmu Pendidikan*, 5(2), 30-42. <https://doi.org/10.25217/ji.v5i2.1019>
- [15]Retnoningsih, E. (2017). Perbandingan Learning Management System Edmodo dan Moodle Dalam Pembelajaran Online. *Information System for Educators and Professionals*,1(2),221–230. <https://doi.org/2548-3587>
- [16]Roy, G., Babu, R., Abul Kalam, M., Yasmin, N., Zafar, T., & Nath, S. R. (2021). Response, readiness and challenges of online teaching amid COVID-19 pandemic: the case of higher education in Bangladesh. *Educational and Developmental Psychologist*, 00(00), 1–11. <https://doi.org/10.1080/20590776.2021.1997066>
- [17]Surani, D., & Hamidah, H. (2020). Students Perceptions in Online Class Learning During the Covid-19 Pandemic. *International Journal on Advanced Science, Education, and Religion*, 3(3), 83–95. <https://doi.org/10.33648/ijoaser.v3i3.78>
- [18]Wei, H. C., & Chou, C. (2020). Online learning performance and satisfaction: do perceptions and readiness matter? *Distance Education*, 41(1), 48–69. <https://doi.org/10.1080/01587919.2020.1724768>

Vocabulary Enhancement for the primary pupils through Total Physical Response

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Abstract: There are several techniques that teachers can use to help students learn vocabulary enhancement. It takes effective approaches and ways to teach English so that the learning and teaching process is successful, especially in primary school. The goal of this study is to increase fourth-graders vocabulary proficiency through Total Physical Response (TPR). This study seeks to answer "Is there any significant difference in vocabulary enhancement between students who are taught through Total Physical Response (TPR) and students who are taught through Conventional method?". This study is an experimental research design using a pre-test and post-test design. Grade four pupils participated in this study. Two classes were used, one was a control group, and the other an experimental group. The result shows that there is a significant difference in the vocabulary enhancement of the students. The experimental group outperformed the control group.

Keywords: *vocabulary enhancement, primary school, TPR- a total physical response*

Introduction

Knowing the words is a must for learning a language, and being unable to articulate oneself properly prohibits one from communicating their thoughts and intents to others (Katemba, 2022). Students studying English as a Foreign Language (EFL) find it challenging to learn English vocabulary because the first language has different phonology, writing, and meaning. Vocabulary is vital to the success of any communication, whether it be written or verbal (Berliani & Katemba, 2021)

There are a number of methods that teachers can use to help students learn more vocabulary in order to get around these issues (Taebenu & Katemba 2021). To ensure that the learning and teaching processes are successful, teaching English requires the use of appropriate techniques and approaches. Total Physical Response (TPR) is one approach that works well for teaching vocabulary to young people. According to Katemba & Tampubolon (2011) in their study, the result demonstrated how TPR can improve students' vocabulary performance levels. The findings of the pre-test, post-test, and t-test make it clear. Further, they explained that Total Physical Response (TPR) occurs when students pay attention, follow a detailed set of instructions, and carry out what their teacher directs. It is an effective technique to begin utilizing English in the classroom for conversation.

In addition to that, Khandamova (2022) stated that due to the teacher's use of imperative drilling and modeling techniques, which later served as the foundation for the TPR approach, the students became more engaged and motivated to learn English. According to Ekawati's (2022) research findings, TPR helps students, teachers, and parents learn English while studying at home, also known as Belajar Dari Rumah in Indonesian (BDR). Students can study with pleasure and swiftly assimilate material by adopting TPR. TPR also makes it simpler for teachers and parents to teach English to kids.

TPR, often known as teaching language via activity, is a strategy for language instruction that is focused on the coordination of speech and action. Students shouldn't be reluctant or scared to argue with their teachers. Regarding the issue, the TPR approach has a unique dependency on action (physical response). Many adults and kids are frightened and ashamed to march around a room to mimic the teacher's statements for social reasons. The teacher is expected to be imaginative for it. On the other side, the necessary action could be changed to be less demanding. Adults eventually learn to be more accommodating, especially if they observe their teacher performing the same duties. This study's boundaries and focus included: (1) assessing students' vocabulary learning abilities using the Total Physical Response method; and (2) assessing students' vocabulary knowledge using the TPR method. (3) Open class words like verbs and nouns will make up the vocabulary that is being worked

on. The researcher thinks that the pupils will be able to improve their simple vocabulary using this vocabulary target. This study was conducted at Sekolah Dasar Negeri (SDN) in Bandung. Participants in the study were fourth graders, whose ages ranged from 9 to 10. The total number of participants in this study was 59. The study's participants were elementary school students in Karyawangi, Bandung Barat.

Furthermore, According to Ur (1996), "alongside structure and pronunciation, vocabulary is one of the linguistic characteristics that are significant in teaching a language. Vocabulary can be thought of as a person's collection of words, roughly equivalent to the words we teach in a foreign language (p.60). A list of words and frequent phrases that are defined or translated in a lexicon or glossary is referred to as a vocabulary.

People improve their language skills in speech and writing, claims Spache (1964). Harmer (1991) added that "Students need to learn what words signify and how they are used" (p. 74). It goes without saying that vocabulary is crucial to learning a language, especially English because the language's lexicon is so vast and diverse. Therefore, it is imperative that English teachers assist their students in developing their vocabulary.

The researcher draws the conclusion that vocabulary is a stock list of words with meanings that are used singly or in a group and are organized alphabetically. Vocabulary is crucial to learning a language, and there are ways to help students increase their vocabulary in both speech and writing.

Building vocabulary, according to Nation and Waring (1997), is the key to a student's academic achievement. In other words, understanding vocabulary is the first stage of learning English successfully. Although acquiring a new vocabulary is not like learning new grammar, it is a process that requires patience, practice, and repetition. Furthermore, in order to recall high-frequency vocabularies and retain them in their long-term memory, vocabulary acquisition necessitates that students be disciplined in devoting more time to new terms.

David Nunan (2011) mentioned in his book that younger learners enjoy songs, rhymes, and games, as well as Total Physical Response (TPR) activities. These all can be used in the teaching of vocabulary. So, the researcher hopes by Total Physical Response Storytelling, the students might enjoy learning English vocabulary.

Characteristics of TPR

Asher (1969) outlined certain roles between students and teachers while applying TPR in the classroom: Students' Function. In TPR, students' primary roles are listening and performing. Students should pay close attention when the teacher gives instructions before responding physically. Comprehending what was being said would result in listening and physical response, which would then lead to long-term memory. Students may respond either individually or collectively. The teacher provides the lesson's content by issuing either conventional orders, like "Stand up" and "Sit down," or unexpected ones, like "Stand on the chair" or "Sit on the table." Both types of commands are taught to students, along with how to make their own. It's crucial to let language learners speak when they feel ready rather than pressuring them to do so; otherwise, they risk feeling humiliated and losing interest in the process.

Teacher's roles. The student becomes the actor, and the teacher is the director. The instructor chooses new materials for classroom usage, models lessons, presents them and decides what to teach. The teacher must be properly prepared and organized at all times. Asher suggests creating thorough lesson plans to ensure a predictable and easy-going learning environment: Because the action moves so quickly, it is advisable to write out the precise utterances you will use, especially the unique orders. Otherwise, you won't have time to think of them on the spot. It is crucial that teachers encourage students to acquire the English language while also assisting them in doing so. English language instruction for children has drawn a lot of attention.

Total Physical Response (TPR)

According to Richards and Rogers, "Total Physical Response is a language teaching method centered around coordination of speech and an action, it tries to teach language through physical activity" (2001). Focused on the coordination of speech and action, Total Physical Response is a method for teaching languages through motor physical exercise.

One of Dr. James J. Asher's ideas and techniques for teaching English is called TPR. It has been used for about three decades. This approach makes an effort to focus on motivating students to pay attention to and respond to their professors' spoken commands in the target language. In other words, TPR aims to teach language through physical (motor) activity. It is a language education approach that emphasizes the coordination of speech and motion.

Total Physical Response (TPR), according to Ashers (1969), is a method of teaching language that uses physical movement to respond to verbal input in order to lessen student inhibitions and their effective filter. According to Singh (2011), the three processes at the heart of TPR are as follows: a) A child first masters the skill of listening before mastering the art of speaking. b) Because they must physically comply with spoken language in the form of parental directives, children learn the skill of listening comprehension. c) Speech spontaneously and easily develops from it.

The researcher conducted the study on the application of the Total Physical Response Method to the vocabulary education of fourth-grade students at one of SDN Karyawangi in Bandung Barat using the background material given above as a basis.

The conceptual framework of the study

The conceptual framework for this study is displayed in Figure 1. First, the fourth grade is the researcher's choice for study participants. To determine the pupils' past vocabulary skills, a pre-test was done before the treatment. The fourth-grade students in the elementary school were then taught using the TPR approach. The students then completed a post-test at the conclusion of the 16-hour program to determine whether their vocabulary had improved.

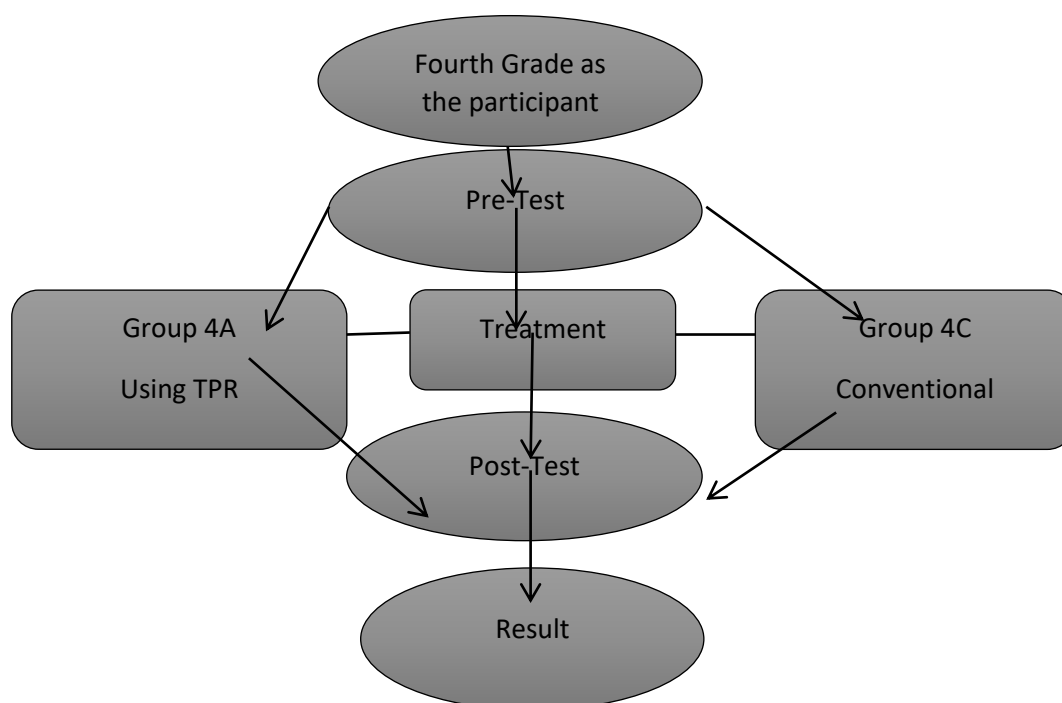


Figure 1. Conceptual Framework

This study intended to seek an answer to the research question "Is there a significant difference in vocabulary enhancement between students who are taught using Total Physical

Response (TPR) and students who are taught using conventional methods? This is the key issue that this research focuses on.

Research Hypothesis

The researcher has constructed the following hypothesis:

Null Hypothesis

H₀: There is no significant difference in vocabulary enhancement between students who are taught through Total Physical Response (TPR) and students who are taught through the Conventional method.

Alternative Hypothesis

H_a: There is a significant difference in vocabulary enhancement between students who are taught through Total Physical Response (TPR) and students who are taught through the Conventional method.

Methodology

Participants

The population of this study was the fourth graders and the samples of this study were students around 9-10 years old who studied in SDN Karyawangi Parongpong, Bandung Barat. Where two groups from grade 4 were taken as the samples, class 4A was treated using TPR method and class 4C was treated using the Conventional method. The total sample size was 59 students.

Research Instrument

Pre-tests and post-tests that were given at the start and end of the program served as the researcher's instruments. To gauge their past knowledge and vocabulary level, the students took a pre-test that consisted of 40 command word items. The researcher employed the TPR approach and school textbooks as the treatment materials. After the programs, students took a post-test to gauge their progress in vocabulary learning using the TPR method. The pre-test and post-test bore perfect similarities. Adapted from Tampubolon and Katemba (2011).

Pre-test

The Pre-test was conducted to diagnose the students' prior ability in vocabulary and it was conducted before the researcher gives the treatment. The Pretest instrument was in form of 40 items command words.

Research design & procedures

This research utilized a quantitative method; the research design was an experimental design. The following are several steps in TPR (adopted from James Asher cited in Tampubolon and Katemba, 2011). The following are the procedures in the **experimental class**.

1. The teacher says the commands as both the teacher and the students perform the action.
2. The teacher says the commands but only students perform the action.
3. The teacher tells one student at a time to do commands.
4. The roles of teacher and students are reversed. Students give commands to the teacher and to other students.
5. The teacher and students allow for command expansion or produce a new sentence.

The following are the steps in teaching a control class that has been taught using the **conventional** method:

1. The teacher explains one by one the meaning of the English words according to the chosen topic.
Example: "Parts of Body"

The teacher mentions a part of the body in English and the student's open their dictionaries to search for the meaning in the language.

2. The teacher discusses with the students how to make a sentence. The teacher gives an example of one sentence and the students will continue to make a sentence with friends.
3. The teacher gives the name of a part of the body and the students make a group discussion to make a sentence.
4. The teacher teaches a song about body parts "Head and shoulder, knees and toes." And all students will follow to sing that song. (repeat 2 times) or, if there is no song that has any relation to the day's topic, the teacher can give some games. They will be divided into some groups.
5. The teacher re-explains one by one the meaning of the English words. Students volunteer to answer the questions.
6. The teacher brings the students into the main activity, the students are given a paper activity. Connect words with pictures, or answer some questions from the textbook. Teachers take students who get a good grade and give good comments to them so that the students will get better results.
7. The teacher asks the students to write the new vocabulary that has been given by the teacher in their notebooks.
8. The teacher gives 10 minutes to the students to memorize all new words. The teacher gives a quiz (not required).

Post-Test

After the treatments, a post-test was conducted to find out whether the use of the TPR technique makes an impact on the student's vocabulary. The post-test instrument was the same as the pre-test. The students were given a vocabulary test of 40 items of command words.

Result and Discussion

The data were processed using SPSS 16. The researcher conducted a normality test, homogeneity test, and normalized gain to seek an answer to the questions, "Is there any significant difference between students who are taught using Total Physical Response (TPR) and students who are taught using Conventional Methods to enhance vocabulary knowledge of fourth-grade students?"

The result of pre-test, post-test, Mean, Standard Deviation, and Gain

Group	TPR		Conventional	
	Mean	Standard Deviation	Mean	Standard Deviation
Pre-Test	45.8667	11.43115	40.6429	14.18192
Post-Test	83.8333	13.44743	81.1786	14.95686
Gain Score	0.7157	0.21149	0.6825	0.26454

The results above show that the enhancement of students' vocabulary knowledge between the TPR group and the Conventional group is not significantly increased even though the normalized gain of the TPR group is 0.7157 which is slightly enhanced than the Conventional group's 0.6825. After finding out the results based on all data, the researcher concludes that the TPR method and conventional method could be utilized to enhance students' vocabulary knowledge since both methods have no significant difference.

The question pre-test and post-test in the picture is not clear so that makes students confused. The researcher seeing that when the teacher teaches in the afternoon, so many students in TPR class

absent because of the students do afternoon prayer. The students are therefore not able to get the maximum knowledge from the teacher.

From the result of pre-test and post-test in the calculated normalized gain vocabulary achievement of students who obtained the model TPR and Conventional, normalized gain results

Descriptive Gain Normalized

Information	TPR	Conventional
Participant	30	28
Mean	0.7225	0.7851
Standard Deviation	0.2115	0.26454
Variances	0.045	0.070
Skewness	-0.163	-0.431
Minimum	0.28	0.09
Maximum	1.00	1.00

Above shows that the average gain normalized of vocabulary achievement of students who obtained TPR learning amounted to 0.7225 while the average model for Conventional was 0.6958. Based on the normalized gain criteria, the TPR vocabulary achievement is in the high category and Conventional achievement is in the medium category.

The researcher conducted a t-test since the result of normality test is normally distributed and the result of homogeneity test is homogenous. A T-test is conducted to test the difference between the samples when the variances of two normal distributions are not known since the research utilized small sample sizes. From the table 4.5, it is found that the result of independent sample t-test, the sig 2-tailed is 0.599; it is higher than 0.05; which means H_0 is accepted. Thus, there is no significant different between students who were taught by using TPR method and students who were taught using Conventional method to enhance fourth-grade students' vocabulary knowledge.

Independent Samples T-Test

		Levene's Test for Equality of Variances		t-test for Equality of Means		
		F	Sig.	T	Df	Sig. (2-tailed)
Gain	Equal variances assumed	1.520	.223	.529	56	.599
	Equal variances not assumed			.525	51.694	.602

The table above showed the result of the data between the two methods: TPR and Conventional were homogeneous because sig. (0.223) > ($\alpha = 0.05$). Based on Table 4.5 the Mean and Standard Deviation of students' vocabulary knowledge in TPR and Conventional were moderate after giving the treatments. It is considered moderate because the gain score of TPR group is 0.7157 and the gain score of Conventional group is 0.6825; the gain scores of both groups are in the category of $0.30 \leq 0.70$, as seen from chapter 3, Table 3.2. There is no significant of TPR method and Conventional method.

Discussion

This study used quantitative research methods with an experimental design. In this design, the study measured two groups by conducting a pre-test before giving treatment. After they were treated with different methods, the post-test was given to find out students' vocabulary enhancement. In the pre-test and post-test, both groups received the same pre-test and post-test. The vocabulary test consisted of 20 multiple choices, 10 Fill in the Blank questions and 10 matching questions, hence the total number of questions is 40.

The collected data from the two groups were calculated. The results showed that in the TPR group, which consisted of 30 students, the mean of pre-test was 45.8667 and the mean of the post-test was 83.83. The total gain score was 0.71. The Conventional group consisted of 29 students, the mean of the pre-test was 40.64 and the mean of the post-test was 81.17 the total gain was 0.68. From the results and findings of this research; it can be seen that both methods have no significant difference after the students were given the treatment based on the statistical treatment.

After calculating the data, the researcher drew the conclusion that there was no significant difference between students who were taught using Total Physical Response (TPR) method and students who were taught using Conventional Methods.

References

- [1] Ashers, J. (1969). *Learning Another Language Through Action: The complete Teachers' Guide Book, 5th Ed.* Los Gatos, California: Sky Oaks Productions.
- [2] Berliani, N., A. & Katemba, C., V. (2021). The Art of Enhancing Vocabulary Through Technology. *Journal of English Language Teaching and Applied Linguistics (SMART)*. Vol.7 no.1. <https://doi.org/10.26638/js.1340.203X>
- [3] Ekawati, A. D. (2022). The implementation of Total Physical Response (TPR) to improve students' English vocabulary during the pandemic. *English Journal*, 16(1), 50-55.
- [4] Harmer, J. (1991). *The Practice of English Language Teaching*, New Edition, New York: Longman.
- [5] Khandamova Feruza Bakhodirovna. (2022). The Importance of TPR (Total Physical Response) Method in Teaching English for beginners. *Eurasian Journal of Learning and Academic Teaching*, 8, 156–158.
- [6] Katemba & Tampubolon (2011). Improving vocabulary achievement through total physical response among grade four elementary school pupils. *Journal of Language Pedagogy*, Vol 1 No.2, 2011
- [7] Katemba, C.V. (2022), Vocabulary Enhancement through Multimedia Learning Among Grade 7th EFL Students: MEXTESOL Journal, Vol.46 no.1, 2022. http://www.mextesol.net/journal/index.php?page=journal&id_article=46009
- [8] Richards, J., & Rogers, (2001). *Approaches and Methods in Language Teaching*. London: Cambridge University Press. <https://doi.org/10.1017/CBO9780511667305>
- [9] Singh, Jai, P. (2011). *Effectiveness Of Total Physical Response*. *Departement Of English Education*. Academic Voices A Multidisciplinary Journal. Volume 1, NO. 1, 2011
- [10] Taebenu, S. F., & Katemba, C. V. (2021). Vocabulary Enhancement Through Memrise and Google Classroom. *Journal of Linguistics Literature and Language Teaching*, 5(1), 228-241.
- [11] Ur, P. (1996). *A Course in Language Teaching: Practice and Theory*, New York: Cambridge University Press.

Continuing to the End: A Narrative Inquiry into the Lives of Retired Principals of Faith-Based Elementary Schools in the Philippines

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Abstract: This narrative inquiry study explored the life and career journey of six Adventist elementary school principals who remained in the position until retirement. Further, it aimed to identify the factors that influenced principal retention. This study was anchored on resiliency, spiritual leadership, and job embeddedness theories. The participants shared their stories and experiences through narrative interviewing using McAdams's life story interview framework, aesthetic portrayals, and pertinent documents. The researcher did a restorying of the participants' narratives, following a chronological frame, then analyzed the data using the thematic analysis of Braun and Clark (2006). Principals in Adventist elementary schools stay until retirement because of their spiritual maturity, vocational commitment, service opportunity, passion for students, and community engagement. This study developed the principal retention model with the following components: retired faith-based school principals' formative experiences, reasons why they remain in the principalship until retirement, and the strategies they used to overcome challenges in the principalship. Drawing from the findings, I recommend that further research using a quantitative approach be conducted to help verify the accuracy of the principal retention model and measure the incidence of different factors that influence retention.

Keywords: *principal, school, leadership*

Introduction & Literature Review

Principals play crucial roles in any integrated human capital strategy for the school system. It is vitally important to recognize the linkages between principalship and school improvement. Victor (2017) said that the system desperately needs reform in school leadership. Schools may be relatively small organizations in the grand scheme of things, but a need to examine the leadership role is far from short or simple, considering matters for improvement. Prior studies have shown that improving school leadership ranks high on the priorities for school reform (Yan, 2020). Others found that school leadership is pivotal in safeguarding school efficiency (Tran, McCormick, & Nguyen, 2018), success (Tran & Buckman, 2017), and special operations (Boyce & Bowers, 2016).

On top of these are the reports on the growing number of research suggesting a shortage of school principals (Tenelle, 2018). "Reaching crisis proportion" characterizes school leadership (Edwards, Quinn, Fuller, & Pendola, 2018, p. 23). There is a consensus that there is a shortage of principals for available positions at all levels. There was a projection that between 2015 to 2020, an additional 2.2 million new teachers would be needed to fill classrooms for a growing population of students (Donley, Detrich, States, & Keyworth, 2020). Adding more teachers will create an even greater demand for qualified principals. Teacher candidates interested in the position were discouraged by the principalship's environment and were less likely to aspire to the post (Fronius et al., 2019). Over the past several years, many studies have clarified that qualified professionals are not seeking the school principal's position. Half of those who started and engaged in the job left their position after the third year (Dhuey & Smith, 2014). Attracting and retaining qualified principals continues to be a difficult nationwide task (Day & Sammons, 2014). These trends contributed to the conduct of this study to understand the dynamics of effective longstanding principalships in faith-based schools (Buenviaje, 2016; Caasi-Tabbal, Ocampo, & Agustin, 2019).

This narrative inquiry explores the reasons for the school principal's retention by restorying the narratives of seven faith-based school principals (FSPs) throughout their career cycle. In addition,

this study seeks to identify the linkage between retention and career development, describing the early formative and transformative experiences. Furthermore, this study aims to identify influences and strategies facilitating their decision to stay until retirement.

In this study, faith-based schools operate under the auspices of the Seventh-day Adventist Church. They are an integral feature of the Seventh-day Adventist educational system globally and function autonomously with the school boards as the governing organization for the schools. The FSPs are answerable to the school boards and serve as the school's spiritual, educational, and managerial leaders (Staude, 2015). Hence, an essential competence for the success of FSPs is the ability to foster and maintain a cordial relationship with the school board (Damos, 2016). Moreover, most of these schools are small and cater to multi-grade students. The principals involved in teaching occupy FSPs retention is unique due to the differences in the environment and the job itself compared to principals' retention in the public and other private school sectors (Hurt, 2020). For example, many FSPs stay on the job due to their commitment to faith-based educational missions espoused by the church in general (Bauch, 2014). They would argue that their job is a vocation or a spiritual calling by God to serve in the school's community. Their unwavering dedication to God's calling is reflected in their unwavering determination to stay in educational ministry (Ledesma, 2011). Frequently, FSPs' faith is at the center of their retention. They fulfill the leadership roles as a vow to God (Tran & Buckman, 2017). As a result, they persevere despite the job's inherent problems and expectations, which are ill-defined and highly complicated. They persevere and prosper despite misfortune because they depend on God's direction and prayer to support them. Hence, notwithstanding the challenging situations that may cause them to be burnt out, they choose to stay.

Like public school principal retention, Johnson (2014) identified financial security, engaging and diverse day-to-day responsibilities, and helpful staff as several factors contributing to the retention of FSPs. In interviews with principals from both the public and church-based sectors, Drago-Severson (2012) found that principals need support to manage the various challenges of their roles to avoid burnout. Similarly, Katranci, Sungu, and Saglam (2015) also suggested offering more support for FSPs from the church as employing agencies. There must be more clearly defined role expectations and the identification of incentives and disincentives specific to the roles of the principal.

Methodology

The interpretive worldview guided this study of principal retention in faith-based schools following the theories of experience advanced by Dewey (1958). Dewey (1958) believes that there is a reality out there (Marshall & Rossman, 2016), and by participating in active and dynamic interactions with individuals and their surroundings, researchers may help make sense of this reality (Clandinin, 2016). Further, Dewey (1958) asserted that researchers, using a relational methodology, may examine the human experience in a continuum (Clandinin, 2016; Daiute, 2014; Dewey, 1958).

The inductive approach utilized in this study was suitable for the narrative inquiry design (Lieblich, Hrebiniak, & Alutto, 1998). Green (2013) recognized three central claims in narrative research approaches: (a) the people around them construct a person's entire existence, (b) people tell stories based on who they are, and (c) a multiplicity of images exists in their stories. Connelly and Clandinin (2006) contend that in narrative research, one must engage with temporality, sociality, and place—three focal points fundamental to the theoretical framework. Further, they assert that, for narrative inquirers, it is essential to express a connection between private interests and the usefulness of society's social concerns, which are brought to light in work and the lives of others. These are expressed in personal, practical, and social justifications that strengthen the purpose and hope the researchers might understand differently by engaging in this inquiry on principal retention.

The primary research approach for data collection and analysis followed an inductive

approach (Yin, 2016). Consequently, the findings emerged from interactional experiences, not from constructs designed by theory (Saunders et al., 2019). The data was collected from narrative interviews, document analysis, and aesthetic portrayals to be shared by the study participants. These were analyzed recursively in the restoring of narratives and thematic data analysis.

The study was conducted in North Philippines, where 14 academies and 158 elementary schools belong to a faith-based system. Seven principal retirees were selected according to the criteria set. The selection of the participants had the assistance of the higher-level administrators through purposive criterion sampling (Saunders et al., 2019). To ensure trustworthiness, I declared my reflexivity statement. I safeguarded the study's credibility through triangulation, negative case analysis, and member checking. I strengthened the dependability or consistency of this study by keeping a research audit trail from the initial phases of the inquiry. To ensure that the findings could be confirmed beyond the researcher's positioning, I presented a detailed audit trail (Lincoln & Guba, 1985; Shenton, 2004), and to guarantee the transferability of the study; I provided rich, thorough, and thick descriptions of the phenomenon, the participants, and the context of the study.

Findings

This narrative inquiry aimed to understand principal retention from the lenses of the retired FSPs. The focus was on the factors that led to retention after considering early formative experiences and the strategies they used to overcome challenges in the principalship. The result is the development of a principal retention model. This study narrowed its scope to the narratives of six principals who retired from faith-based elementary schools in the North Philippine Union Conference.

From the data analysis, three main themes emerged to describe the formative experiences of the retired FSPs—(a) childhood and adolescent experiences, (b) early career experience, and (c) critical life events. Two categories—family experiences and school experiences fall under the first theme. The second theme covers experiences with both students and colleagues. The third theme consisted of personal and work-related critical life events. The data analysis also revealed five themes on why the FSPs remain in principalship until retirement. These themes were the following: (a) spiritual maturity, (b) vocational commitment, (c) service opportunity, (d) passion for students, and (e) community engagement. In their narratives, the participants shared their struggles. They also described the joy and satisfaction that defined their careers until their tenure ended. Further, the FSPs recognized valuable strategies to overcome challenges in their faith-based school principalship, such as (a) maintaining work-life balance, (b) getting support, (c) constant learning, and (c) fostering prayerful life and faith in God. Resilience theory identifies such skills as the FSP's capacity of a dynamic system to adapt successfully. The strategies as resilience skills help the FSPs to rebound or bounce back from adversity, conflict, failure, or even positive events, progress, increased responsibility, and other eventualities inherent in the principalship.

Discussion

Participants recounted their early experiences as significant and relevant to their career formation. A career counseling tenet indicates that it is impossible to ignore an individual's current personal life and previous developmental history when addressing career concerns (Bettinelli, Fayolle, & Randerson, 2018). The individual's career and early personal experiences are immutably intertwined (Björnberg & Nicholson, 2017). Moreover, the few studies that Whiston and Keller (2019) found on adults indicated that early formative experiences influence resilience as one's career develops. The finding aligned with the qualitative studies on African adult women, suggesting that resiliency in work as their career progresses is influenced by their initial interactions with their immediate surroundings and culture (Lopez & Ann-Yi, 2016; Phillips & Imhoff, 2017). Among these formative experiences, the most salient was from family and school (Gushue & Whitson, 2016).

The most significant influences on retired FSPs' decisions to remain in the principalship emerged through several themes. These themes— (a) spiritual maturity, (b) vocational commitment, (c) service opportunity, (d) passion for students, and (e) community engagement provides a framework that espouses the essential wholeness of being human as rooted in altruistic behavior—the practice of selfless concern for the well-being of others (Fry & Nisiewicz, 2013; Lazlo & Brown, 2014). The themes promote the spiritual leadership theory, which guides this study. The framework highlights that vision, hope or faith, and altruistic love are integrated into the workplace to improve spiritual consciousness and provide the stakeholders with more meaningful interactions and experiences (Fry, Matherly, & Ouimet, 2010; McCovey, 2015). Further, job embeddedness described in terms of three core elements: fit, links, and sacrifice, found its meaning and significance to this study's themes.

The national educational agenda continues to center upon discussions of production, consumption, competition, outcomes, efficiency, technology, wealth, and standards as essential tenets of success (Fry & Nisiewicz, 2013; Fullan, 2016; Heifitz, Grashow, & Linsky, 2019). School principals are recognized and rewarded for supporting the national agenda (Benefiel & Fry, 2014). The reward system, which often equates to job satisfaction, tends to promote a reductionistic view of education that sounds success-promoting but alienates the school principal from the students, faculty and staff, and other school stakeholders (Cunningham, 2015; McCovey, 2015). Altruism behavior is often neglected and ignored as they become absorbed with completing performance targets (Ferdig, 2017; Lazlo & Brown, 2014). Community building, democratic processes, personal meaning, student-selected interests, peace-making, or social justice are often not part of the process (Fry & Nisiewicz, 2013; Weeney & Fry, 2012).

The data analysis revealed five themes identified as strategies the retired FSPs used to overcome the obstacles they faced as they had their leadership position: (a) maintaining work-life balance, (b) getting support, (c) constant learning, and (d) fostering prayerful life and faith in God. The themes (strategies) support the resilience theory that framed this study. Every theme embodies a variety of meanings that appear in different manners as resilience skills that the FSPs developed and put into practice. They are recursively linked and significantly influence the lived experience of the FSPs. Consequently, through these resilience skills, the resilience theory found its more profound significance when associated with the challenges of principalship (Ledesma, 2011) in this inquiry.

Research indicates that educational leaders need to thrive in a culture with enormous pressure, insufficient means, and increasing public criticism. (Levin & Bradley, 2019; Snodgrass Rangel, 2018). Although moderate stress stimulates optimal performance, excessive stress leads to exhaustion among seasoned administrators (Jacob et al., 2015; Loeb et al., 2015; Tekleselassie & Villarreal, 2011). To endure, restore, and flourish in such an environment, school administrators must possess resilience skills that help them survive and recover.

The model depicts the findings of this study that led to the identification of factors of principal retention. From their formative experiences, the participants seem to experience a vertical development passing through the teaching stage to the principalship. The principalship dynamics involve challenges that the retired FSPs faced with the strategies that helped them endure while clinging to the reason to remain until retirement.

As a result of formative experiences, respondents emphasized placing a high value on education. The phenomenon supports the findings of Gottfried et al. (2019), who identified the importance of the family and schools in encouraging learning, regardless of socio-economic status. Respondents also outlined the positive impact of their parents and teachers' constant, unwavering belief in their abilities, supporting the findings of Pascal & Ribbins (2018) and Parker (2019).

These formative experiences contributed to the respondent's approach to life as a journey of learning experiences. Each led their journey, learning with and from influential people and significant experiences as they navigated their way through their formative years. They worked hard to identify and secure the best opportunities, defining their pathway and realizing the better life their parents had worked hard to help them achieve (Dimmock & O'Donoghue, 2017). As a result of these experiences, respondents developed a strong sense of self, style, and outlook, making them resilient leaders.

Implications

This narrative inquiry explored the factors that explain principal retention. The participants' professional trajectory or career progression describes formative experiences that influence retention. Teachers' identities and backgrounds are essential and cannot be written out of the storying of their leadership practice (Fuller & Young, 2019). Also, the positioning of overarching retention components (Gates et al., 2019) through identifying factors and strategies resulting in a principal retention model is implicated in this study.

This study highlights formative experiences influential to the career development of the FSPs. The concept of career progression commencing with formative experiences did not overtly guide most research on principal retention (Fronius et al., 2019). The professional literature in the field includes a variety of approaches to teacher career progression and has identified several professional progression stages in the course of a teacher's career (Henry & Harbatkin, 2019). However, it appears that the bulk of the research relating to teachers becoming school principals (Béteille, Kalogrides, & Loeb, 2012), which included formative experiences in their career progression, has garnered little or no attention in the literature (Bingham & Witkowski, 2021). The inquiry of this study requires gathering and theorizing from early experiences. The process includes biographies of leaders and those who are led (Campbell-Evans, 2018).

As the first theoretical contribution, this study identified early formative experience in the career pathways leading to the retention of retired FSPs. The deplorable condition of the participants' families with uneducated parents who struggled to send them to school influenced them to get formal education and progress in their chosen field and helped them embed in the job. Job embeddedness theory or theory of retention explains that a collection of forces, including formative experiences, influences people not to leave the job even when opportunities exist (Mitchell et al., 2001). The personal and professional accounts, encounters, and experiences before and during the participants' actual principalship supported their career development and job embeddedness. The influence of the time in history and the society and culture which shapes the participant's career formation were taken into account when exploring their career retention (Fuller & Young, 2019). The formative period was believed to be critical within the FSP's life and contributed to the leader's formation or shaping, embedding them in the job, and influencing their retention in the position.

The literature found a strong linkage between principal retention and job satisfaction (Fullan, 2014; Donley et al., 2020). Job satisfaction is associated with favorable school characteristics (Chemers et al., 2020; Davis, 2021), decreased accountability (Fuller et al., 2015); Chen & Mc Grath, 2020), shared responsibility (Clotfelter et al., 2016), high salary (Darling-Hammon, 2017), a substantial amount of autonomy (Fuller & Young, 2019; Davis, 2021), and other factors that strongly connect job satisfaction to principal retention. As a second theoretical contribution, this study implicates that choosing and staying on the job does not necessarily equate to job satisfaction (Goldring et al., 2018; Grissom & Bartanen, 2019). Retired FSPs seem to have different perspectives due to their redemptive educational mission (Beardsley-Hardy, 2017). They viewed their work through an altruistic lens (Driscoll & Wiebe 2017). FSPs possessed a behavior intended to benefit others, more than just the ability to fulfill their roles with a motive to improve one's welfare (Farsides, 2007). They strived for

spiritual maturity—one's collective well-being, where altruism has significant implications in the development process (Buragohain & Senapati, 2016). Guided by the belief that the lack of altruism in individuals can disrupt the continuity of social life in society (Zwick & Fletcher, 2014), the FSPs genuinely valued their relationships with students, parents, and teachers; and approached each day with the perspective that each of these groups deserved the very best they can offer. They consciously viewed students, parents, teachers, and other stakeholders as a community worthy of interaction.

Anchored on the spiritual leadership theory that framed this study, the analysis revealed that the FSP's altruism defined their spiritual leadership (Blackaby & Blackaby, 2011). It does not suppose spirituality as a tool but posits that spirituality should be the primary end of the leadership process (Fairholm 1998). FSPs are spiritual leaders who establish a social and organizational culture based on values of altruistic principles (Ledesma, 2011; Leithwood et al., 2019). The stakeholders had a sense of membership and felt understood because they were loved, appreciated, genuinely cared for and concerned about, and feel appreciated (Fry, 2003). Moreover, the FSPs established a social and organizational culture based upon the principles of building community as defined by spiritual leadership theory (Korach & Cosner, 2017). They highlighted their value for developing and cultivating relationships with their school communities. The principals identified the relationships as dependable, caring, long-lasting, and loyal.

The strategies the retired FSPs used to overcome challenges in the principalship, hence, improving their retention, ushered the third theoretical contribution of this study. The resilience theory that framed this study mentioned a series of resilience skills needed to mitigate turnover, thus increasing retention, such as instituting a mentorship system or increasing the number of work teams an individual participates in (Mitchell et al., 2001). Further researchers identified attendance to pre-service training and in-service support network of the highest quality (Day & Gurr, 2014), getting support for improved working conditions (Donley et al., 2020), exercising greater leadership decision-making autonomy, and supporting work-life balance as powerful retention strategies. Yet, the retired FSPs who participated in this study found fostering prayerful life and faith in God formidable schemes for retention.

This study develops a principal retention model as its fourth theoretical contribution. The formative experiences influenced the participants' outlook on life as a journey of learning events. Each person took the lead in their journey, navigating their formative years by learning from and with the help of significant experiences and critical life events. When principals thought about the advantages of spiritual growth and the opportunity to serve, they were more likely to stay in their positions. One of the most significant factors in each participant's decision to remain in the field was their innate desire to change the world through their service. This finding was noted in their sense of duty to affect positive change and improve student success. Further, their intention to impact others while engaging in the community gave them reasons to remain.

Likewise, the retired FSPs identified strategies to handle the challenges in the principalship. These techniques included being intentional about life-work balance, never bringing work home at the end of the day, spending time with their spouses and kids, and allotting time for personal regeneration and restoration. The difficulties of being a principal were overcome with assistance through the professional learning network and continued professional development. They prayed for the Lord's direction and relied on the support of their faith communities.

Conclusion

This narrative inquiry establishes an understanding of effective longstanding principalships in faith-based schools. It seeks to identify the linkage between retention and career development, describing the early formative experiences. Furthermore, this study aims to identify influences and

strategies that facilitate the FSP's decision to stay until retirement. This section highlights the significant findings and how they relate to the theoretical frameworks that guide this study.

1. The retired FSPs identified childhood and adolescent experiences, early career experiences, and critical life experiences as the most critical formative experiences they had before and during their administrative assignment. Resiliency theory indicates that quality familial support and opportunities for learning during early life facilitate the positive development of one's cognitive, social, and self-regulation skills that help individuals meet obstacles in later life. Healthy attachment relationships and good internal adaptive resources during the early years influence individuals' choices. They are very likely to get off to a good start in life, well equipped with the human and social capital for success as they enter school and society. Such individuals typically manifest resilience in the face of adversity during career progression.

2. The FSPs stayed until retirement because of their (a) spiritual maturity, (b) vocational commitment, (c) service opportunity, (d) passion for students, and (e) community engagement characterizing their altruistic behavior, which the spiritual leadership theory emphasizes. Findings from this study revealed participants' altruism—a significant component of spiritual leadership theory—that the FSPs possessed, influencing them to have different perspectives on remaining in their job. Indeed, the theory found its significance in the redemptive educational mission of the FSPs. They viewed their role through the altruistic lens that deepened their faith, with a motive to serve and make a difference in the lives of others.

3. The FSPs recognized valuable strategies to overcome challenges in their faith-based school principalship, such as (a) maintaining work-life balance, (b) getting support, (c) constant learning, and (c) fostering prayerful life and faith in God. Resilience theory identifies such skills as the FSP's capacity of a dynamic system to adapt successfully. The strategies as resilience skills help the FSPs to rebound or bounce back from adversity, conflict, failure, or even positive events, progress, increased responsibility, and other eventualities inherent in the principalship.

4. This study develops a principal retention model. It depicts the formative experiences that contributed to the FSP's approach to life as a journey of learning experiences in their career development. The model also portrayed the FSP's strategies in dealing with the challenges accompanied by the issues in the principalship. The formative experiences and the strategies are all framed by the Resiliency Theory. In the model also are the factors that influence the FSPs to remain in principalship until their retirement. Spiritual Leadership theory and Job Embeddedness Theory guide the identification of these factors.

Recommendations

This section aims to transfer the findings of this study into practical recommendations. These recommendations aim to improve practices that influence principal retention. The researcher presents recommendations for future research.

Despite the study's limitations, its findings offer several implications and recommendations for future research. However, this study's findings and implications may raise many more questions than answers. In this section, The researcher presents recommendations for further research concerning FSPs retention.

1. This study indicated findings related to factors contributing to elementary principal retention at faith-based schools in the north Philippines. Expanding the analysis to principals in other regions or across the Philippines could significantly broaden the perspectives developed or perhaps be different from those shared by the elementary principals in the North Philippines. Principals in

other sections of the country could reflect different implications for retention based on a difference in school types or student demographics.

2. Researchers may want to investigate the retention of secondary school principals. Secondary campuses are different from elementary campuses in many ways, such as the school day's structure, the instruction schedule, and the staff's configuration.

3. A quantitative research approach can help verify the accuracy of the principal retention model proposed in this study in faith-based schools and in measuring the incidence of different factors that influence retention.

4. Through appreciative inquiry, researchers may want to discover, dream, design, and implement policies to foster the best practices of unions, conferences, and school leaders to promote retention among principals in a faith-based school.

References

- [1] Ackerman, R., & Maslin-Ostrowski, P. (2017) Conceptual models, methodology and methods for studying school leadership. In J. Murphy & K. Seashore-Louis (Eds.), *The 2nd handbook of research in educational administration* (pp. 141-162). San Francisco, CA: McCutchan.
- [2] Babo, G., & Postma, K. L. (2017). The influence of a principal's length of service on elementary school academic performance: A study of one northeastern USA State. *International Studies in Educational Administration*, 45(2), 117-130.
- [3] Bajunid, J. D. (2015). *Recruitment, retention, and development of school principals*. Retrieved from <http://www.iaoed.org/downloads/Edpol2.pdf>
- [4] Baker, Y. Hallinger, P., & Heck, R. H. (2010). Collaborative leadership and school improvement: Understanding the impact on school capacity and student learning. *School Leadership and Management*, 20(2), 93-110.
- [5] Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2). Retrieved from <http://eprints.uwe.ac.uk/11735>
- [6] Brining, M. F., & Garnett, N. S. (2012). Catholic schools and broken windows. *Journal of Empirical Legal Studies*, 9(2), 347-367.
- [7] Caasi-Tabbal, B., Ocampo, J. M., & Agustin, L.S. (2019). A framework for enhancing the leadership competence of diocesan school principals. *International Journal for Educational, Social, Political and Cultural Studies*, 2 (1), 1-16.
- [8] Campbell-Evans L, (2018). *How teachers taught: Constancy and change in America's classrooms, 1890-1980*. New York, NY: Teacher's College Press.
- [9] Cannata, D. (2017). Turnover in principal focus of research. *Education Week*, 29(9) 1-14.
- [10] Cannata, M., Rubin, M., Goldring, E., Grissom, J. A., Neumerski, C. M., Drake, T. A., & Schuermann, P. (2017). Using teacher effectiveness data for information-rich hiring. *Educational Administration Quarterly*, 53(2), 180-222.
- [11] Chemers, F., Watson G., & May, H. (2020). The causal order of job satisfaction and organizational commitment in models of employee turnover. *Human Resources Management Review*, 9(4), 495-524.
- [12] Chen, C., & Mc Grath, J. (2020). High-poverty schools and the distribution of teachers and principals. *NCL Review*, 85, 1345.

- [13]Chowdhury, M. F. (2015). Coding, sorting, and sifting of qualitative data analysis: Debates and discussion. *Quality and Quantity* 49(3), 1133-1143. doi:10.1007/s11135-014-0039-2
- [14]Darling-Hammond, L., Wilhoit, G., & Pittenger, L. (2014). *Accountability for college and career readiness: Developing a new paradigm*. Stanford, CA: Stanford Center for Opportunity Policy in Education. Retrieved from <https://edpolicy.stanford.edu/sites/default/files/publications/accountability-college-andcareer-readiness-developing-new-paradigm.pdf>
- [15]Davis, J. J. (2021). Guest editorial: The nicest work. *The Journal of Adventist Education*, 83(1), 3, 33. Retrieved from <http://jae.adventist.org>
- [16]Davis, G., Hallinger, P., & Murphy, J. (1986). *Instructional leadership in effective schools*. Washington, DC: U.S. Department of Education Office of Educational Research and Improvement.
- [17]Fry, L. W. (2003). Toward a theory of spiritual leadership. *The Leadership Quarterly*, 14(6), 693-727.
- [18]Fuller, G. F., Young, E. A., & Orr, S. G. (2017). Principal effectiveness in leadership in an era of accountability. What research says. *CALDER Working Paper*, 66, 1-50.
- [19]Furst, L. (2019). Some legal considerations for operating boards in Adventist schools (K-12). *The Journal of Adventist Education*, 81(1), 16-22. Retrieved from <http://jae.adventist.org>
- [20]Fusarelli, B. C., Fusarelli, L. D., & Riddick, F. (2018). Planning for the future: Leadership development and succession planning in education. *Journal of Research on Leadership Education*, 13(3), 286-313.
- [21]Gale, J. J., & Bishop, P. A. (2014). The work of effective middle grades principals: Responsiveness and relationship. *RMLE Online*, 37(9), 1-23. Retrieved from <https://files.eric.ed.gov/fulltext/EJ1032367.pdf>
- [22]Gannell, G. (2014). More than a calling: the experiences of new principals in Christian schools. *Insights for educators in Christian schools*, 6(4), 235-246).
- [23]Gates, S. M., Baird, M. D., Master, B. K., & Chavez-Herrerias, E. R. (2019). *Principal pipelines: A feasible, affordable, and effective way for districts to improve schools*. Santa Monica, CA: RAND Corporation. Retrieved from https://www.rand.org/pubs/research_reports/RR2666.html
- [24]Gates, S. M., Hamilton, L. S., Martorell, P., Burkhauser, S., Heaton, P., Pierson, A., & Gu, K. (2014). *Preparing principals to raise student achievement: Implementation and effects of the New Leaders program in ten districts*. Santa Monica, CA: RAND Corporation. Retrieved from https://www.rand.org/content/dam/rand/pubs/research_reports/RR500/RR507/RAND_RR50
- [25]Kachchhap, S. L. & Mishika A. (2015). Theoretical contributions of graduate research: An investigative study in the Philippines. *International Forum*, 18 (2). 65-82. Retrieved from https://www.researchgate.net/publication/281432493_Theoretical_Contributions_of_Graduate_Research_An_Investigative_Study_in_the_Philippines
- [26]Kaplan, L. & Owings, W. (2017). An empirical test of a new human theory of human needs. *Organizational Behavior and Human Performance*, 4(2), 142-175.
- [27]Katranci, I., Sungu, H. & Saglam, M. (2015). Teachers' perceptions about the school principals' ethical leadership behaviours: A study from Turkish vocational high

- schools. *Universal Journal of Educational Research*, 3(8), 546-554.
doi:10.13189/ujer.2015.03081
- [28]Kaufman, J. H., Gates, S. M., Harvey, M., Wang, Y., & Barrett, M. (2017). What it takes to operate and maintain principal pipelines: Costs and other resources. Santa Monica, CA: RAND Corporation.
- [29]O'Reilly, S. & Parker, H. (2012). The qualitative content analysis process. *Journal of Advanced Nursing Research Methodology*, 62(1), 107-115. doi:10.1111/j.1365-2648.2007.04569x
- [30]Palmer, R. A. (2021). Building a culture of trust: An imperative for effective school leadership. *The Journal of Adventist Education*, 83(1), 4-8. Retrieved from <http://jae.adventist.org>
- [31]Papa, E. (2017). Retaining principals. *Eric Digest*, 147.
- [32]Papa, R. L. (2007). *Practicing the art of leadership: A problem-based approach to implementing the ISLLC Standards*. Upper Saddle River, NJ: Prentice Hall.
- [33]Papa, E., Herrbach, O., & Mignonac, K. (2016). How an organization's image affects employee attitudes. *Human Resource Management Journal*, 14(4), 76-88.
- [34]Papandria, G. (2018). Turnover: The real bottom-line. *Public Personnel Management*, 29(3), 333-342.
- [35]Parylo O., Zepeda S.J., & Bengston, E. (2013). Career paths in educational leadership: Examining principals narrative. *Alberta Journal of Educational Research*, 58 (4), 565-599. Retrieved from https://www.researchgate.net/publication/277010471_
- [36]Rangel, V. S. (2018). A review of the literature on principal turnover. *Review of Educational Research*, 88(1), 87-124. https://www.researchgate.net/publication/319965164_A_Review_of_the_Literature_on_Principal_Turnover
- [37]Rathee, F. D., & Rajain, L. M. (2020). Race and sex differences in quits by young workers. *Industrial and Labor Relations Review*, 34(11), 563-577.
- [38]Reave, G. C. (2015). The transformation of an urban principal: Uncertain times, uncertain roles. Paper presented at the Annual Meeting of the American Educational Research Association, San Francisco, CA, April 2015. Retrieved from <https://eric.ed.gov/?id=ED348461>
- [39]Redding, C., Booker, L. N., Smith, T. M., & Desimone, L. M. (2019). School administrators' direct and indirect influences on middle school math teachers' turnover. *Journal of Educational Administration*, 57(6), 708-730.
- [40]Redmond, P. J. (2016). Why employees go or stay. *Workforce*, 77(10), 74.
- [41]Reissman, C. K. (2008). *Narrative methods for the human sciences*. Thousand Oaks, CA: SAGE.
- [42]Resnik, D. B. (2020). What is ethics in research & why is it important? Retrieved from <https://www.niehs.nih.gov/research/resources/bioethics/whatis/index.cfm>
- [43]Rice, M. (2014). *Tomorrow's learning leaders: Developing leadership and management for compulsory learning*. 2002 Survey Report. London, UK: Learning and Skill Development Agency.
- [44]Ritchie, J., Lewis, J., Nicholls, C. M., & Ormston, R. (2013). *Qualitative research practice a guide for social science students and researchers*. Retrieved from http://www.sagepub.com/sites/default/files/upm-binaries/58628_Ritchie__Qualitative_Research_Practice.pdf
- [45]Ronfeldt, M., Loeb, H., & Wyckoff, J. (2013). How teacher turnover harms student achievement. *American Educational Research Journal*, 50(1), 4-36. Retrieved from <https://cepa.stanford.edu/sites/default/files/TchTrnStAch%20AERJ>

- [46]Rutter, C. (2017). Summary of responses to NAESP/NAASP/NMSA survey questions. Washington, DC: Principals' Leadership Summit.
- [47]Rosario, A. (2019). A college president and her board: Reflection on the journey. *The Journal of Adventist Education*, 81(1), 11-15. Retrieved from <http://jae.adventist.org>
- [48]Rupa, J., Rathee, K., Pallavi, U., & Rajain, T. (2020). A review of neuro-transmitted illnesses among employess.
- [49]Jindal *Journal of Business Research* 9 (1), 27–40
- [50]Saldaa, J. (2011). *Fundamentals of qualitative research*. New York, NY: Oxford University Press.
- [51]Saunders, M. N. K., Lewis, P. & Thornhill, A. (2019). *Research methods for business students* (8th ed.). London, UK: Pearson.
- [52]Wang, F., Pollock, K. E., & Hauseman, C. (2018). School principals' job satisfaction: The effects of work intensification. *Canadian Journal of Educational Administration and Policy*, 185, 73-90.
- [53]Webb-Johnson, J. (2016). The talent enigma. *International Journal of Leadership in Education*, 9(3), 183-204. doi:10.1080/13603120600741474
- [54]Winchester, C., & Salji, M. (2016). Writing literature review. *Journal of clinical urology*, 9(5), 308-312. doi:10.1177/2051415816650133

Antimicrobial Activity Of Aloe Vera (*Aloe Barbadensis* Miller) Root Extract Against *Escherichia Coli*, *Staphylococcus Aureus*, And *Salmonella Typhimurium*

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Abstract: Food and water-borne diseases constitute a large and growing global public health problem. FWBDs are usually caused by microorganisms that cause infections such as viruses, bacteria, and parasites. Aloe vera (*Aloe barbadensis miller*) is widely used worldwide. Evidence shows that Aloe vera (*Aloe barbadensis miller*) gel and leave extract contains many medicinal properties but not much attention is given to establishing the antimicrobial ability against *Escherichia coli*, *Staphylococcus Aureus*, and *Salmonella typhimurium* of the root extracts. The goal of the study is to determine the antimicrobial properties of *Aloe vera (barbadensis Miller)* root extract against *Escherichia coli*, *Staphylococcus Aureus*, and *Salmonella typhimurium*. The plant authenticity was determined. The study utilized a complete randomized design to determine the phytochemical properties and antimicrobial efficacy of Aloe vera (*Aloe barbadensis miller*) root extract against *Escherichia coli*, *Staphylococcus Aureus*, and *Salmonella typhimurium*. The root extraction of Aloe vera (*Aloe barbadensis miller*) was tested according to the procedure of Standards and Testing Division of the Department of Science and Technology (DOST). Qualitative analysis was also used to determine the phytochemical constituents of the root extract. An antimicrobial Assay was done to test the susceptibility of the root extract to *Escherichia coli*, *Staphylococcus Aureus*, and *Salmonella typhimurium*. Positive control (Amikacin and Oxacillin) was used as a comparison. The Result of antimicrobial screening of the root extract reveals a complete inhibitory activity with mild reactivity against the test organism *Escherichia coli*, *Staphylococcus Aureus*, and *Salmonella typhimurium* which is comparable with Amikacin and Oxacillin. It is therefore recommended that similar studies be conducted to establish the antimicrobial property of the plant.

Keywords: antimicrobial property, aloe vera, root extract, *escherichia coli*, *staphylococcus aureus*, *salmonella typhimurium*

The Problem and Its Background

Food and water-borne diseases constitute a large and growing global public health problem. FWBDs are usually caused by microorganisms that cause infections such as viruses, bacteria and parasites. According to the World Health Organization (WHO), the burden of diarrheal diseases alone is estimated to be 3.6% of the total Disability Adjusted Life Years (DALY) worldwide and estimated to cause 1.5 million deaths per year, most of which can be attributed to contaminated food or water. The occurrence of food and water-borne diseases (FWBDs) remains a significant health issue in both developed and developing countries. In the Philippines, a total of 11,876 cases of acute bloody diarrhea (ABD) were reported from sentinel sites nationwide in 2015. Based on the latest Department of Health (DOH) report, acute watery diarrhea (AWD) ranked seventh among the top leading causes of morbidity, affecting 76.3 per 100,000 populations. AWD is also the seventh leading cause of mortality among infants, with a rate of 0.5 per 1,000 live births. Although the exact burden and cost of FWBDs is still unknown, it is surmised to be substantial. (Department of Health, 2019). The most common bacteria known to cause FWBDs are *Escherichia coli*, *Staphylococcus aureus*, and *Salmonella*. (Illinois Department of Public Health, n.d.). Due to the acute circumstance of manifesting food and water-borne diseases, the use of new substances as an antibacterial remedy is being prompted.

A dramatic increase has been noted in the global consumption of natural products and herbal medicines in the past three decades. (Abdulrhman Alsayari, 2018) Among the various currently available herbal agents the most popular and the plant that is currently receiving a lot of scientific attention is *Aloe vera*. It is a perennial succulent xerophyte, that can easily be grown at home both as an aesthetic and for medicinal purposes. (Sajjad, 2014) Today it is one of the herbal medicines widely used worldwide due to its popularity as a component of countless beauty, health, and skin care products. The aloe vera gel and leaf extracts are commonly known to relieve sunburn, help heal wounds and rehydrate the skin. A number of studies has been conducted on ways how the gel and leaf extracts can be used, but not as much attention has been given to the study about the medicinal capabilities of the root extracts. Although many studies have proven the effectiveness of Aloe Vera, the Department of Health still does not recognize it as a proven medicinal plant, but instead encourages exhaustive research and testing to be officially declared safe to use.

The goal of the researchers is to determine the antibacterial properties of *Aloe barbadensis* Miller roots to test its efficacy against *Escherichia coli*, *Staphylococcus Aureus* and *Salmonella typhimurium*. Since the awareness of many medicinal properties of Aloe Vera is being recognized, this study will provide further information of its healing benefits and as a possible herbal/natural remedy.

Research Design

The study will mainly focus on a quasi-experimental research design in order to achieve the specified objectives and to determine the efficacy of *Aloe barbadensis* Miller roots extract against *Escherichia coli*, *Staphylococcus Aureus* and *Salmonella typhimurium*.

In the study of infection control and antibiotic resistance, the quasi-experimental study design, sometimes called the pre-post-intervention design, is often used to evaluate the benefits of specific interventions. Quasi-experimental studies encompass a broad range of nonrandomized intervention studies. These designs are frequently used when it is not logistically feasible or not ethical to conduct a randomized, controlled trial. Although the randomized controlled trial is generally considered to have the highest level of credibility with regard to assessing causality, in medical informatics, researchers often choose not to randomize the intervention for one or more reasons: (1) ethical considerations, (2) difficulty of randomizing subjects, (3) difficulty to randomize by locations (e.g., by wards), (4) small available sample size. (Anthony and Harris, 2006).

Data Gathering Procedure

This chapter presents the discussion on the data collection methods and preparations done for *Aloe Barbadensis* Miller roots and its extracts. The antimicrobial assay of the samples was done in a comprehensive process.

Authentication of Aloe Vera Plant

A whole plant of home-grown Aloe Vera is to be collected. The plant, along with two (2) copies of letter of the request for authentication and the picture of the plant, was submitted to the Bureau of Plant Industry. A certification will be issued

Collection of Aloe Vera

Materials. were used for the collection of Aloe Vera roots (container, weighing scale, distilled water)

Methods. Aloe Vera roots will be collected. The roots will be cut and separated from the stem and leaves until it weighs four hundred grams. The Aloe Vera roots are to be placed in the container and to be washed thoroughly using distilled water to remove the soil and other debris. After cleaning, the

Aloe vera roots are to be sent to the Standards and Testing Division of the Department of Science and Technology.

Preparation of Aloe Vera root extracts. Two hundred (200) grams of finely cut, fresh Aloe Vera roots is to be submerged in 300 ml of 95% ethyl alcohol, and soaked for 24 hours. Afterwards, it is to be filtered using a coarse filter paper. The flask and the roots will be rinsed with portions of alcohol, and the washings will be combined with the first filtrate. The plant residue will then be discarded and the filtrate will be concentrated over a water bath at 40 to 60 C until syrupy consistency or about 20 ml concentrated extract collected. The extract will be then stored in a desiccator, ready for phytochemical testing.

Phytochemical Analysis

Test for Saponins Froth Test – The alcoholic extract is to be dissolved in hot water and then filtered. The aqueous filtrate extract when shaken vigorously should become frothy; honeycomb in nature should persist for at least 30 minutes.

Test for Tannins Ferric Chloride Test – The dried extract is to be dissolved in hot water, and then filtered. One to two drops of Ferric Chloride is to be added. Production of dark coloration that may be either black, dark blue, blue-black, indicate the presence of tannins.

Test for Glycosides Fehling's Test- The dried extract will be dissolved in hot water, and then filtered. The filtrate will be used in the test. Two test tubes are to be utilized, and 2 mL of samples are placed in each tube. For tube 1, 1 mL of diluted HCL is added; while nothing will be added to tube 2 (control tube). The two test tubes are then placed in a boiling water bath for 5 minutes, and are to be cooled afterwards. The samples are to be neutralized with anhydrous sodium carbonate until no effervescence is produced. Then 1.0 mL of Fehling's solution is added. The sample tubes are to be heated in a water bath for two minutes. The amount of brick red precipitates that are formed. An increased amount of brick red precipitate in the hydrolyzed sample (the sample to which dilute acid was added) as compared to the control tube indicated the presence of glycosides.

Test for Flavonoids. Mg+ Turning Test- 1 mL or a small amount of dried alcoholic extract will be treated with 1.0 mL 10%HCL and magnesium turning. Red coloration observed indicated a positive result.

Test for Alkaloids. Mayer's Test – The dried alcohol infused extract is extracted with 1% HCL filter. Two drops of Mayer's reagent are then added to the filtrate.

Wagner's Test- The small amount of dried extract is dissolved with 1.0 mL of diluted acetic acid. It will show formation of a white- or cream-colored precipitates

Note: For false positive reaction, remove impurities capable of giving false positive reactions (i.e., proteins) from initial aqueous acidic extract. These materials are salted out by adding powdered NaCl.

Test for Sterols and Triterpenes. Libermann-Buchard Test- A small amount of dried extract is dissolved in acetic acid anhydride, and the soluble portion is decanted. To this, on to two drops of concentrated sulfuric acid is added. A green color, either immediately or slowly going to red or blue tones will form. A pink to red color is indicative of triterpenoids, while a blue color indicates the presence of steroids.

Salkowski's Test- concentrated sulfuric acid is added to several mg of the extract, and two drops of acetic anhydride to its solution in chloroform. Production of red color indicated triterpenoids and blue for steroids.

Antimicrobial Assays

Preparation of test organisms. Inoculated the isolate to 10mL. Tryptic Soy Broth (TSB) and incubated overnight at 35 °C

Preparation of Antimicrobial Assay Plates. Adjusted the overnight culture to a turbidity comparable to 0.5 McFarland Standard. Added 200uL of the adjusted bacterial suspension to a standard size sterile petri dish. Added approximately 15 to 20mL of Mueller-Hinton Agar (prepared as per manufacturer's recommendations), swirled, and allowed plate to simplify and dry. Incubated bacterial plates at 35 °C (20 mins for *E. coli* and 1 hour for *S. aureus*) then proceed to step C

Addition of samples to filter paper discs. For dry extracts and solid samples, prepared sufficient amounts of the extract or samples and added 1mL of water and waited until the sample was dissolved. Dipped filter paper discs in the sample to spread into the paper. Removed excess extracts by tapping the sides of the container. Placd the discs on the prepared plates from step B accordingly and arrange them in places with sufficient space for observation of the zone of inhibition.

Use of Positive Controls. Commercially available antibiotic discs are to be used as positive controls.

Incubation. The plates were incubated in an inverted manner overnight at 35 °C. Observed zones of inhibition after incubation. Measure the zones of inhibition using a caliper. If there are no zones surrounding the paper discs, aseptically lift the paper and observe the area under the sample. Report results as follows:

Reactivity rating: 0 - None (No detectable zones or under specimen)

1 - Slightly (Some malformed or degenerated cells under the specimen)

2 - Mild (Zone limited under the specimen)

3 - Moderate (Zone extends 5 to 10 mm beyond specimen)

4 - Severe (Zone extends greater than 10 mm beyond the specimen)

Inhibitory activity results: (+++) complete, (++) partial, (+) slight, and (-) negative Reference: USP 30-NF 25, 2007, <Biological Reactivity Test, in vitro

Results and Discussion

The result of the study and the interpretation of the results concerning the secondary compound of the Aloe Vera (*Aloe Barbadensis* Miller) roots, and its antimicrobial activity against the organisms *Escherichia coli*, *Staphylococcus Aureus*, and *Salmonella typhimurium*.

Plant Authentication Results

Plant Identification/Certification

Table 1a. *Aloe barbadensis* Miller authenticity

Local/ Common Name	Sabila (Tag.), Aloe (Engl.)
Family/ Scientific Name	LILIACEAE/ Aloe vera Linn. s n. Aloe Barbadensis Mill
Types of Sample	Leaves
Status of Sample	Fresh
Family	- LILIACEAE
Common Name	- Sabila (Tag.), Aloe
Scientific Name	- Aloe vera Linn. syn. Aloe barbadensis Mill

Sabila is cultivated for ornamental and medicinal purposes. The stem grows from 30 to 40 cm in height. The leaves are fleshy, mucilaginous, and succulent; gradually narrowed from the base, pale green and irregular, with white blotches and the margins having weak prickles. It is sword-like spreading or sub-

erect and crowded in rosette or in two opposite vertical rows. The inflorescence is erect, and usually twice the height of the plant. The flowers are 2 to 3 cm long, yellow with segments about equaling the oblong tube.

The juice of the fleshy leaves is usually mixed with gogo by Filipino women to prevent falling hair and to cure baldness while when mixed with wine preserves the hair. The juice mixed with milk cures dysentery and pains in the kidney. The leaves are used to poultice edema of beriberi patients. Mucilaginous pulp of the leaves is used as purgative. The ointment out of Aloe vera powder is also used in burns and scalds.

Table 2a. *Phytochemical Test for Plant Constituent of Aloe barbadensis Miller roots*

Phytochemical Test Results

Constituents	Results
Sterols	(+)
Constituents	Results
Triterpenes	(+)
Flavonoids	(+)
Alkaloids	(+)
Saponins	(+)
Glycosides	(+)
Tannins	(+)

Note: (+) Indicates the presence of constituents, (-) Indicates the absence of constituents

According to the table above, phytochemical test results demonstrate that Aloe vera root extracts are positive for the presence of Sterols, Triterpenes, Flavonoids, Alkaloids, Saponins, Glycosides, and Tannins. These findings are in total agreement with those existing in the literature

Phytochemicals exert potential antimicrobial activities against both resistant and sensitive pathogenic microorganisms through distinct mechanisms of action. Additionally, some of them exert in vitro synergistic effects when combined with conventional antibiotics. These natural products have intrinsic antibacterial, antiviral, antifungal, and antiparasitic activity, usually in higher concentrations than synthetic compounds, but they can be used to potentiate the effect of drugs. (Khameneh, 2019). The medicinal roles of these plants could be related to such identified bioactive compounds. Having known that Aloe vera root extracts contain Sterols, Triterpenes, Flavonoids, Alkaloids, Saponins, Glycosides, and Tannins, it can be concluded that it can potentially be an effective medicinal use especially for antimicrobial activity against pathogenic organisms.

Table 3a. Antimicrobial Activity Aloe Vera (*Aloe barbadensis miller*) root extract against *Escherichia coli* (ATCC 25922)

Sample/Control	Replicate 1 1 (mm)	Replicate 2 1 (mm)	Replicate 3 1 (mm)	Total Mean Zone of Inhibition	Reactivity	Inhibitory
Aloe vera roots (sun dried) Extract 100% (10mm)	10.00	10.00	10.00	10.00	2	+++
Aloe vera roots (sun dried) Extract 75% (10mm)	10.00	10.00	10.00	10.00	2	+++
Aloe vera roots (sun dried) Extract 50% (10mm)	10.00	10.00	10.00	10.00	2	+++
Positive Control Amikacin 30ug (6mm)	13.74	13.66	13.22	13.54	3	+++
Negative Control Sample-free disk (10mm)	0.00	-	-	0.00	0	(-)

Table 3a demonstrates the susceptibility of the extract to the *Escherichia coli*. A positive control (Amikacin & Oxacillin) was used as a comparison. The sample, Aloe vera roots (sun dried) Extract 100%, Aloe vera roots (sun dried) Extract 75%, Aloe vera roots (sun dried) Extract 50%, produce complete inhibitory (+++), with mild reactivity against the test organism *Escherichia coli*, *Staphylococcus aureus*, and *Salmonella typhimurium*. Amikacin 30ug, which serves as positive control, produces complete inhibitory (+++), with moderate reactivity against the test organism *Escherichia coli*.

Amikacin is an aminoglycoside that exerts antibiotic activity against more resistant gram-negative bacilli and most aerobic gram-negative bacilli of Enterobacteriaceae family. Amikacin leads to interference with translational initiation complexes and misreading of mRNA of a bacterial ribosomal unit, thereby inhibiting protein synthesis and resulting in a bactericidal effect (National Center for Biotechnology Information, 2022). A study by Bahman Khameneh et al., (2021), concluded that phytochemicals exert their antimicrobial activities via different mechanisms, including (I) structural disruption of the bacterial cell and increase in cell permeability and leakage of cell constituents, (II) alterations in the bacterial cell wall and cell membrane, (III) losing ATP, (IV) inhibition of protein synthesis, (V) intracytoplasmic damage, pH disturbance, DNA damage and (VI) inhibition of quorum sensing among bacteria. The presence of phytochemical components in Aloe vera root extracts such as Sterols, Triterpenes, Flavonoids, Alkaloids, Saponins, Glycosides, and Tannins; may correlate to the ability of amikacin to inhibit protein synthesis of bacteria resulting to complete inhibitory with mild reactivity against the test organism.

Table 3b. Antimicrobial Activity Aloe Vera (*Aloe barbadensis miller*) root extract against *Staphylococcus aureus* (ATCC 6538)

Sample/Control	Replicate 1 1 (mm)	Replicate 2 1 (mm)	Replicate 3 1 (mm)	Total Mean Zone of Inhibition	Reactivity	Inhibitory
Aloe vera roots (sun dried) Extract 100% (10mm)	10.00	10.00	10.00	10.00	2	+++
Aloe vera roots (sun dried) Extract 75% (10mm)	10.00	10.00	10.00	10.00	2	+++
Aloe vera roots (sun dried) Extract 50% (10mm)	10.00	10.00	10.00	10.00	2	+++
Positive Control Oxacillin 1g (6mm)	18.26	19.23	20.27	19.25	3	+++
Negative Control Sample- free disk (10mm)	0.00	-	-	0.00	0	(-)

Table 3b demonstrates the susceptibility of the extract to *Staphylococcus Aureus*. A positive control (Oxacillin) was used as a comparison. The sample, Aloe vera roots (sun-dried) Extract 100%, Aloe vera roots (sun-dried) Extract 75%, Aloe vera roots (sun-dried) Extract 50%, produce complete inhibitory (+++), with mild reactivity against *Staphylococcus aureus*, and *Salmonella typhimurium*.

Oxacillin 1ug, produce complete inhibitory (+++), with severe reactivity against the test organism *Staphylococcus aureus*. The sample-free disc, which serves as a negative control has no inhibitory activity (-) and no reactivity (-) against the test organisms.

Oxacillin, the positive control we used, is known to have a limited spectrum of activity which includes primarily gram-positive bacteria. Though resistance is common, especially among enteric gram-negative bacilli, *Staphylococci* are proven to be susceptible since oxacillin can counter the bacterial beta-lactamase produced by *Staphylococcus* spp (Papich, 2016).

Wishart et al., (2018) of drug bank defined Oxacillin's pharmacodynamics as a penicillin beta-lactam antibiotic used to treat infections caused by susceptible, mostly gram-positive, microorganisms. Authors also referred to "penicillin" as either several variants of penicillin available or to the group of antibiotics generated from penicillin. Oxacillin is proven to have an in-vitro activity against gram-positive and gram-negative aerobic and anaerobic bacteria. The anti-bacterial activity of Oxacillin is generated from the inhibition of cell wall synthesis and is mediated through Oxacillin binding to penicillin-binding proteins (PBPs). Oxacillin was observed to be stable against hydrolysis through a

variety of beta-lactamases, which include penicillinases, cephalosporinases, and extended-spectrum beta-lactamases.

The results above show the significance of the antimicrobial efficacy of phytochemicals that were found in *Aloe barbadensis* miller. Results have shown that the efficacy of Aloe vera root extracts is comparable to the inhibitory activity of the positive control; both have shown complete inhibitory effect against *S. aureus* and *Salmonella typhimurium* though they have slight differences in reactivity, thus, it is safe to say that phytochemicals found in *Aloe barbadensis* miller such as triterpenes are proven to be effective which is supported by the literature gathered about the phytochemical, triterpenes, from Nzogong et al., (2018, May 16) entitled "*Antimicrobial and antioxidant activities of triterpenoid and phenolic derivatives from two Cameroonian melastomataceae plants: Dissotis senegambiensis and Amphiblemma monticola*".

Table 3c. Antimicrobial Activity Aloe Vera (*Aloe barbadensis* miller) root extract against *Salmonella typhimurium* (ATCC 14028)

Sample/Contro l	Replicate 1 1 (mm)	Replicate 2 1 (mm)	Replicate 3 1 (mm)	Total Mean Zone of Inhibition	Reactivity	Inhibitory
Aloe vera roots (sun dried) Extract 100% (10mm)	10.00	10.00	10.00	10.00	2	+++
Aloe vera roots (sun dried) Extract 75% (10mm)	10.00	10.00	10.00	10.00	2	+++
Aloe vera roots (sun dried) Extract 50% (10mm)	10.00	10.00	10.00	10.00	2	+++
Positive Control Amikacin 30ug (6mm)	16.08	15.00	15.94	15.67	3	+++
Negative Control Sample-free disk (10mm)	0.00	-	-	0.00	0	(-)

Table 3c demonstrates the susceptibility of the extract to *Salmonella typhimurium*. A positive control (Oxacillin) was used as a comparison. The sample, Aloe vera roots (sun dried) Extract 100%, Aloe vera roots (sun dried) Extract 75%, Aloe vera roots (sun dried) Extract 50%, produce complete inhibitory (+++), with mild reactivity against *Salmonella typhimurium*. Amikacin 30ug, which serve as positive control, produce complete inhibitory (+++), with moderate reactivity against the test

Salmonella typhimurium organism. The sample free disc, which serves as a negative control, has no inhibitory activity (-) and no reactivity (-) against the test organisms.

Note: Inhibitory Activity Rating: (-) negative; (+) slight; (++) partial; and (+++) complete

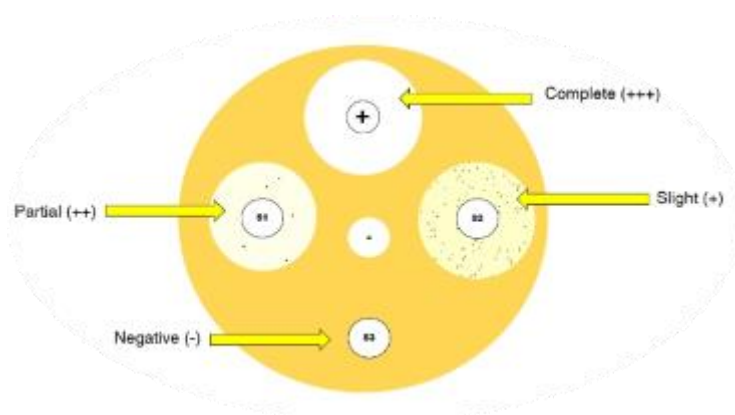


Figure 1. Cartoon representation of Inhibitory Activity

Figure 1 represents the inhibitory activity rating of the Aloe Vera (*Aloe barbadensis miller*) Root Extract against *Escherichia coli*, *Staphylococcus aureus*, and *Salmonella typhimurium*.

In the photo provided (figure 1), there are four discs presented. First, the positive control disc which appeared with (+++) complete inhibitory rating which indicates that there is no colony growth in the zone of inhibition observed. Second is sample 1 where the picture showed (++) partial inhibitory activity which indicates limited growth of the microbial colony in the zone of inhibition. Third is sample 2 where the picture showed a slight (+) inhibitory activity that indicates a minimal growth of the microbial colony in the zone of inhibition. Lastly, sample 3 where the picture showed (-) inhibitory activity indicates a complete growth of the fungal colony in the zone of inhibition and that the sample exhibits failure to inhibit the growth of fungus.

The test result revealed that Aloe Vera (*Aloe barbadensis miller*) root extract and amikacin and oxacillin produced the same (+++) complete inhibitory rating. This implies that clotrimazole and Aloe Vera (*Aloe barbadensis miller*) root extract have equivalent rate with regards to their effectiveness in inhibiting the growth of *Escherichia coli*, *Staphylococcus aureus*, and *Salmonella typhimurium*.

Figure 2. Zone Inhibition and Reactivity of Averrhoa bilimbi Fruit Extract represents the disc diffusion test result of Aloe vera (*Aloe barbadensis miller*) root extract against *Escherichia coli*, *Staphylococcus aureus*, and *Salmonella typhimurium*

Reactivity Rating:

None (No detectable zone around or under specimen)

Slight (Some malformed or degenerated cells under the specimen)

Mild (Zone limited under the specimen)

Moderate (Zone extends 5-10 mm beyond specimen)

Severe (Zone extends greater than 10 mm beyond specimen)

Table 3a.3b,3c

Antimicrobial Assay was done to test the susceptibility of the extract to the *Escherichia coli*, *Staphylococcus Aureus* and *Salmonella typhimurium*. A positive control (Amikacin & Oxacillin) was used as a comparison. The sample, Aloe vera roots (sun dried) Extract 100%, Aloe vera roots (sun dried) Extract 75%, Aloe vera roots (sun dried) Extract 50%, produce complete inhibitory (+++), with

mild reactivity against the test organism *Escherichia coli*, *Staphylococcus aureus*, and *Salmonella typhimurium*.

Amikacin 30ug, which serves as positive control, produces complete inhibitory (+++), with moderate reactivity against the test organism *Escherichia coli* and *Salmonella typhimurium*.

Oxacillin 1ug, produced complete inhibitory (+++), with severe reactivity against the test organism *Staphylococcus aureus*. The sample free disc, which serves as a negative control, has no inhibitory activity (-) and no reactivity (-) against the test organisms.

We used a method for disk-diffusion testing developed in 1940 and described by Balouri et al. (2016) as a procedure used by various clinical microbiology laboratories for routine antimicrobial susceptibility testing. Balouri et. al (2016) also stated that at present, several accepted and approved standards are implemented by the Clinical and Laboratory Standards Institute (CLSI) for testing bacteria and yeasts. This popular procedure is done through inoculating agar plates with a standardized inoculum of the test microorganism, after which, filter paper discs (about 6 mm in diameter), diluted in the test compound (in this case, the *Aloe barbadensis* miller root extract) at a desired concentration (which in this case are 50%, 75%, and 100% as shown in tables 3a, 3b, and 3c), are placed on the agar surface. The Petri dishes are then incubated under suitable conditions (in this case, the incubation was done at 35 degrees Celsius and the incubation period lasted for a night long as described in the E, Antimicrobial Assays above). Accordingly, the disc containing the suspected antimicrobial agent (*Aloe barbadensis* miller root extract) is diffused into the agar and is observed if it inhibits spreading and growth of the test microorganism. The extent of growth or inhibition of the microorganism is then determined by measuring. Results are interpreted accordingly (as shown in Figure 1).

Conclusions

Aloe vera *Aloe Vera* (*Aloe barbadensis* miller) roots extract is an effective antimicrobial agent as it produces complete inhibition (+++) and mild reactivity against the microbes *Escherichia coli*, *Staphylococcus aureus*, and *Salmonella typhimurium* comparable to the control group tested with Amikacin (30 µg) and Oxacillin (1 µg), which also resulted to a complete inhibitory (+++), with moderate reactivity against the test organisms.

References

- [1] Abdulrhman Alsayari, D. A. (2018). Community Pharmacists' Knowledge ,Attitudes, and Practice of Herbal Medicines in Asir Region, Kingdom of Saudi Arabia. Evidence-Based Complementary and Alternative Medicine , 7.
- [2] Balouri, M., Sadiki, M., & Ibnsouda, S. K. (2016, April). Methods for in vitro evaluating antimicrobial activity: A Review. Journal of pharmaceutical analysis. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5762448/>
- [3] Jain, S., Rathod, N., Nagi, R., Sur, J., Laheji, A., Gupta, N., Agrawal, P., & Prasad, S. (2016, November). Antibacterial effect of aloe vera gel against oral pathogens: An in-vitro study. Journal of clinical and diagnostic research : JCDR. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5198455/>.
- [4] Khameneh, B., Eskin, N. A. M., Iranshahy, M., & Fazly Bazzaz, B. S. (2021). Phytochemicals: A Promising Weapon in the Arsenal against Antibiotic-Resistant Bacteria. Antibiotics, 10(9), 1044.
- [5] Khameneh B, Iranshahy M, Soheili V, Fazly Bazzaz BS. Review on plant antimicrobials:a mechanistic viewpoint. Antimicrob Resist Infect Control. 2019 Jul 16;8:118.

- [6] Nzogong, R. T., Ndjateu, F. S. T., Ekom, S. E., Fosso, J.-A. M., Awouafack, M. D., Tene, M., Tane, P., Morita, H., Choudhary, M. I., & Tamokou, J.-de-D. (2018, May 16). Antimicrobial and antioxidant activities of triterpenoid and phenolic derivatives from two Cameroonian melastomataceae plants: *Dissotis senegambiensis* and *Amphiblemma monticola*. *BMC complementary and alternative medicine*. <https://www.ncbi.nlm.nih.gov/pmc/articles>
- [7] Papich, M. G. (2016). *Saunders Handbook of Veterinary Drugs* (Fourth edition) (4th ed.). W.B. Saunders.
- [8] Sajjad, A. S. (2014). Aloe vera: An Ancient Herb for Modern Dentistry—A Literature Review. *Journal of Dental Surgery*, 6.
- [9] Wishart DS, Feunang YD, Guo AC, Lo EJ, Marcu A, Grant JR, Sajed T, Johnson, D, Li C, Sayeeda Z, Assempour N, Iynkkaran I, Liu Y, Maciejewski A, Gale N, Wilson A, Chin L, Cummings R, Le D, Pon A, Knox C, Wilson M. DrugBank 5.0: a major update to the DrugBank database for 2018. *Nucleic Acids Res*. 2017 Nov 8. doi: 10.1093/nar/gkx1037.
- [10] Yoo, S., Kim, K., Nam, H., & Lee, D. (2018, August 8). Discovering health benefits of phytochemicals with integrated analysis of the Molecular Network, chemical properties and ethnopharmacological evidence. *Nutrients* <https://www.ncbi.nlm.nih.gov/pmc/articles>
- [11] International Association for Medical Assistance to Travellers. (2018, January 18). IAMAT.org: <https://www.iamat.org/country/philippines/food-and-water-safety>
- [12] National Center for Biotechnology Information (2022). PubChem Compound Summary for CID 37768, Amikacin. <https://pubchem.ncbi.nlm.nih.gov/compound/Amikacin>.
- [13] Phytosterols & Cholesterol. Cleveland Clinic. (n.d.). [https://my.clevelandclinic.org/health/articles/17368-phytosterols-sterols-stanols#:~:text=Phytosterols%20\(referred%20to%20as%20plant,absorption%20in%20the%20digestive%20system](https://my.clevelandclinic.org/health/articles/17368-phytosterols-sterols-stanols#:~:text=Phytosterols%20(referred%20to%20as%20plant,absorption%20in%20the%20digestive%20system).
- [14] World Health Organization. (2018). E. Coli. World Health Organization. <https://www.who.int/news-room/fact-sheets/detail/e-coli>.

Analysis of Pollen Abortiveness of Two Weed Species, *Mimosa pudica* and *Cynodon Dactylon*, Exposed to Lead (Pb)

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Abstract: Weeds are robust plants that can withstand various challenging environments. Due to their habitat, they are most susceptible to exposure to hazardous chemicals like heavy metals. Pollen grains' abortiveness due to lead chloride was microscopically analyzed in the weeds *Mimosa pudica* and *Cynodon dactylon*. Exposed plants displayed significantly higher pollen grains' abortive index at high concentration (240 μM) than the unexposed. *Mimosa pudica* obtained 2.60% (240 μM), and 0.20% (control groups) while, 1% (control groups) and 13% (240 μM) for *Cynodon dactylon*. Statistical analysis of diameter and area data suggested there was a significant difference ($p < 0.00$) between the size of normal and aborted pollen grains of *Mimosa pudica* (mean diameter 12.838 μm normal; 891.47 aborted) and *Cynodon dactylon* between the size of the normal and aborted pollen grains with 12.838 μm (mean diameter) and 891.47 μm^2 (mean area) for normal pollen grain and 9.001 μm (mean diameter) and 444.52 μm^2 (mean area) for the aborted ones of *Mimosa pudica*. Whereas 46.9 μm (mean diameter) and 13,320.27 μm^2 (mean area) for normal pollen grains, 30.01 μm (mean diameter) and 082.64 μm^2 (mean area) for the aborted ones of *Cynodon dactylon*. However, microscopic analysis revealed that aborted pollen grains exhibited two types of pollen abnormalities which are the staining deficiencies and reduction in pollen sizes. These results showed that lead exposure had a significant effect on normal pollen grains resulting in pollen abortion. The results can be helpful for the analysis of heavy metal pollution in plants particularly on the morphological effects of lead (Pb) on plant reproductive cells.

Keywords: *abortiveness, heavy metal, Pb, Mimosa pudica, Cynodon dactylon*

Introduction and Literature Review

Grasses are hardy plants that can withstand harsh environments such as industrial sites, cemeteries, garbage dumps, and even mining sites. They replicate faster than crops they compete with (Regis & Lagunzad, 2002). Due to their exposure to harmful chemicals in their habitats, they have developed the ability to store metals in their shoots and root systems (Girdhar et al. 2014) and despite the high toxicity of heavy metals even in small amounts in the soil, the grasses continue to grow unaffected even when the metals enter the plant tissues where they can be used as tools for monitoring soil pollution. While many plants exposed to lead show ultrastructural and morphological aberrations in pollen (Arce & Yllano 2008), grasses respond to heavy metal pollution through pollen grain abortion (Murin 1995) with aberrations in size, shape, staining deficiency (Micieta and Murin, 1996), and non-disjunctional meiotic events (Chapman & Mulcahy, 1997). In this study, pollen grain abortion as a result of exposure to different concentrations of lead (Pb) was studied in two common grass species *Mimosa pudica*, commonly known as Makahiya, and *Cynodon dactylon*, also known as Bermuda grass. Microscopic observation of the pollen abortion level of these plants may be useful for understanding the effects of lead exposure on plant reproduction and may also aid in related pollution studies on lead.

Methodology

Sample Collection

The flowers of *M. pudica* and *C. dactylon* were collected from the field beside the AUP Main Gate used for Driving Class with coordinates 14.5172° N, 121.1413° E; the second collection area was alongside the road near the old College of Education building at 13.5172° N, 132.1413° E, where the wide

distribution of these weeds are found. The flowers with visible anthers from both species were independently placed in a sealed container and stored in a dry place in the laboratory in preparation for microscopic analysis.

Chemicals and Slide Preparation

Lead (II) chloride was prepared to 60, 120, 180, and 180 μ M concentrations. The Chemistry Department laboratory provided 1% methylene blue as the staining solution. Flowers were selected at random from the preserved samples. Anthers from each flower were carefully placed on a glass slide, cut, and then crushed using dissecting needles. Larger portions of the anthers were removed from the slide to allow better analysis of the pollen grains. A minute drop of 1% methylene blue was added and coverslips were placed on the slides (Melser, et al. 1999). Slides of pollen were prepared for each concentration of lead chloride; a drop of lead chloride solution was added to each prepared slide before the 1% methylene blue was added. Five replicates were prepared for the control group and for each Pb concentration for both species.

Microscopic Analysis

Pollen grains were counted under compound microscope following the method from Regis and Lagunzad (2002). There were 200 pollen grains for *M. pudica* from each slide (replicate) for a total of 1000 per concentration. Due to the small number of pollen grains observed from *C. dactylon*, 20 pollen grains were counted from each slide with a total of 100 pollen grains counted per concentration. Pictures were taken and the number of aborted pollen grains at each treatment concentration was noted. A pollen abortive index was calculated from each concentration using the formula: Pollen Abortive Index = No. of Aborted Pollen/Total No. of Pollen X 100.

Measurement of Diameter and Area of Pollen

Fifty normal and another fifty aborted pollen grains from each species were randomly selected using a computer-generated table of random numbers for measurement. Using the Toup View application of the microscope camera, initial data were obtained in pixels at 400x magnification. The results were then converted to microns through comparison of the pixel length of 0.1mm in a stage micrometer at 400x magnification (1mm = 6850 pixels).

Statistical Analysis

The results from the microscopic analysis and the measurement of diameter and area were tallied. Data regarding the occurrence of aborted pollen in different concentrations of lead chloride for both species were analyzed using one-way analysis of variance (ANOVA). On the other hand, data from the measurement of diameter and area were analyzed using the t-test.

Findings

Morphological Characterization of Abortive Pollen of *M. pudica* and *C. Dactylon*

Figure 1 and 2 show the sample of normal and aborted pollen grains of *M. pudica* and *C. Dactylon* from the control and treated samples. Microscopic observation revealed that aborted pollen grains exhibited different types of pollen abnormalities such as staining deficiencies due to inability to absorb the stain wherein they are significantly lighter in staining compared to the normal pollen; they were also deformed and reduced in size.

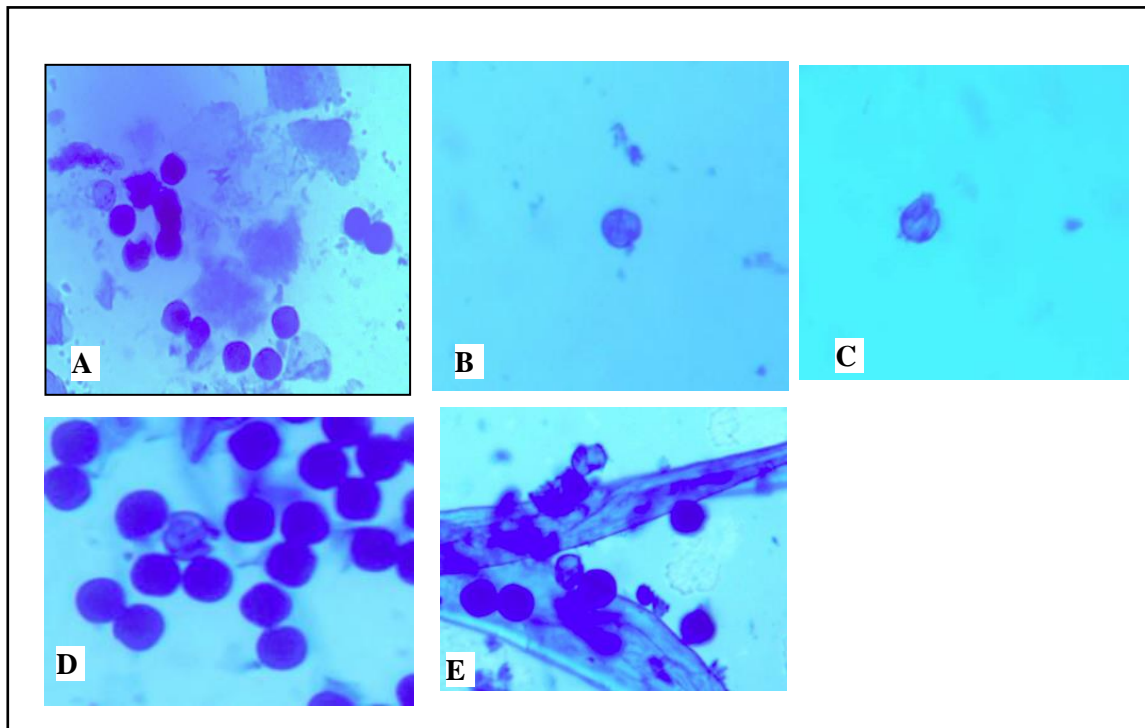


Figure 1. Photomicrograph of *M. pudica* pollen showing normal and aborted pollen in control and in various $PbCl_2$ concentrations (B: 60 μ M, C: 120 μ M, D: 180 μ M, E: 240 μ M) observed at 400x (normal-black arrow, aborted-red arrow).

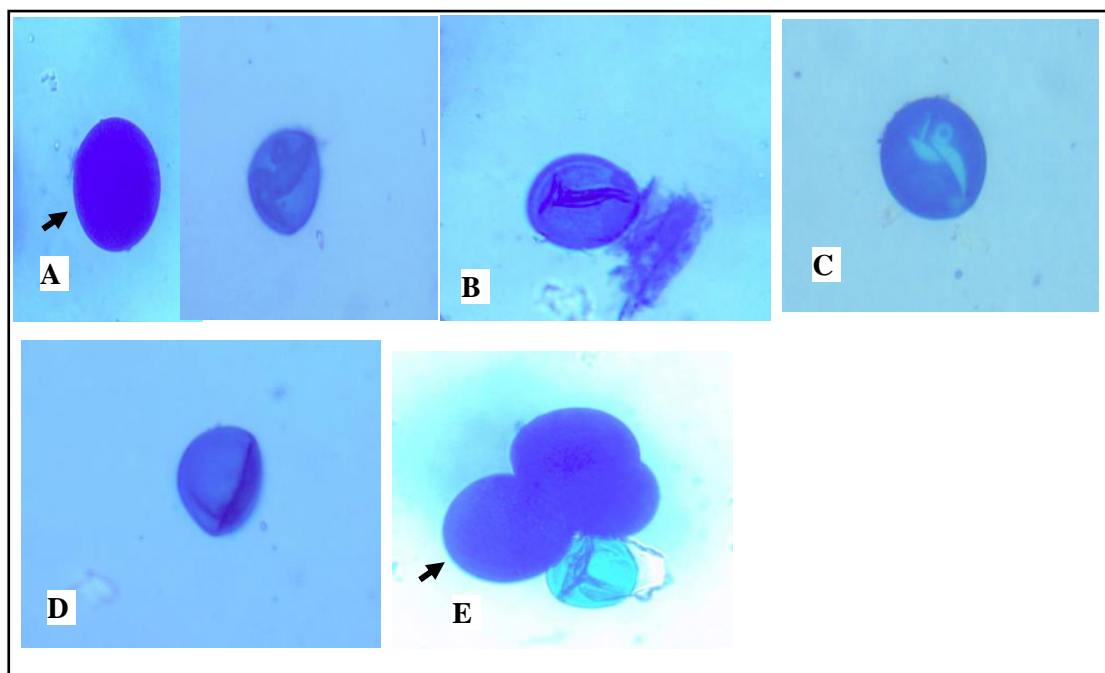


Figure 2. Photomicrograph of *C. Dactylon* pollen showing normal and aborted pollen in control and in various $PbCl_2$ concentrations (B: 60 μ M, C: 120 μ M, D: 180 μ M, E: 240 μ M) observed at 400x (normal-black arrow, aborted-red arrow).

Abortive Index of *M. pudica* pollen

Table 1 shows the number of aborted pollen grains observed in *M. pudica* replicates at each concentration of lead chloride. In total there were 5000 pollen grains derived from the five replicates with one thousand pollen grains each for every concentration including the control group. We observed 78 aborted pollen grains. All concentrations, including the control, exhibited aborted pollen grains with the control having the least (2) and the 240 μ M lead chloride with the most (26). There was a positive correlation between the number of aborted pollen and lead chloride concentration. The Pollen Abortive index for each concentration also showed the same trend, increasing from 0.20% abortive index with the control to 2.60% at 240 μ M lead chloride.

Table 1. Number of aborted pollen found in *M. pudica* replicates

	Control	60uM	120uM	180uM	240uM
R1	0	2	4	6	4
R2	1	3	4	4	6
R3	0	1	2	4	5
R4	0	2	3	3	4
R5	1	3	4	5	7
TOTAL	2	11	17	22	26

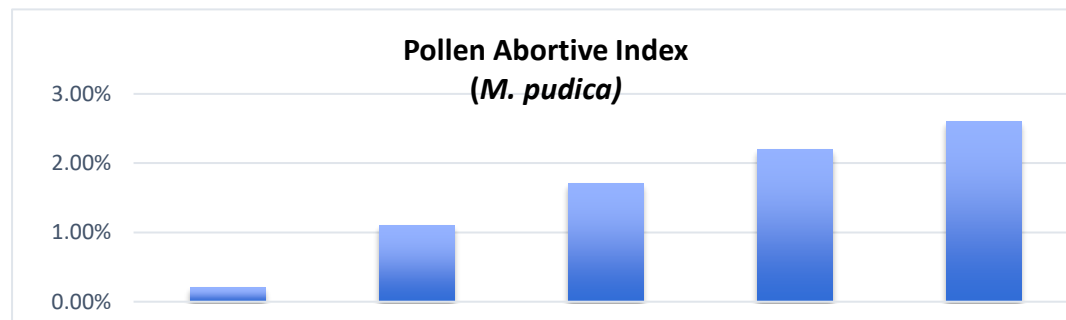


Figure 3. Pollen abortive index of *M. pudica*

Table 2 shows the ANOVA results from *M. pudica*. At $p = 0.000002$, there was significant difference in the number of aborted pollen exposed to different concentrations of lead chloride. Further post hoc analysis of the data using Duncan's test indicated that the concentrations where the most significant number of aborted pollen lie in the control and samples exposed to 240 μ M lead chloride (Figure 4). Figure 4 also shows the number of aborted pollen grains in each concentration along with the results from the Duncan's test.

Table 2. One-way ANOVA results from *M. Pudica*

Summary						
Groups	Sample size	Sum	Mean	Variance		
Control	5	2.	0.4	0.3		
60uM	5	11.	2.2	0.7		
120uM	5	17.	3.4	0.8		
180uM	5	22.	4.4	1.3		
240uM	5	26.	5.2	1.7		
ANOVA						
Source of Variation	SS	df	MS	F	p-level	F crit
Between Groups	71.44	4	17.86	18.60417	0.000002	3.73125
Within Groups	19.2	20	0.96			
Total	90.64	24				

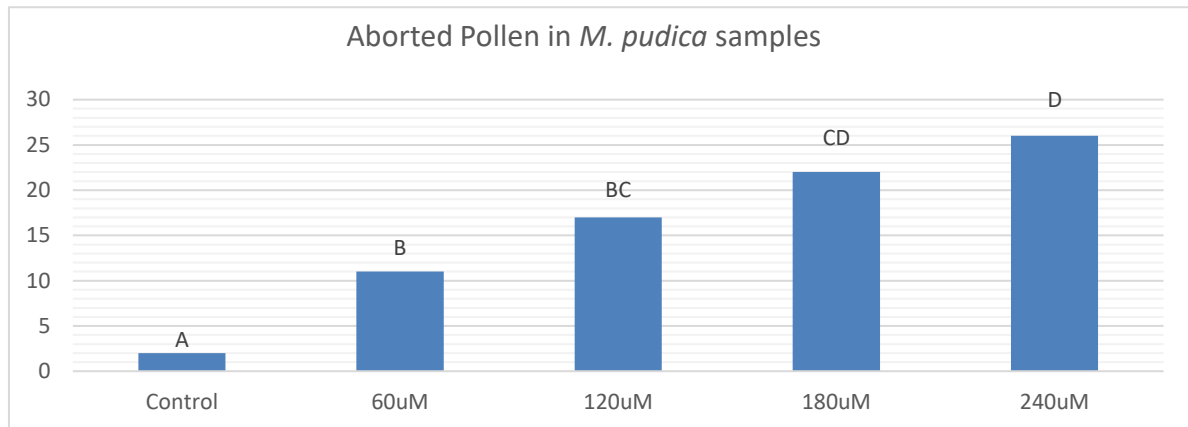


Figure 4. Number of aborted pollen from *M. pudica* samples under each concentration with results from Duncan's test.

Abortive Index of *C. dactylon* pollen

We counted 500 total pollen grains for *C. dactylon* with 33 aborted pollen grains. Twenty pollen grains were counted from each replicate amounting to a total of 100 pollen grains per concentration. Table 2 shows the number of aborted pollen grains seen in the *C. dactylon* replicates. Like *M. pudica*, all concentrations along and the control showed aborted pollen grains ranging from one in the control to 13 at the highest concentration (240 μ M) of lead chloride. As the concentration increased, the number of aborted pollen grain also increased. There was a positive correlation between the number of aborted pollen and lead chloride concentration.

Table 3. Number of aborted pollen found in *C. dactylon* replicates

	Control	60uM	120uM	180uM	240uM
R1	1	1	2	2	3
R2	0	0	0	0	4
R3	0	1	1	3	1
R4	0	0	1	1	3
R5	0	2	3	2	2
TOTAL	1	4	7	8	13

The Pollen Abortive Index of *C. dactylon* was higher than for *M. pudica*. Figure 5 shows the pollen abortive index increased through each concentration with the control having a 1% abortive index and the highest concentration of lead chloride having a 13% abortive index. There was a significant different between the number of aborted pollen grains among the different lead chloride concentration treatments ($p = 0.00$).

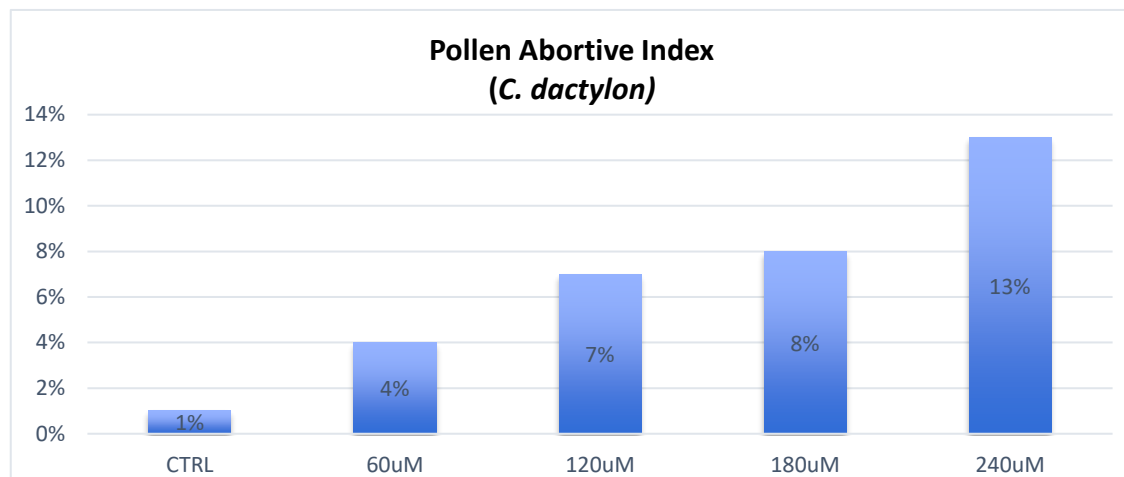


Figure 5. Pollen abortive index of *C. dactylon*

Table 4. One-way ANOVA results from *C. Dactylon*

Summary

Groups	Sample size	Sum	Mean	Variance
Control	5	1.	0.2	0.2
60uM	5	4.	0.8	0.7
120uM	5	7.	1.4	1.3
180uM	5	8.	1.6	1.3
240uM	5	13.	2.6	1.3

ANOVA

Source of Variation	SS	df	MS	F	p-level	F crit
Between Groups	16.24	4	4.06	4.22917	0.01216	3.73125
Within Groups	19.2	20	0.96			
Total	35.44	24				

Figure 6 shows the number of aborted pollen grains at each concentration of lead chloride for *C. dactylon*. Post hoc analysis using Duncan's test shows that the concentrations with the most aborted pollen grains were 180 μ M and 240 μ M lead chloride.

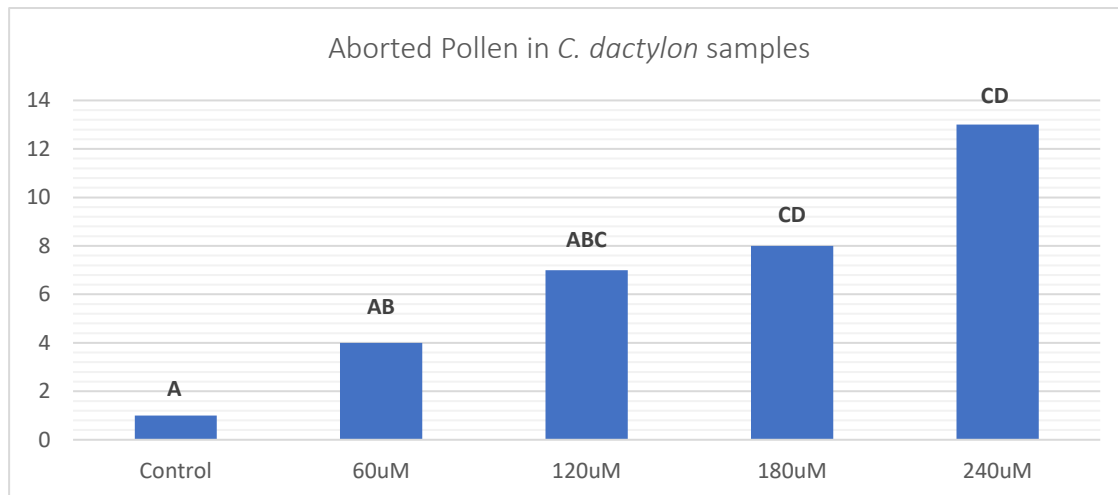


Figure 6. Number of aborted pollen grains from *C. dactylon* samples treated with different concentrations of lead chloride and analysed using Duncan's test.

Diameter and Area of Normal and Abortive Pollen of *M. pudica*

Fifty normal and fifty aborted pollen grains from *M. pudica* were selected through a computer-generated table of random numbers and were measured for their diameter (microns).

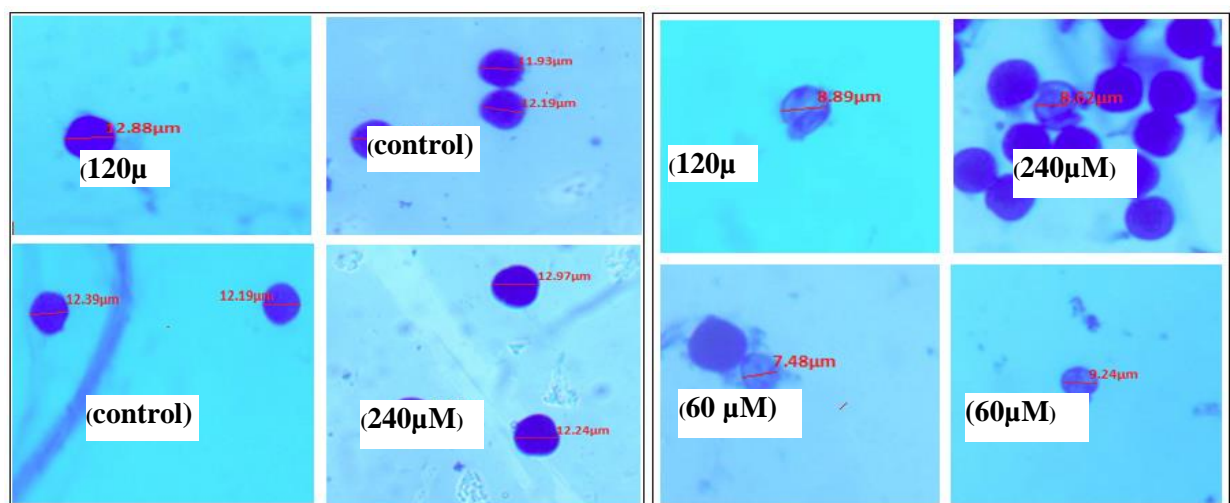


Figure 7. Measured diameter of *M. pudica* normal (left) and aborted (right) pollen grains selected randomly across the different concentrations of $PbCl_2$ at 400x magnification.

The mean diameter of normal pollen grains and aborted pollen grains were 12.838µm for and 9.001µm respectively (Figure 8). The same number of pollen grains were randomly selected for measurement of area. The results in pixels and were converted to microns. Analysis of the area data

for *M. pudica* showed a mean of 891.47 μm^2 for the normal pollen grains and 444.52 μm^2 for the aborted ones (Figure 9).

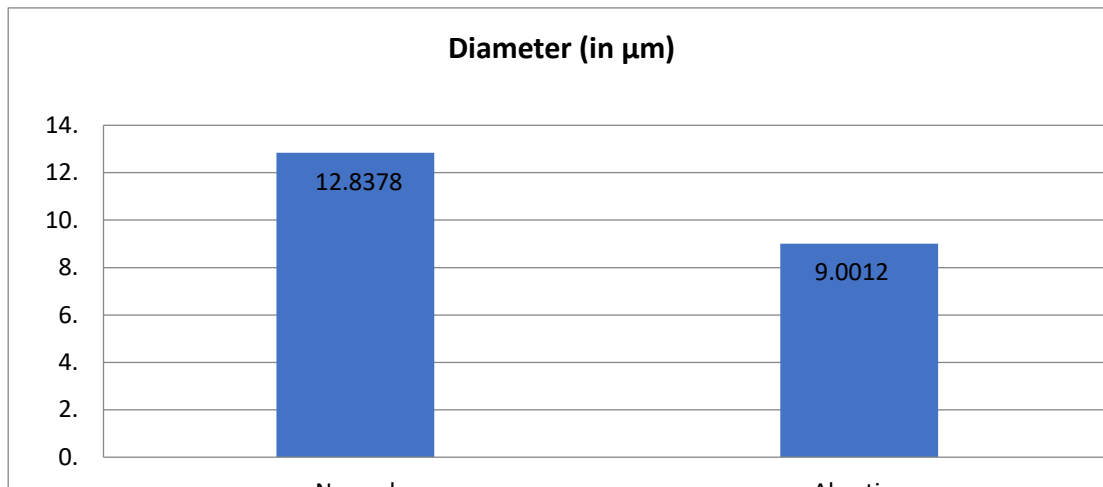


Figure 8. Comparison of means of diameter between normal and abortive *M. pudica* pollen

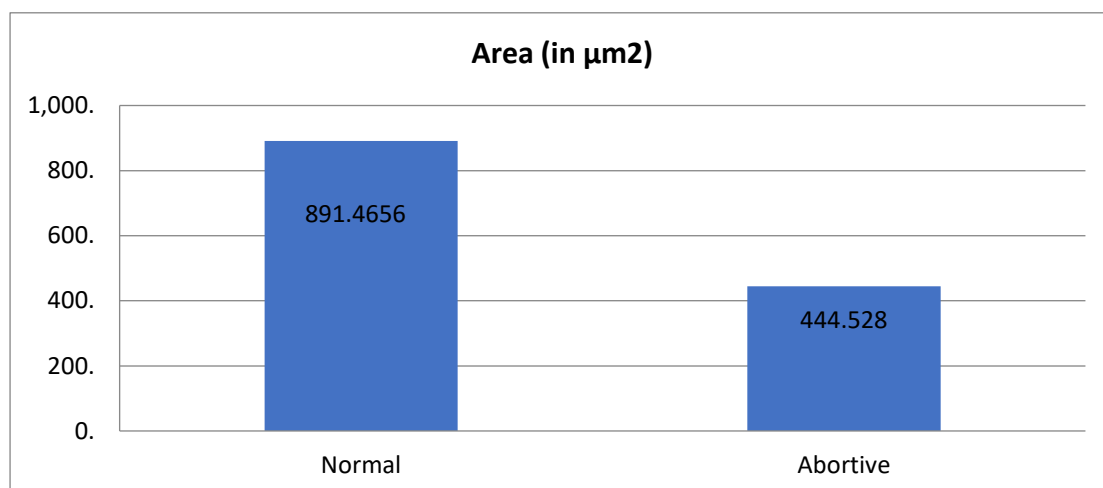


Figure 9. Means area of normal and abortive *M. pudica* pollen grains.

Statistical Analysis of Diameter and Area

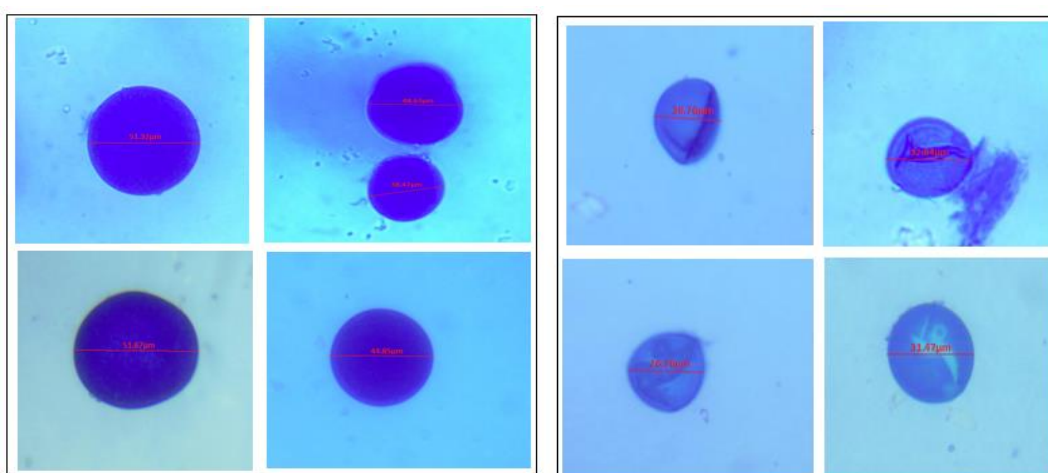
Results from the measurement of area and diameter were analyzed using t-test. A $p = 0.00$ for both diameter and area suggest significant difference between the normal and aborted pollen grains for *M. pudica*. Table 5 shows the summary of the results from the t-test for both area and diameter and the comparison between the means of the results between the normal and aborted pollen.

Table 5. T-test results for Area and Diameter of *M. pudica* samples

Diameter			
<i>Descriptive Statistics</i>			
VAR	Sample size	Mean	Variance
Normal	50	12.8378	0.52253
Abortive	50	9.0012	0.97911
Degrees Of Freedom	98	Hypothesized Mean Difference	0.E+0
Test Statistics	22.13849	Pooled Variance	0.75082
<i>Two-tailed distribution</i>			
p-level	0.E+0	t Critical Value (5%)	1.98447
Area			
<i>Descriptive Statistics</i>			
VAR	Sample size	Mean	Variance
	50	891.4656	11,182.73751
	50	444.528	8,283.8864
Degrees Of Freedom	98	Hypothesized Mean Difference	0.E+0
Test Statistics	22.65096	Pooled Variance	9,733.31196
<i>Two-tailed distribution</i>			
p-level	0.E+0	t Critical Value (5%)	1.98447

Diameter and Area of Normal and Abortive Pollen of *C. dactylon*

Fifty normal and aborted pollen grains from *C. dactylon* were also randomly selected and measured for their diameter. Analysis of the data showed that the mean diameter for normal pollen grains was 46.9 μm and 30.01 μm for the aborted ones (Figure 11). The mean diameter for normal and aborted pollen grains of *M. pudica* were measured in microns (Figure 10).

**Figure 10.** Measured diameter of *C. dactylon* normal (left) and aborted (right) pollen grains selected randomly across the different concentrations of PbCl_2 at 400x magnification.

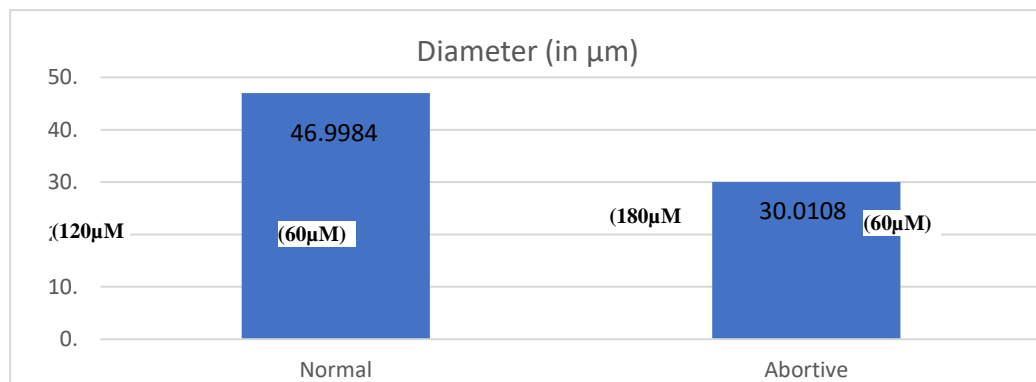


Figure 11. Mean diameters of normal and abortive *C. dactylon* pollen grains.

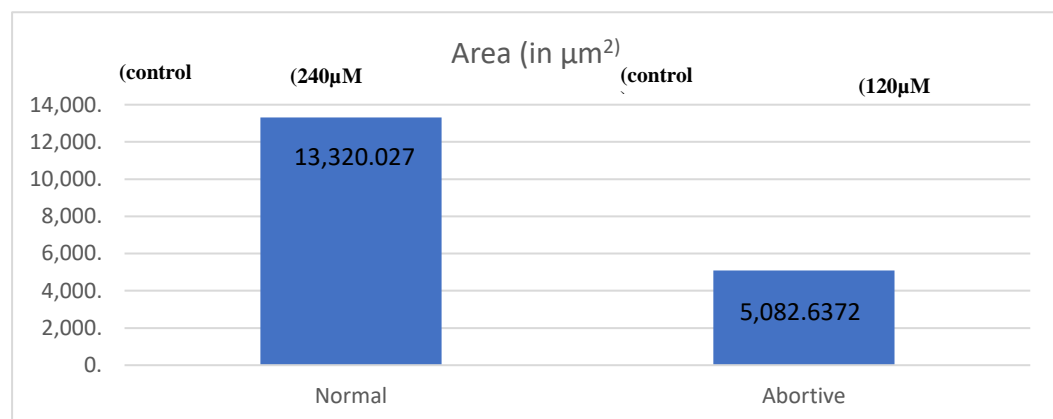


Figure 12. Mean area of normal and abortive *C. dactylon* pollen grains.

There was significant difference between the normal and aborted pollen grain diameter and area ($p = 0.00$). Table 6 shows the t-test results summary for both area and diameter

Table 6. T-test results for Area and Diameter of *C. dactylon* samples

Area			
<i>Descriptive Statistics</i>			
VAR	Sample size	Mean	Variance
Normal	50	46.9984	28.21079
Abortive	50	30.0108	18.49784
Degrees Of Freedom	98	Hypothesized Mean Difference	0.E+0
Test Statistics	17.57594	Pooled Variance	23.35431
<i>Two-tailed distribution</i>			
p-level	0.E+0	t Critical Value (5%)	1.98447
Diameter			
<i>Descriptive Statistics</i>			
VAR	Sample size	Mean	Variance
Normal	50	13,320.027	75,660,755.53716
Abortive	50	5,082.6372	2,101,264.65677
Degrees Of Freedom	98	Hypothesized Mean Difference	0.E+0
Test Statistics	6.60527	Pooled Variance	38,881,010.09696
<i>Two-tailed distribution</i>			
p-level	0.	t Critical Value (5%)	1.98447

Discussion

Deformation, small size, and staining deficiencies were observed in aborted pollen grains of *M. pudica* and *C. Dactylon*. These findings are consistent with the study conducted on *Tradescantia pallida* which also indicated changes in pollen form and inability to absorb stain when exposed to heavy metal pollution (Breckle, 1992). Similar observations were noted by Micieata & Murin, (1996). According to Ceglinski et al. (2021), pollen morphology aberrations may also be attributed to the effects of aerial metal pollution. The pollen abortive index for the same species gradually increased as the concentration increased and most of the changes were seen at 180µm and 240µm, an observation also noted in the study on the effect of lead toxicity on pollen grains in *Matricaria chamomile*. Also, under heavy metal stress the pollen sacs become deformed and the number of pollen grains is significantly reduced (Ismael et al. 2018). Thus, changes in morphological characters such as pollen surface area, diameter, and shape are all the result of heavy metal exposure, which has a direct effect on fertilization and plant reproduction (Albooghobaish, 2011).

Limitations and Implications

A similar study must be done on other weed species in the Philippines with the inclusion of electron microscopy in the analysis to find out more detailed effects of lead exposure in pollen grain. Future studies should also use other staining agents to further confirm the results of this study. A comparative study on the pollen abortiveness between different species of weeds and grasses is also highly recommended to find out which species react the most to lead exposure in order to identify a good bioindicator for lead pollution. An analysis of the soil in the area where the samples were collected is also recommended to determine the lead levels and if they influenced the results of this study. Microscopic observation of the pollen abortion level of these plants may be useful for understanding the effects of lead exposure on their reproduction and may also aid in related pollution studies on lead.

Conclusion

This study aimed to observe pollen abortion in two weed species, *Mimosa pudica* and *Cynodon dactylon* under various treatments of lead chloride. Aborted pollen grains were observed from the control and the treated samples for both *M. pudica* and *C. dactylon*. Aborted pollen exhibited a deficiency in staining and a decrease in size. It was found out that the Pollen Abortive Index increases as the lead concentration increases. The highest number of aborted pollen grains was observed in the highest concentration of lead and was evident for both species tested. A significant difference was observed between the diameter and area of aborted pollen grains compared to normal pollen grains for both species. Aborted pollen were smaller in size than the normal ones. These results suggest that there is a significant effect of lead exposure on the pollen grains of the experimented species.

References

- [1] Albooghobaish, N. (2011). Effect of lead toxicity on pollen grains in *Matricaria chamomilla*. *International Conference on Bioscience, Biochemistry and Bioinformatics*. IPCBEE vol.5
- [2] Arce D, Yllano O (2008). Sensitivity and tolerance of pokkali and IRRI-112 rice (*Oryza sativa*) varieties to lead (Pb) stress. *University Research Journal*.
- [3] Breckle, S.W. (1991). Growth under Stress, Heavy metals. In: Waisel Y Eshel A Afkafi U (eds.), *Plant Roots: The Hidden Half*. Marcel Dekker Inc, USA pp. 351-273
- [4] Ceglinski LV, Menestrino Garcia E, Reis FO, Tavella RA, Silva Jr FMR. Air quality assessment using the Pollen Abortion assay in *Tradescantia pallida* in a Mid-sized City in Southern Brazil.

- Rev. Soc.cient. Parag. 2021;26(1):6-16.<https://doi.org/10.32480/rscp.2021.26.1.6>Recibido: 3/03/2021.
- [5] Chapman, M.J. & Mulcahy, D. (1997). Effect of genomeplastome interaction on meiosis and pollen development in *Oenothera* species and hybrids. *Sexual Plant Reproduction*. 10(5):288-292.
- [6] Girdhar, M., Sharma, N. R., Rehman, H., Kumar, A., & Mohan, A. (2014). Comparative assessment for hyperaccumulatory and phytoremediation capability of three wild weeds. 3 *Biotech*, 4(6), 579-589. <https://doi.org/10.1007/s13205-014-0194-0>
- [7] Ismael, M., Elyamine, A., Zhao, Y., Moussa, M., Rana, M., Afzal, J., Imran, M., Zhao, X., & Hu, C. (2018). Can selenium and molybdenum restrain cadmium toxicity to pollen grains in brassica napus? *International Journal of Molecular Sciences*, 19(8), 2163. <https://doi.org/10.3390/ijms19082163>
- [8] Mičičeta, K., & Murín, G. (1996). Microspore analysis for genotoxicity of a polluted environment. *Environmental and Experimental Botany*, 36(1), 21-27. [https://doi.org/10.1016/0098-8472\(95\)00050-x](https://doi.org/10.1016/0098-8472(95)00050-x)
- [9] Regis, E. & Lagunzad, D (2002). Comparison of pollen abortiveness in four weed species treated with mercuric chloride. *Science Diliman (Philippines)* ISSN : 0115-7809

A Comparative Study on the Depth of Cure and Thermal Rise of Composite Resin using Two Light Emitting Diode Light Cure Unit

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Abstract: Dentists are curious about the reliability in performance of generic LED LCU compared to expensive brands. This experimental study tested a generic LED LCU against a branded competitor, measuring two parameters: (i) depth of cure and (ii) temperature rise. Depth of cure was measured with a digital micrometer after the manual scraping technique (ISO 4049:2002); rise of temperature was measured with a K-type thermocouple wire. For each parameter, three specimens were tested using two LED LCUs, at 5, 10, 15, and 20 seconds. The results were statistically evaluated using the two-way repeated measures ANOVA. There was no significant difference between the depth of cure of the composite achieved by both LED LCUs. Exposure time had a significant impact ($p = 0.006$) as each period provided a significant increase in the depth of cured resin with an increase in exposure time. For the rise of temperature test, both LED LCUs yielded significant effects from initial curing time to final curing time ($p < 0.001$) and from initial curing time to the peak temperature ($p < 0.001$) with an increased exposure time. In conclusion, Device 1 has similar efficiency as Device 2 with respect to the depth of cure and rise of temperature properties, despite the big difference in market value.

Keywords: *depth of cure, thermal rise, curing, exposure times, hybrid composite resin, light intensity*

Introduction and Literature Review

Far-reaching improvements in technology have been experienced over the years in the field of Dentistry. Included in these advancements are the light-emitting diode (LED) light curing units (LCU) that were introduced 20 years ago yet are now the most common means in restorative dentistry.

People have often perceived light curing to be as simple as using an on and off switch. While seemingly simple and routine, the process is complex. In fact, several factors must be considered to ensure the quality and durability of the treatment being given to patients (Strassler, 2013). *"The right light can help you achieve remarkable results, while conversely, the wrong light can make your efforts more tedious and your results less consistent"* (Miller, 2009). This is the reason why most dental practitioners take time in choosing the LCU that fits best their circumstances.

Unfortunately, the International Standards Organization (ISO) minimal requirements for curing light performances may have caused the emergence of low-cost, poorly-performing LCUs (Strassler, 2013). There is no standardized testing of LCUs that are used in dental offices and not all are equivalent, thus, dental practitioners could be misled by insufficient information or inaccurate specifications (Ocean Optics, n.d.).

However, in today's market, be it over the internet or physical stores, LCUs are sold either as top-quality products or cheaply manufactured merchandise with the same claim of being the best-buy. Though both units, high- or low-priced, may have similar specifications, there may be differences in the physical reaction of the polymer. This study aims to identify the operational differences between recognized curing lights and generically manufactured counterparts that show significant impact on restoration quality.

Materials and Methods

The test comprised of procedures in relation to two properties of composite restoration. The depth of cure was measured by using the scraping technique according to ISO 4049:2002. The rise of temperature was observed by using a thermocouple wire. Temperature assessment was by the Electronic Product Development Center of Department of Science and Technology. Every procedure was carried out on the same LED LCUs and hybrid composite material to maintain homogeneity of results. The LED LCUs irradiance output may or may not change over time during the tests, hence, a dental radiometer was routinely used to monitor changes in their intensity output.

Based on comparative studies about radiometers, the Bluephase Meter II provided the most accurate data and was used to periodically monitor changes in the light output to make sure the output was consistent in both LCUs before irradiating the test specimens (Shimokawa et al., 2016).

The common specimens for testing depth of cure and rise of temperature were prepared by creating 9 mm cylindrical stainless-steel moulds from commonly available stainless-steel straws with an inside diameter of 4 mm (Figure 2). In each test, 24 specimens were prepared to meet the requirements of the statistical analysis for the veracity of the results.

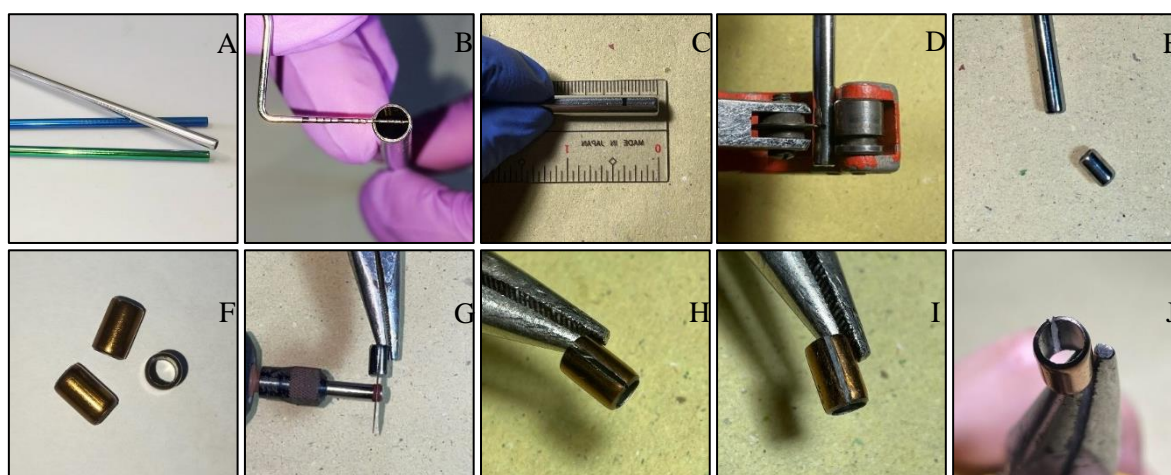


Figure 1. Preparation of samples from stainless-steel straw

Materials used in all test procedures:

Tetric® N-Ceram

Two LED LCUs: Device 1 and Device 2

Curing Radiometer

Table 1. Technical specifications of the LED LCU devices used

LED LCU	WAVE LENGTH	INTENSITY	MANUFACTURER	PRICE
DEVICE 1	420 - 480 nm	1000 – 1200 mW/cm ²	Manufacturer 1	~7,000php
DEVICE 2	385 – 515 nm	1200 mW/cm ²	Manufacturer 2	~100,000php

The procedures conducted were enumerated respectively:

Depth of Cure using scraping technique according to ISO 4049:2002.

Procedure

The needed materials were set up inside a semi-dark room with minimal vision to reduce interference of the polymerization of the composite resin by surrounding light.

The researchers prepared 24 cylindrical stainless-steel moulds measuring 9 mm in length and 4 mm diameter, placed above the transparent glass slide. A hemostat was used to hold the mould flat and ensure its stability over the slide.

Using composite filling instruments, the moulds were filled in bulk of resin composite and packed generously allowing an excess of around 0.5mm.

A polyester strip was placed on the composite-filled mould and a glass slab was used to apply consistent pressure for the extrusion of the excess material which was carefully removed.

The composites were irradiated through the polyester strip using the two LED units for 5, 10, 15 and 20 seconds making sure that the light tip was at the center and keeping in immediate contact with the strip. For each light curing unit and for each exposure time, three specimens were prepared. The LED light-curing output was checked with Bluephase Meter II curing radiometer after three specimens.

The mould was held by hand and an endodontic clamp forcep was used to carefully split open the mould into half at the base end of the longitudinal cut.

The cured composite was extracted from the mould using the Woodson instrument.

After the removal of the cured composite, the non-cured material was gently scraped off using a plastic spatula. Damp tissue was used to neatly wipe off the uncured composite from the plastic spatula to avoid the uncured composite from sticking onto the cured composite. A light source was turned on during the scraping for better vision.

Three different areas on top of the composite were marked using a gel pen to measure the height of the cured material using a digital micrometer. The composite was placed on the composite well, covered with paper, sealed with tape, and neatly wrapped with a clean plastic cover. Specimen were stored this way for later measurement. The measured values were averaged and registered as the depth of cure and recorded as the D(ISO).

For the accuracy of the measurement, the specimens were turned over to the DOST, wherein a precise digital micrometer was used.

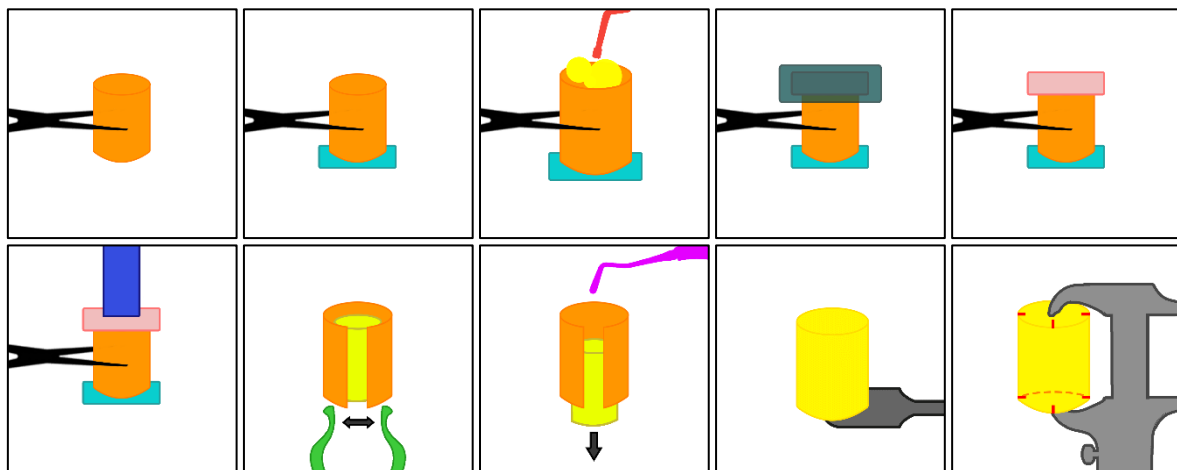


Figure 2. Depth of cure - step by step diagram

Rise of Temperature Test

The rise of temperature tests were carried out at the Department of Science and Technology Advanced Science Technology Institute, Electronics Product Development Center Laboratory (DOST-ASTI EPDC) in Taguig City, Philippines. A Type K Thermocouple (Nickel-Chromium / Nickel-Alumel) wire was used to detect the change in temperature during the tests. Thermocouples consist of two wires of different types of metal. A K-type thermocouple has a grey positive wire composed of 90% nickel and 10% chromium and a red negative wire composed of 95% nickel, 2% aluminum, 2% manganese, and 1% silicon. When the junction is heated or cooled, a voltage is created that transfers to the other side of the wire connected to a data logger for reading the temperature. (*RS PRO Thermocouple Wire, PFA Sheath Twisted, Type K, 7/0.2mm, 50m | RS Components, n.d.*)

Procedures

A controlled environment in a humidity chamber was set to 25 degrees Celsius. The complete set up was prepared inside the chamber.

A K-type thermocouple wire was passed from the inside of the platform with the end of the wire exiting the top through a hole in the center perpendicular to its flat surface as shown in Figure 3. The stainless-steel mould was placed at the center on top of the platform with the hole and the tip of the wire was placed inside the mould.

For each 9 mm x 4 mm stainless-steel mould, the K-type thermocouple wire was inserted from the bottom of the mould with the tip of the wire reaching 4mm deep from the top edge of the mould.

A composite-filling instrument was used to pack each stainless-steel mould in the controlled environment. The researcher allowed an excess of around 0.5 mm. A hemostat was used to hold the mould steady. The wire was kept in the center of the mould as much as possible.

A polyester strip was on top of the composite-filled mould and a glass slide was used to apply consistent pressure to extrude the excess material. The glass slide was removed afterwards.

The packed stainless-steel mould was separately cured inside the controlled environment using each LCU one at a time for exposure times of 5s, 10s, 15s and 20s. The LED light-curing output was checked using a Bluephase Meter II radiometer after every three specimens.

The measured temperature displayed by the data logger was recorded. Initial temperature and final temperature were noted.

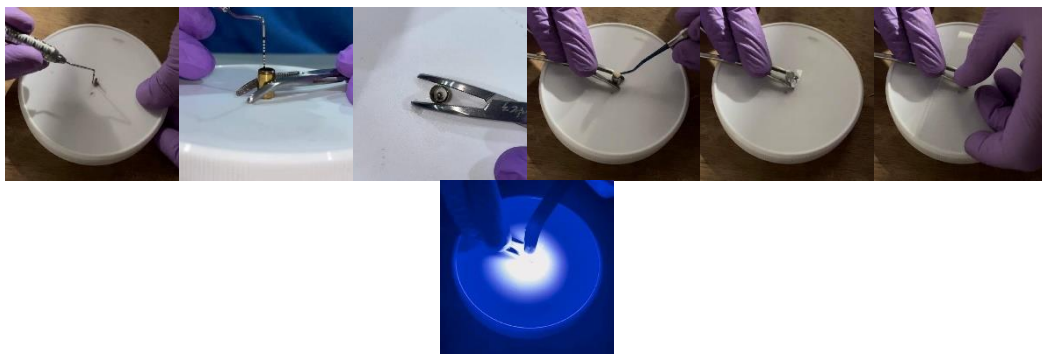


Figure 3. The step by step setup of the composite mould for the rise of temperature test.

Statistical Analysis

The researcher calculated the mean and standard deviation of depth of cure for each group of specimen and used a two-way repeated measures ANOVA to determine the influence on the depth of cure and rise of temperature of the composite by light curing units under consistent exposure of time applied in this study.

Results and Discussion

Depth of Cure (DOC) Test Results

Table 2 shows the recorded DOC in millimeters of the composite resin material measured by a digital micrometer for Device 1. The mean of the measurements of the three marked areas for each specimen collected from the three cured composite materials per exposure time was calculated. Table 3 presents data for the DOC of the resin material for Device 2 following the same procedure.

Table 2. Device 1 | DOC Test Results

DEVICE 1 DOC TEST RESULTS (mm)									
5 SECONDS					10 SECONDS				
Specimen	Point 1	Point 2	Point 3	Average	Specimen	Point 1	Point 2	Point 3	Average
1	3.6	3.68	3.94	3.74	1	3.55	3.58	3.35	3.49333
2	3.39	3.44	3.55	3.46	2	4.49	4.58	4.52	4.53
3	3.51	3.35	3.6	3.487	3	4.36	4.27	4.29	4.30667
15 SECONDS					20 SECONDS				

Specimen	Point 1	Point 2	Point 3	Average	Specimen	Point 1	Point 2	Point 3	Average
1	4.82	4.36	4.82	4.66667	1	5.02	5.12	5.18	5.10667
2	4.6	4.61	4.76	4.65667	2	5.17	5.26	5.14	5.19
3	4.94	4.98	4.93	4.95	3	5.29	5.28	5.33	5.3

Points 1, 2 and 3 refer to the measurement of the marked areas of the cured composite per specimen.

Table 3. *Device 2 / DOC Test Results*

DEVICE 2 DOC TEST RESULTS (mm)									
5 SECONDS					10 SECONDS				
Specime n	Point 1	Point 2	Point 3	Average	Specime n	Point 1	Point 2	Point 3	Average
1	3.56	3.69	3.67	3.64	1	4.85	4.99	4.88	4.91
2	3.64	3.67	3.77	3.69	2	4.33	4.39	4.87	4.53
3	3.68	3.72	3.59	3.66	3	4.88	4.65	4.76	4.76
15 SECONDS					20 SECONDS				
Specime n	Point 1	Point 2	Point 3	Average	Specime n	Point 1	Point 2	Point 3	Average
1	5.31	5.46	5.36	5.38	1	5.51	5.76	5.61	5.63
2	5.16	5.14	5.05	5.12	2	5.45	5.6	5.54	5.53
3	5.1	5.19	5.25	5.18	3	5.43	5.96	5.56	5.65

Points 1, 2 and 3 refer to the measurement of the marked areas of the cured composite per specimen.

Table 4. *DOC Results / Mean of the Average*

LED LCU	5 seconds	10 seconds	15 seconds	20 seconds
Device 1	3.56	4.11	4.76	5.20
Device 2	3.67	4.73	5.22	5.60

Note. Figures in millimeters (mm)

Table 2 shows the mean of the average of the three specimens per exposure time for Device 1 and Device 2. The data shows Device 2 cured composite resins more than Device 1 by a narrow margin. Moreover, the depth of cure was proportional to the exposure time.

DOC Statistical Output

Table 5. *DOC Statistical Output / Mean Depth of Cure (mm)*

	D1 5 Sec	D2 5 Sec	D1 10 Sec	D2 10 Sec	D1 15 Sec	D2 15 Sec	D1 20 Sec	D2 20 Secs
N	3	3	3	3	3	3	3	3
Mean	3.56	3.67	4.11	4.73	4.76	5.22	5.20	5.60
Standard deviation	0.155	0.0267	0.546	0.190	0.167	0.136	0.0970	0.0636

Table 6. DOC Statistical Output | Comparison of Mean Depth of Cure

	Sum of Squares	df	Mean Square	F	P
Device	0.717	1	0.7170	5.258	0.106
Residual	0.409	3	0.1364		
Time	8.091	3	2.6968	8.444	0.006
Residual	2.874	9	0.3194		
Device * Time	0.160	3	0.0534	0.955	0.455
Residual	0.503	9	0.0559		

Note: Type 3 Sums of Squares

The findings were analyzed using a two-way repeated measures ANOVA. There is no significant difference between devices or interaction between Device and Time. The statistical analysis demonstrates that time had a significant effect, $F(3,9) = 8.44$, $p = 0.006$.

Table 7. DOC Statistical Output | Post Hoc Comparisons – Time

Comparison						
Time	Time	Mean Difference	SE	df	t	p _{Tukey}
5 sec	- 10 sec	-0.808	0.0993	6.00	-8.14	< .001
	- 15 sec	-1.377	0.0993	6.00	-13.87	< .001
	- 20 sec	-1.787	0.0993	6.00	-17.99	< .001
10 sec	- 15 sec	-0.569	0.0993	6.00	-5.74	0.005
	- 20 sec	-0.979	0.0993	6.00	-9.86	< .001
15 sec	- 20 sec	-0.409	0.0993	6.00	-4.12	0.024

Though Device 2 produced longer cured composites than the Device 1, the difference was not statistically significant. Furthermore, there was no significant influence of Device or interaction between Device and time.

Rise of Temperature (ROT) Test Results

The data gathered for Tables 8-11 were recorded in degrees Celsius (°C). The readings on the data logger were the temperatures obtained at the beginning, end, and peak of each time exposure for the three specimens. Throughout the curing of each specimen, the initial temperature was recorded at the commencement of the corresponding time exposure and during the curing of each specimen. The final temperature was recorded at the end of the appropriate time exposure while the peak temperature was recorded when the temperature reached its greatest point after curing time.

Table 8 ROT Test Results / 5 Seconds

Specimen	DEVICE 1			DEVICE 2		
	INITIAL (°C)	FINAL (°C)	PEAK (°C)	INITIAL (°C)	FINAL (°C)	PEAK (°C)
1	25.59	26.4	30.18	26.71	26.55	30.48
2	26.25	26.81	30.04	27.2	27.9	31.22
3	25.59	26.82	30.21	26.27	27.55	29.96

Table 8 presents data of recorded temperature of the initial curing time, the final curing time and the peak temperature reached during the ROT test using Device 1 and Device 2 curing units at 5 seconds exposure time.

An increase in temperature of a few degrees was observed from the initial curing time until the end of curing of the specimen. Temperature continued to increase even after the use of the curing units and reached the highest temperature within a few seconds to minutes. The temperatures increased by several degrees from initial curing time until the peak temperature on both Device 1 and Device 2 and seemed yield similar in results in this time period.

Table 9. ROT Test Results / 10 Seconds

Specimen	DEVICE 1			DEVICE 2		
	INITIAL (°C)	FINAL (°C)	PEAK (°C)	INITIAL (°C)	FINAL (°C)	PEAK (°C)
1	26.63	30.2	32.35	26.62	27.6	32.23
2	26.72	28.91	29.42	26.99	28.9	33.0
3	26.67	30.23	33.38	26.77	28.2	31.91

As seen Table 9, the ROT for 10 s was greater than for 5 s. Nevertheless, temperature continued to increase as well even after exposure to the curing units and reached the highest temperature within a few seconds to minutes. It can also be observed that the temperatures increased by several degrees from initial curing time until the peak temperature on both curing units.

Table 10. ROT Test Results / 15 Seconds

Specimen	DEVICE 1			DEVICE 2		
	INITIAL (°C)	FINAL (°C)	PEAK (°C)	INITIAL (°C)	FINAL (°C)	PEAK (°C)
1	26.58	32.87	34.61	26.93	32.54	33.7
2	26.85	34.08	35.22	26.27	31.53	34.88
3	26.91	32.72	33.62	27.23	32.33	35.04

As the time of exposure was increased, the difference of the final and initial temperature also increased. As for 5 and 10 s exposure, the temperature continued to increase. Both devices revealed a great difference compared to the 5 s curing time and the highest temperature reached and showed a peak average which was almost similar.

Table 11. ROT Test Results / 20 Seconds

Specimen	DEVICE 1			DEVICE 2		
	INITIAL (°C)	FINAL (°C)	PEAK (°C)	INITIAL (°C)	FINAL (°C)	PEAK (°C)
1	26.58	34.3	35.44	26.82	33.72	34.9
2	26.83	35.06	35.4	26.51	31.63	33.32
3	26.82	35.22	35.82	26.83	33.69	35.82

Compared to the previous time exposures, the ROT in 20 seconds time exposure was significantly higher on the difference of initial curing time to the end of curing and on the initial curing time to the

highest temperature reached. It can also be observed that the average temperatures were similar, however, Device 1 showed higher results in this time period.

Table 12. *ROT Test Results | Average of Initial - Final - Peak*

LED LCU	Temperature (°C)	5 seconds	10 seconds	15 seconds	20 seconds
Device 1	- INITIAL	25.81	26.67	26.78	26.60
	- FINAL	26.68	29.81	33.22	34.86
	- PEAK	30.14	31.68	34.48	35.55
Device 2	- INITIAL	26.73	26.79	26.81	26.72
	- FINAL	27.33	28.23	32.13	33.01
	- PEAK	30.55	32.38	34.54	34.68

Table 12 above presents a comparison of the averages of the collected data for the initial, final, and peak temperatures for each time exposure on Device 1 and Device 2. Device 2 reached slightly higher temperatures than device 1, except for a few values, but device 1 reached the highest average peak temperature among the two LCUs.

ROT Statistical Output Final – Initial Difference

Table 13 *ROT Statistical Output | Mean Final – Initial Temp*

	Diff Final D1 5	Diff Final D2 5	Diff Final D1 10	Diff Final D2 10	Diff Final D1 15	Diff Final D2 15	Diff Final D1 20	Diff Final D2 20
N	3	3	3	3	3	3	3	3
Mean	0.867	0.607	3.14	1.45	6.44	5.32	8.26	6.29
Standard deviation	0.339	0.725	0.825	0.480	0.722	0.261	0.553	1.02

Table 14. *ROT Statistical Output | Comparison of Mean Final – Initial Temp*

	Sum of Squares	df	Mean Square	F	p
Device	9.513	1	9.5130	163.83	0.006
Residual	0.116	2	0.0581		
Time	166.984	3	55.6613	174.79	< .001
Residual	1.911	6	0.3184		
Device * Time	2.556	3	0.8519	1.11	0.417
Residual	4.621	6	0.7702		

Note. Type 3 Sums of Squares

Two-way repeated measures ANOVA showed that difference between the final and initial temperature was statistically significant, $p = 0.006$. The difference might result from the difference in manufacturing properties of both LED LCUs, particularly in terms of wavelength, which contributed to

the temperature increase during curing time. The wavelengths of the Device 1 and Device 2 LED LCUs were not the same, as shown in Table 1. Table 14 also revealed that there was a significant main effect of time on increase in temperature, $F(3,6) = 174.79$, $p < 0.001$.

Table 15. *ROT Statistical Output | Post Hoc Comparisons - Device*

Device			Mean Difference	SE	df	t	p _{tukey}
DEVICE 1	-	DEVICE 2	1.26	0.0984	2.00	12.8	0.006

The result in Table 15 verifies and supports a study linking wavelength and temperature, indicating that the shorter the wavelength, the higher the temperature elicited by the device, and vice versa (Harrington, T., 2004). With $t = 12.8$, $p = 0.006$, the temperature increase in Device 1 was much higher than Device 2.

Table 16. *ROT Statistical Output | Post Hoc Comparisons - Time*

Comparison			Mean Difference	SE	df	t	p _{tukey}
Time		Time					
5 min	-	10 sec	-1.56	0.326	6.00	-4.78	0.012
	-	15 sec	-5.15	0.326	6.00	-15.80	< .001
	-	20 sec	-6.54	0.326	6.00	-20.07	< .001
10 min	-	15 sec	-3.59	0.326	6.00	-11.01	< .001
	-	20 sec	-4.98	0.326	6.00	-15.29	< .001
15 min	-	20 sec	-1.39	0.326	6.00	-4.28	0.020

As seen in Table 16, each time period provided a significant increase in temperature compared to previous period of measurement.

Conclusion

Based on the results of this study, Device 1 and Device 2 can cure the recommended bulk fill of composite resin given that the duration for curing is appropriate. Under the parameters of this research, the researchers obtained 3.5 mm curing for 5 seconds light, 4mm for 10 seconds, 4.5mm for 15 seconds and 5mm for 20 seconds of LED LCU irradiation. Meanwhile, as the exposure time increased, the effect of both LED LCUs on the depth of the cured resin and heat emission increased as well. Furthermore, ROT from the start of curing until the end of exposure caused by Device 1 was faster than Device 2. Hence, careful consideration should be taken when curing restorations on deep cavities approximating the pulp because the deeper the bulk fill, the higher the temperature and longer the irradiation time needed, increasing the potential risk for pulpal damage.

Further tests may be done using other brands of LCU and shorter exposure time as one, two and three second LCU are gaining popularity.

Consequently, results of the study infers that the Device 1 can perform with similar efficiency to Device 2 on the same range of light output intensity, with respect to the depth of cure, and rise of temperature properties, despite the big difference in market value.

References

- [1] Assaf, C., Fahd, J.-C., & Sabbagh, J. (2020). Assessing Dental Light-curing Units' Output Using Radiometers: A Narrative Review. *Journal of International Society of Preventive & Community Dentistry*, 10(1), 1–8. https://doi.org/10.4103/jispcd.JISPCD_407_19
- [2] Badhiye, S., Chatur, B., & Wakode. (2011). Data Logger System: A Survey. 2249-6343.
- [3] Camargo, E. J. de, Moreschi, E., Baseggio, W., Cury, J. A., & Pascotto, R. C. (2009). Composite depth of cure using four polymerization techniques. *Journal of Applied Oral Science*, 17, 446–450. <https://doi.org/10.1590/S1678-77572009000500018>
- [4] Carrasco, T. G., Carrasco-Guerisoli, L. D., & Fröner, I. C. (2008). IN VITRO STUDY OF THE PULP CHAMBER TEMPERATURE RISE DURING LIGHT-ACTIVATED BLEACHING. *Journal of Applied Oral Science*, 16(5), 355–359. <https://doi.org/10.1590/S1678-77572008000500010>
- [5] Catelan, A., Araújo, L. S. N. de, Silveira, B. C. M. da, Kawano, Y., Ambrosano, G. M. B., Marchi, G. M., & Aguiar, F. H. B. (2015). Impact of the distance of light curing on the degree of conversion and microhardness of a composite resin. *Acta Odontologica Scandinavica*, 73(4), 298–301. <https://doi.org/10.3109/00016357.2014.946965>
- [6] Demarco, F., Conde, M., Cavalcanti, B., Casagrande, L., Sakai, V., & Nör, J. (2011). DENTAL PULP TISSUE ENGINEERING. *Brazilian Dental Journal*, 22(1), 3–13.
- [7] Dunne, S. M., & Millar, B. J. (2008). Effect of Distance from Curing Light Tip to Restoration Surface on Depth of Cure of Composite Resin. *Primary Dental Care*, 15(4), 147–152. <https://doi.org/10.1308/135576108785891150>
- [8] Ferracane, J. L. (2011). Resin composite—State of the art. *Dental Materials*, 27(1), 29–38. <https://doi.org/10.1016/j.dental.2010.10.020>
- [9] Gonulol, N., Ozer, S., & Tunc, E. (2015). Effect of a third-generation LED LCU on microhardness of tooth-colored restorative materials. *International Journal of Paediatric Dentistry*, 26, n/a-n/a. <https://doi.org/10.1111/ipd.12213>
- [10] Gopikrishna, V. (2013). *Sturdevant's Art and Science of Operative Dentistry—South Asian Edition*.
- [11] Lombardini, M., Chiesa, M., Scribante, A., Colombo, M., & Poggio, C. (2012). Influence of polymerization time and depth of cure of resin composites determined by Vickers hardness. *Dental Research Journal*, 9(6), 735–740.
- [12] Madhusudhana. (n.d.). *A clinical survey of the output intensity of light curing units in dental offices across Nellore urban area*. Retrieved April 24, 2022, from <https://www.srmjrd.in/article.asp?issn=0976-433X%3Byear%3D2016%3Bvolume%3D7%3Bissue%3D2%3Bspage%3D64%3Bepage%3D68%3Baulast%3DMadhusudhana>
- [13] *Meteorology 3*. (n.d.). Retrieved April 29, 2022, from <http://www.meteo.psu.edu/wjs1/Meteo3/Html/radiation.htm>
- [14] Mezomo, M. B., Abreu, J., Weber, J., Garcia, R. D. P., Figueiredo, J. A. P., & de Lima, E. M. (2017). Temperature Rises in the Pulp Chamber with Different Techniques of Orthodontic Adhesive Removal. *Iranian Endodontic Journal*, 12(3), 338–342. <https://doi.org/10.22037/iej.v12i3.16635>
- [15] Miller, M. (2009). Curing lights: What you should know before buying one. *Oral Health* December, 48–56.
- [16] Morotomi, T., Washio, A., & Kitamura, C. (2019). Current and future options for dental pulp therapy. *Japanese Dental Science Review*, 55(1), 5–11. <https://doi.org/10.1016/j.jdsr.2018.09.001>
- [17] Novin Rooz, M., & Yousefi Jordehi, A. (2020). The Effect of Shade and Thickness on the Depth of Cure of Bulk-Fill Composites with Different Viscosities. *Journal of Dentistry*, 21(4), 322–329.
- [18] Ocean Optics. (n.d.). Exposing Low-Cost Dental Curing Lights. May 18, 2016, 1.

- [19]Price, R. B., Labrie, D., Kazmi, S., Fahey, J., & Felix, C. M. (2012). Intra- and inter-brand accuracy of four dental radiometers. *Clinical Oral Investigations*, 16(3), 707–717.
- [20]Price, R. B. T. (2017). Light Curing in Dentistry. *Dental Clinics*, 61(4), 751–778. <https://doi.org/10.1016/j.cden.2017.06.008>
- [21]Price, R., Shortall, A., & Palin, W. (2013). Contemporary Issues in Light Curing. *Operative Dentistry*, 39(1), 4–14. <https://doi.org/10.2341/13-067-LIT>
- [22]RS PRO Thermocouple Wire, PFA Sheath Twisted, Type K, 7/0.2mm, 50m | RS Components. (n.d.). Retrieved May 3, 2022, from <https://ph.rs-online.com/web/p/thermocouple-extension-wire/8140055>
- [23]Rueggeberg, F. A., Giannini, M., Arrais, C. A. G., Price, R. B. T., Rueggeberg, F. A., Giannini, M., Arrais, C. A. G., & Price, R. B. T. (2017). Light curing in dentistry and clinical implications: A literature review. *Brazilian Oral Research*, 31. <https://doi.org/10.1590/1807-3107bor-2017.vol31.0061>
- [24]Santini, A., Gallegos, I. T., & Felix, C. M. (2013). Photoinitiators in dentistry: A review. *Primary Dental Journal*, 2(4), 30–33. <https://doi.org/10.1308/205016814809859563>
- [25]Shimokawa, C. A. K., Harlow, J. E., Turbino, M. L., & Price, R. B. (2016). Ability of four dental radiometers to measure the light output from nine curing lights. *Journal of Dentistry*, 54, 48–55.
- [26]Shortall, A. C., Price, R. B., MacKenzie, L., & Burke, F. J. T. (2016). Guidelines for the selection, use, and maintenance of LED light-curing units—Part 1. *British Dental Journal*, 221(8), 453–460.
- [27]Strassler, H. E. (2013). Successful light curing-not as easy as it looks. *Oral Health*, 103(7), 18–26.
- [28]Waghmare, M. B., & Chatur, D. P. N. (n.d.). *Temperature and Humidity Analysis using Data Logger of Data Acquisition System: An Approach*.

Identification of plant diversity around Tangkuban Perahu mountain Bandung

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Abstract: Indonesia one of the mega biodiversity countries of the world with 95.6 million hectares of tropical rain forest rich with biodiversity of flora and fauna. However, this diversity has not been fully utilized. Mount Tangkuban Perahu is one of the places rich in flora. The purpose of this study was to determine the diversity of plants around Mount Tangkuban Perahu and determine their use as medicinal plants. The researchers went to the mountain site and identified plants using computer software followed by taxonomical identification of the plants. The researchers identified 32 different plants divided into four categories; trees (12 types), wild plants (11 types), ornamental plants (5 types), and flower plants (4 types). Further observation is needed to identify more plants in the mountain area.

Keywords: *Mount Tangkuban Perahu, plant identification*

Research background

This research was undertaken to determine and record the diversity of plants in the Tangkuban Parahu Mountain area near the campus of Universitas Advent Indonesia (UAI). Tangkuban Parahu mountain is a volcano which erupted years ago and recently erupted in 2019. The area around the mountain has fertile soil that can grow many diverse plants including fruits and vegetables.

With regards to worldwide biodiversity, Indonesia has 10% of the flowers, 12% of mammals, 17% of birds, and 25% of different of fish. This flora and fauna are spread throughout the country.

The Indonesia Research Institute is serious in conserving the diversity of flora and fauna in Indonesia and this research will help the conservation of plants around the mountain near the UAI campus through the identification of the different plants, determination of their distribution around the mountain and establishing the medicinal and other benefit of the plants as well, especially as people increasingly cut trees for their livelihoods and there are businesses flourishing around the foot of the mountain that endanger the diversity of plants. The study area, located to the north of Bandung city, is important for water conservation for the city population thus the government is protecting the area to maintain its natural habitat with trees and other plants so that they can conserve water.

With many business entities building in the area and unlimited spread of development endangering the natural habitat, the conservation program is urgently needed. Our work to determine the identity and diversity of flora in the area may convince the government of the importance of conservation efforts that need to be done as soon as possible.

The purpose of the research

The researchers aim to identify and name the different kinds of plants that grow in an area around Tangkuban Parahu Mountain and describe their morphology, habitat, and benefits for health purposes.

The location of the research

The research site is in the designated area around Tangkuban Parahu Mountain, near the UAI campus.

Research Methodology

Photographing of the plants at the research site.

Identification of plants using Google Lens software. The identification included the local name, scientific name, morphology of root, stem, leaf, flower, fruit, the habitat, and the benefit of the plant.

Taxonomic identification of the plants by using plantamor.com software.

Categorizing the plants into ornamental plants, trees, and herbs.

Results

The researchers identified 32 different kinds of plants which were divided into ornamental leaves (5), ornamental flowers (4), trees (12), and herbs (11).

Ornamental leaves

No	Family	Species	Benefit or Use
1	Bromeliaceae	<i>Tillandsia usneoides</i>	Cancer prevention
2	Araceae	<i>Syngonium podhophyllum</i>	Decoration
3	Commelinaceae	<i>Tradescantia pallida</i>	Decoration
4	Malvalceae	<i>Sida rhombifolia</i> L	For Hypertension
5	Nyctaginaceae	<i>Pisonia alba</i>	Asthma treatment

Ornamental flowers

No	Family	Species	Benefit or Use
1	Euphorbiaceae	<i>Rinicus communis</i>	Diabetes treatment
2	Orchidaceae	<i>Spathoglottis picata</i>	Blood circulation enhancement
3	Arales	<i>Zantedeschia aethiopica</i>	Decoration
4	Clusiaceae	<i>Hypericum androsaemum</i>	Decoration

Trees

No	Family	Species	Benefit or Use
1	Araucariaceae	<i>Agatis dammara</i>	Glue
2	Sterculiaceae	<i>Theobroma cacao</i> L	Food
3	Meliaceae	<i>Azadirachta indica</i>	Cancer prevention
4	Poaceae	<i>Bambusa multiplex</i>	Delicacy
5	Moraceae	<i>Broussonetia papyrifera</i>	To make paper
6	Combretaceae	<i>Terminalia mantaly</i>	Pollution control
7	Oleaceae	<i>Syringa reticulata</i>	Decoration
8	Ebanaceae	<i>Diospyros kaki</i> Lf	Vitamin A
9	Myrtaceae	<i>Syzygium polyanthum</i>	Delicacy
10	Myrtaceae	<i>Syzygium cymosum</i>	Coloring
11	Myrtaceae	<i>Eugenia uniflora</i>	Hypertension treatment
12	Moraceae	<i>Morus alba</i>	Malaria treatment

Herbs

No	Family	Species	Benefit
1	Asteraceae	<i>Agerantina riparia</i>	Diabetes medication
2	Solaceae	<i>Brugmansia suaveolens</i>	Cancer prevention
3	Araceae	<i>Xanthosa sagittifolium</i>	Good Digestion
4	Asteraceae	<i>Tithonia diversifolia</i>	Treating Diarrhea
5	Asteraceae	<i>Synedrella nodiflora</i>	Alleviating pain
6	Melastomataceae	<i>Tibouchina urvilleana</i>	Decoration
7	Acanthaceae	<i>Thunbergia alata</i>	Decoration
8	Asteraceae	<i>Vernonia amygdalina</i>	For malaria treatment
9	Acanthaceae	<i>Ruellia nudiflora</i>	For cough
10	Urticaceae	<i>Pipturus albidus</i>	Enhancing energy
11	Rubiaceae	<i>Hamelia patens</i>	Antibacterial

Examples of plants

Ricinus communis*Rinicus communis***Taxonomy**

Kingdom	Plantae
Subkingdom	Tracheobionta
Superdivision	Spermatophyta
Division	Magnoliophyta
Class	Magnoliopsida
Subclass	Rosidae
Order	Euphorbiales
Family	Euphorbiaceae
Genus:	<i>Ricinus</i>
Species:	<i>Ricinus communis</i>
Local name	Jarak Kepyar
Foreign name	Castor Bean

Morphology**A. Root**

Castor plants belong to the class of split-seeded plants, which have a fairly deep taproot root, with lateral roots widening to the sides and quite a lot of root hairs.

B. Trunk

The bark is finely textured, with a light green to dark green color, and pink to brownish-red. The surface of the stem generally has a waxy layer; some stems are thin and some are thick. The trunk stands upright, booked, and each book is bounded by bracelets where there are growing points of leaves and branches on each bracelet. The trunk is woody, soft and hollow in the middle. The diameter of the stem ranges from 3-5 cm, with a plant height between 1-4 meters.

C. Leaves

Creeping-shaped leaves with a range in number of strands of 5-11; leaves have jagged edges and shallow to deep grooves. They are light green to dark green while some are reddish and glossy. Petioles are long and strong, with a length of 17-40 cm.

D. Flower

The composition varies greatly. In one plant there are male and female flowers. The flower does not have corolla leaves but has three to five petals. Female flowers make up 30-50% and are located at the top of the flower bunch, while the male flower make up 50-70% and is located at the bottom of the flower bunch. Male flowers have stamens equal to the number of leaves of the flower decoration. The female flower has a pistil consisting of three fruit leaves, with three pistil stalks that are free or attached. The head of the pistil is forked in three with a pink or red tint.

E. Fruit

After pollination occurs, the fruit will enlarge and develop into a round oblong shape. Young fruits are light green to dark green color. Some are prickly while others are not and when ripe or old have a gray color similar to the soil. There are three parts to each capsule with a seed in each section. The surface of the young skin has a wax coating, and also there are those that do not have a wax coating. Old or ripe fruits are prone to cracking or crushing, but some are difficult to break.

F. Seed

Castor bean kepyar is oval with a length of several mm to 2 cm. Seeds have a light brown, dark brown, red, and black color. There are certain spots or motifs, depending on the cultivar.

Habitat

The plant is found among riverside weeds (i.e. riparian areas), dry riverbeds, waterways, roadsides, railways, disturbed sites, meadows, gardens, neglected suburban areas and other waste areas in tropical, sub-tropical, temperate and sometimes also semi-arid environments. The area altitude is less than 500 meters above sea level and has rainfall ranging from 300 to 1100 mm per year.

Cultivation**A. Land Preparation**

The land for cultivating must be prepared in advance. Remove all weeds or shrubs around the planting place and make a hole of approximately 30 x 30 x 30 cm. Usually, plants at a distance from one another will be about 200 cm apart so that they can grow well.

B. Castor Plant Nursery

Seeding for this plant can be from cuttings of stems or seeds or seedlings. Seeding with the use of seeds is carried out by introducing seeds into a polybag medium that has been filled with soil and fertilizer. Cuttings should be from trees at least 5 years old with a straight, unbent trunk. Planting

media is made of soil, sand, and fertilizer mixed in a ratio of 2: 1: 1 in the polybag medium. The castor cuttings are plugged in an upright position and the stems are securely deposited by the ground.

C. Planting Castor Plants

Seedlings are transferred to the planting field at about 2 months. Transplanted seedlings, make must be healthy and disease free. Seedlings should be regularly watered after transfer.

D. Weed Countermeasures

Weeds are managed manually or using herbicides.

E. Applying Fertilizer

Fertilizer is applied in small trenches of 3 to 5 cm dug around the plant.

F. Harvesting

Castor plants can be harvested when they start flowering, at 3 to 4 months, while the fruit will only grow at the age of 4 to 5 years. Harvesting this plant is easily done by shaking the tree until the fruit falls off. Picking individual fruits can prevent damage to the fruit.

Benefits

The plant is commonly used to stabilize blood sugar levels, repair liver damage, in eye drops, to treat constipation, for canker sores, and in toothache remedies. The seeds of this plant are also used as a source of energy primarily as castor oil.

Pisonia alba



Pisonia alba

Taxonomy

Kingdom	Plantae
Subkingdom	Tracheobionta
Superdivision	Spermatophyta
Division	Magnoliophyta
Class	Magnoliopsida
Subclass	Caryophyllidae
Ordo	Caryophyllales
Family	Nyctaginaceae
Genus	Pisonia
Species	<i>Pisonia alba</i>
Local name	Kol Banda

Morphology

These plants are shrubs or annual small trees with a height of up to 5-7 meters are thought to be native to Asia and New Guinea. This plant is found in Indonesia from lowlands to mountainous areas at 5-1,000 meters above sea level. Kol banda grows in open ground with full sun and a soil medium that has sufficient moisture content. The plant has a woody, branched rounded stem. Kol banda leaves are single ovate, stemmed, and have a rounded base, a tapered tip, and flat edge. Leaves are light yellow or yellow color, green spot, and pinnate with a length of 10-25 cm and a width of 5-12 cm. Kol banda has a tap root system and tubular compound flowers that are white.

Habitat

This plant is widespread in Indonesia from lowlands to mountainous areas, which are 5-1,000 meters above sea level. Kol banda grows in open ground with full sun all day and a soil medium that has sufficient moisture content.

Culture**Seeding**

Seeding can be done by planting grafts or stem cuttings. Stem selection is very important. Choose good strong woody, snugly sized, and pest and disease-free stem.

Planting

Plant seedlings in a medium of soil, sand, and manure/compost (1:1:1). Plant seedlings 20-30 cm deep so that the root is strong and the plant does not collapse easily. Heap and compact the soil around the seedlings.

Treatment

The treatment is only by conducting periodic scara watering when the flower begins to look wilted and dry. Prune, usurp and weed when necessary. Apply fertilizer once every two months.

Benefits

The plant has anti-inflammatory and anti-bacterial properties. The plant is commonly used as a folk remedy to treat asthma, swollen feet, ulcers, fish eyes, and frequent urination. Cabbage banda leaves are also used as an antioxidant, analgesic, anti-inflammatory, anticarcinogenic, antirheumatic, diuretic and antidiabetic.

Hamelia patens



Hamelia patens

Taxonomy

Kingdom	Plantae
Subkingdom	Tracheobionta
Superdivision	Spermatophyta
Division	Magnoliophyta
Class	Magnoliopsida
Subclass	Asteridae
Ordo	Rubiales
Family	Rubiaceae
Genus	Hamelia
Species	<i>Hamelia patens</i>
Local name	Semak Api
Foreign name	Scarlet bush

Morphology**Leaf**

Leaves are usually arranged in 3 circles but may sometimes be up to 7. Young leaves are covered with wool-like red hairs that disappear as the leaves mature. The interpetiolar stilt is triangular in shape and falls at an early stage (kadus).

Flower

The plant is freely flowering. Orange-red flowers are arranged in cymes, clusters of flowers that occur at the ends of branched (terminal) flower stalks. Each flower has small, triangular lobes on a narrow tube (2.5 - 3.8 cm long) with a swollen base.

Fruit

The fleshy fruits are black with an oval to round shape and approximately 1.3 cm long. The fruits are yellowish to red at first, and ripen to dark blue - black.

Habitat

The Scarlet bush (also known as Fire Bush) is a flowering ornamental shrub plant in the Rubiaceae family native to Florida, Central America and Latin America. The plant is tropical and subtropical, so it can live and thrive in Indonesia.

Culture

Although this shrub can tolerate shade, it produces fewer flowers than in full sun. It is quite drought tolerant but grows best under regular watering.

Benefits

All parts of the plant have medicinal properties and are used to treat a wide variety of diseases. It also has anti-bacterial, antifungal and anti-inflammatory properties. Decoctions from leaves, stems and flowers are drunk to smooth menstrual cramps, or applied externally to treat skin problems such as wounds, rashes, burns and insect bites.

References

- [1] Aeni, S. N. (2021, August 27), *Pohon Ketapang: Klasifikasi, Habitat, Ciri-ciri, dan Manfaatnya*
- [2] Agrotek, (2020, May 22), *Klasifikasi dan Morfologi Tanaman Kesemek*.
- [3] Andini, W. C. (2020, Desember 18), *10 Khasiat Menakutkan Kakao Bagi Kesehatan Tubuh*
- [4] Azmi, U. (2020, May 7). *Panduan Pembibitan Dan Penanaman Pohon Ketapang Kencana*
- [5] Budhiman, I. (2020, Oktober 7). *Mengenal Tanaman Unik Jenggol Musa, Karakteristik, Perawatan, Harga, Manfaat*
- [6] Cyberxt. (2020, Desember 3). *Budidaya Tanaman Obat: Salam*
- [7] Dara, T. T. (2020, January 12). *6 Fakta Menarik dari Bunga Liliac*

- [8] Djajadiningrat, S. T., Hendriyani, Y., & Famiola, M. (2011). *Ekonomi Hijau*
- [9] Djatmiko, W. (2021, March 21). *Pertanianku.com*
- [10] Eko, M. (2021, September 14). *Tillandsia usneoides, Sang Jenggol Musa, Tanaman Hias*
- [11] Enderwati. (2005, September 30). *KEANEKARAGAMAN HAYATI DAN KONSERVASINYA DI INDONESIA*. Retrieved from <http://enderwati.blogspot.com/2005/09/>
- [12] Faidi, d. R. (2022, January 25). *Ini Cara Mengolah Daun Sidaguri untuk Meredakan Asam Urat*.
- [13] Forester, P. (2020, April 20). *Tanaman Hias Berbunga Indah, ANGEL'S TRUMPET*.
- [14] Hutomo, I. P., Mahfudz, & Laude, S. (2015). Jurnal, Skripsi. *PENGARUH PUPUK HIJAU Tithonia diversifolia TERHADAP*, 476.
- [15] id.hasenblatt.com. (n.d.). *Informasi Lilac Jepang: Apa itu Pohon Lilac Jepang*.
- [16] Idnmedis, T. R. (n.d.). *Jotang Kuda : Manfaat-Efek Samping dan Cara Penggunaan*.
- [17] Indonesia, Y. K. (2015, Juny 30). *Hareneus | Rubus moluccanus L.*
- [18] Indra, K. (2016, November 27). *Klasifikasi Dan Morfologi Synedrella nodiflora L.*
- [19] Iqvia. (2019, April 2). *Broussonetia Papyrifera*. Retrieved from [Polen.com: https://www.pollen.com/research/genus/broussonetia](https://www.pollen.com/research/genus/broussonetia)
- [20] Khairi, Y. A. (2022, March 10). *Tanaman Kirinyuh, Gulma yang Populer sebagai Obat Herbal*.
- [21] Kharisma, A. S. (n.d.). Skripsi. *EFEKTIVITAS EKSTRAK DAUN LEGETAN (Synedrella nodiflora) TERHADAP MORTALITAS LARVA Anopheles sp. SEBAGAI SUMBER BELAJAR BIOLOG*.
- [22] Kurniawan, F. (n.d.). *Klasifikasi dan Morfologi Tanaman Kesemek*.
- [23] Lutfi, N. (n.d.). *Tanaman Ini Tumbuh Indah Ke Bawah dan Punya Efek yang Mengejutkan*.
- [24] Maretni, S., Mukarlina, & Turnip, M. (n.d.). Journal PROTOBINOT. *Jenis-Jenis Tumbuhan Talas (Araceae) di Kecamatan Rasau Jaya*, 48.
- [25] Maryani, S. (2018, July 21). Skripsi. *KEANEKARAGAMAN TUMBUHAN HERBA DI DAERAH ALIRAN*.

Effects of Mouthwashes on the Surface Hardness of Nanohybrid Composites

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Abstract: Surface hardness is an essential parameter for the long-term durability of composite restorative material in the oral cavity. It is influenced by the intrinsic characteristics of the material and the environment to which it is exposed. This study is an actual quantitative experiment that uses a pretest and a post-test method. It compared the effects of alcohol-based, non-alcohol-based, and organic mouthwashes on the surface hardness of two brands of nanohybrid composites. The composites were packed into acrylic molds. The baseline hardness of each mold was taken and recorded using a Vickers Microhardness Tester at 9.807 N (1 kgf) with 10 s dwelling time. Samples were immersed into three treatments (alcohol-based, non-alcohol-based, and organic mouthwashes) and control (distilled water) for 60 cycles. Each sample's Vickers Pyramid Number (HV) was taken after the 60th cycle. Collected data were subjected to mean, standard deviation, and ANOVA tests. The HV of both nanohybrid composite brands presented statistically insignificant differences before and after the 60th cycle in all treatments. It was also observed that a decrease in HV was present in all initial baselines. Therefore, the results show that the surface hardness of nanohybrid composites decreased in all treatments. The conclusion is that mouthwashes may cause adverse effects on composite restoration in the long run.

Keywords: *mouthwash, nanohybrid composites, surface hardness, vickers hardness test*

Introduction and Literature Review

Much progress has been made with dental restorative materials as the demand for cosmetic requirements is growing. Resin composite has been one of the significant advances in restorative dentistry and is an important discovery in the quest for an ideal aesthetic material (Heymann et al., 2013). However, the length of life and the period of the materials staying in good quality inside the oral cavity are paramount in deciding the best material (Dash & Kallepalli, 2015). Various composite materials are now available in the market, claiming excellent and improved quality for restorative treatment. Nevertheless, the materials' integrity is a matter of concern when internal and external factors are looked at. Surface hardness is one of the important parameters considered in restorative materials to maintain good quality inside the oral cavity.

Armas-Vega et al. (2019) revealed that the performance of restorative materials is always dependent on the environment in which they are placed and worked on. The daily use of mouthwash is one of the most straightforward methods many patients include in their home care practice without any problem (Osso & Kanai, 2013). Mouthwashes have been frequently used universally without regard to their possible adverse effects. However, excessive and prolonged use can consequently increase surface disintegration, decreasing the surface hardness of composite biomaterials (Dash & Kallepalli, 2015).

Objectives of the Study

The study compared the effects of alcohol-based, non-alcohol-based and organic mouthwashes on the surface hardness of two different brands of nanohybrid composites.

To determine the baseline surface hardness of nanohybrid composites using Vickers microhardness tester (ASTM E-384).

To identify the difference in the surface hardness of Brand A and Brand B nanohybrid composite before and after 60 cycles of immersion in alcohol-based mouthwash, non-alcohol-based, organic mouthwash, and distilled water.

To compare the difference between the surface hardness of Brand A and Brand B nanohybrid composites before and after 60 cycles of immersion in:

Hypotheses

There is no significant difference in the surface hardness of Brand A and Brand B nanohybrid composites before 60 cycles of immersion in alcohol-based mouthwash, non-alcohol-based mouthwash, organic mouthwash or distilled water.

There is no significant difference in the surface hardness of Brand A and Brand B nanohybrid composites after 60 cycles of immersion in alcohol-based mouthwash, non-alcohol-based mouthwash, organic mouthwash or distilled.

There is no significant difference in the surface hardness between Brand A and Brand B nanohybrid composites after 60 cycles of immersion in alcohol-based mouthwash, non-alcohol-based mouthwash, organic mouthwash or distilled

Significance of the Study

This study will give a significant contribution to the following:

School and Administration. The study will encourage schools and administrators to provide an environment of learning for students to conduct research that will have a valid impact on society.

Dentists and Dental Students. The result of the study will give dentists and dental students an evidence-based review of dental nanohybrid composite's quality for a better choice of restorative materials, and mouthwashes' effectiveness for better recommendation to the patient.

Manufacturer of Restorative Materials and Mouthwashes. The result of the study will assist the manufacturers of the dental composite to improve the quality and strength of their materials. The result of the study will help the manufacturers of mouthwashes to carefully choose the best ingredients of their product to not have an adverse effect on restorative materials. In turn, both manufacturers can work hand in hand in giving and providing dental care to the patients.

Community: The community will be educated about the possible negative effects of unprescribed and improper use of mouthwash, especially to their composite restoration, which would encourage them to consult their dentist for the recommendation of the best mouthwash for their specific and individual cases.

Researchers. The result of the study will give baseline data which can be used as a reference for further study.

Review of Literature

A composite is a tooth-colored direct restorative material that is generally utilized and accepted worldwide (Zimmerli et al., 2010). Composite is a composition of filler particles surrounded by a solid matrix which secure the filler particles intact. The filler particles have hard, pebble-like components with varying coarseness and shapes. The matrix material is generally a paste, powder, or liquid which hardens upon activation of catalyst, water, or other solvents.

Physical Properties of Dental Composite

Composite materials greatly rely on the filler contents for their efficiency. Fillers are inorganic or organic resin particles designed to make composite material durable, have a slower thermal expansion rate, reduce polymerization shrinkage, and decrease the swelling caused by water sorption.

Fillers are the dispersed phase of composite resins (Ramachandran, 2013). The common compositions of fillers are silica nanoparticles and nanoclusters of silica and zirconia. The smaller particles make the composite more polishable and maintain its polish than bigger particles. Higher filler loading supplies the mechanical properties of composites with strength. Four groups classify composites: Microfills, Nanofills, Microhybrids, and Nanohybrids (Minnesota Mining & Manufacturing [3M] ESPE, 2011).

Microfills are made up of small particles ranging from 40 to 50nm (Alzraikat et al., 2018), are known for their excellent polish effect and retention. However, having those small particles makes it impossible to attain a higher filler loading strength if used in a large surface area. Thus, microfills only suit low load-bearing areas, such as the anterior application. Nanofills are a special combination of nanosize particles and nanoclusters ranging from 1-100nm (Alzraikat et al., 2018). Microhybrid use different particle sizes, which consist of a small size range of large particles ranging from 0.6 to 1 μ m+ 40nm (Alzraikat et al., 2018). Microhybrids are better in polish but consequently suffer from low particle density primarily because of the small size of the largest particle in the mixture. Thus, microhybrids are not recommended in posterior restorations. Nonetheless, microhybrids mechanical properties are strong enough to rebuild the incisal edges of anterior teeth.

Clinical Performance of Nanohybrid Composite

Many factors affect the success or failure of an existing restoration. This encompasses the clinical steps from applying an adhesive material to packing restorative material and even curing the material. Every step should be done with caution, considering the manufacturers' recommendations. Besides, there are many things to consider putting the effects of an individual's oral environment to a minimum on the restoration (Velo et al., 2016).

3M Z250XT Nanohybrid Composite is a universal nanohybrid composite for anterior and posterior restoration. It offers good handling, versatility, ease of use, strong mechanical properties, and good esthetics suitable for anterior and posterior restorations (Askikfgajer et al., 2011).

Ivoclar Tetric N-Ceram Nanohybrid Composite is a nanohybrid composite with excellent mechanical properties, low wear, high strength, and low shrinkage. It is suitable for the esthetic restoration of teeth both in the anterior and posterior (Ivoclar Vivadent, 2019).

Mouthwash and Its Importance

"A mouthwash is a medicated liquid held in the mouth and swished by the action of perioral musculature to eliminate the oral pathogens" (Manipal et al., 2016, p. 81). An effective mouthwash should not only be bactericidal or bacteriostatic but also have a level of substantivity. Substantivity is a property that ensures the mouthwash continues its affect beyond the time it is swished in the mouth. This is necessary because saliva and fluid intake dilute and diminish the efficacy of mouthwash in a matter of minutes (Van Zyl & Van Heerden, 2010).

Mouth rinsing with antimicrobial products is a method to control dental plaque build-up. Mouthwashes are used as an adjunct management to control the development and progression of periodontal diseases and dental caries. Mouthwashes are dispensed over the counter and often used even without a prescription from a health professional. These mouthwashes usually contain water, antimicrobial agents, salts, and alcohol. Alcohol in mouthwashes is used as a solvent, taste enhancer,

and an antiseptic agent. Concerns have been raised regarding mouthwashes containing alcohol as it may soften the tooth-colored restorative materials (Dash & Kallepalli, 2015).

Effects of the Major Components Present in Mouthwashes

Active ingredients in mouthwash comprise the following: cetylpyridinium chloride, chlorhexidine, essential oils, fluoride, and peroxide (American Dental Association [ADA], 2017). Generally, mouthwashes contain varying concentrations of water, antimicrobial agents, salts, preservatives, and alcohol. The concentration of these substances may vary, affecting the mouthwash's pH (Jyothi et al., 2012). Some side effects of commercially available mouthwashes, such as taste dysfunction, tooth staining, xerostomia, and discoloration, are very common. Alcohol is known to cause softening of the composite surface and is still subject to debate (Leal et al., 2017). However, some researchers have determined that alcohol-based and non-alcohol-based mouthwashes can decrease the hardness of restorative materials (Fernandez et al., 2014).

Alcohol-based mouthwashes are a concern as they may soften tooth-colored restorative products. The concentration of alcohol directly influences one of the material's physical properties, i.e. hardness. Alcohol can enter the polymer chain and thus cause unreacted monomers to be released. The low pH of alcohol mouthwashes catalyzes the ester groups from dimethacrylate monomers present in the composite, destroying the polymer chain, then the hydrolytic degradation of the composite material. Alcohol-based mouthwashes showed a greater reduction in nano-composite microhardness values relative to non-alcohol-based mouthwashes (Khan et al., 2015). This softening effect was linked to the amount of alcohol in mouthwashes. Ethanol causes the surface of the resin composite to soften by eliminating the polymer structure as unreacted monomers, oligomers, and linear polymers. It can also present an opener structure to the polymer, reducing its physical properties and increasing wear. Ethanol in mouthwashes initially lowers the surface hardness of the dental resin composite but then approaches a plateau by the second week (Fernandez et al., 2014).

It is recommended to use natural products to lessen the use of chemicals that can cause harm to humans and the environment. Many chemicals in commercially available mouthwashes cause multiple adverse effects. Those include water, ethanol, dyes, surface-active agents, zinc chloride/acetate, aluminum potassium sulfate (astringent) and phenolic compounds, quaternary ammonium compounds and essential oils such as peppermint oil (as antibacterial agents). Essential oils are efficient for gingivitis prevention and dental plaque reduction and are deemed safe for human use by the Food and Drug Administration (FDA). Essential oils can destroy the cell membrane and inhibit bacterial enzymatic activity; they can also prevent bacteria adherence to existing biofilm and reduce the multiplication of bacteria. Furthermore, essential oils have a bactericidal effect, resulting in 78.7% of bacteria being nonvital after exposure for 60 seconds (Luis et al., 2017).

Effects on Composite Restoration

Dash and Kallepalli (2015) showed that regardless of the alcohol content, mouthwashes resulted in a substantial decline in the microhardness of the tested materials from the baseline data. Gürkan et al. (Gürkan et al. 1997 as cited in Rajasekhar et al. 2019) related that alcohol-based and non-alcohol-based mouthwashes affect the composites. However, they reasoned that mouthwashes with alcohol do not affect the composites' microhardness.

On the other hand, studies of Weiner et al. (Weiner et al. 1997 as cited in Thirunavakarasu & Nasim 2019) have shown that composite soaked in alcohol-containing mouthwashes reduced the hardness of composite considerably compared to the ones soaked in non-alcohol-containing mouthwashes. In the same way, Penugonda et al. (Penugonda et al. 1994 as cited in Jyothi et al. 2012) reported that mouthwash with alcohol content is directly related to the softening of the material, hence affecting the hardness of the composite.

Effects on Nanohybrid Composite

The method of testing microhardness using Vicker is known as a microhardness test. Microhardness test technically refers to an indentation with loads no more than 1 kgf done steadily. Optical measurement systems are the ones utilized in the Vickers method. The study will use the ISO-recommended ASTM E-384, which uses a diamond indenter with a specific light load range (Figure 1). Indentations are estimated and changed into a hardness value. Vickers microhardness value is represented with HV, which means "Hardness according to Vickers" which may also be called Vickers Hardness Number (VHN) (Oxford Dictionary of Dentistry, 2016). The test used load in kgf with a dwell time of 10 to 15 s. The larger the indent left by the indenter, the softer the tested material (Ametek, n.d.).

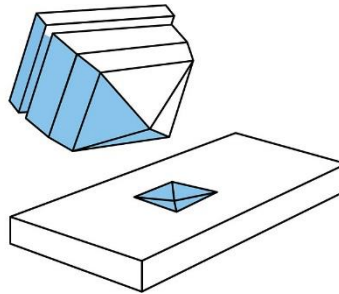


Figure 1. Vickers microhardness test indentation (Ametek, n.d.).

Vickers microhardness test is very useful in different applications, such as testing small parts or small areas that measure the permanent depth of indentation (Figure 1). Some materials that can be tested are metals, ceramics, and composites. However, the specimens should have an even surface layer to allow constant and consistent indentation and shape to facilitate accurate dimensions (Ametek, n.d.). Samples are measured one by one on the tester stage. Positioning, focusing, and test & load selection are all adjusted in the computer. Results are immediately recorded on the computer (Ametek, n.d.). Vickers microhardness test is a test that utilizes a right pyramid with a square base indenter in measuring the microhardness of composite. Reading is taken by making use of 50 g load which lasts for 15 s. Values of surface hardness are reflected in Vickers hardness, where $1 \text{ HV} = 1.854 \text{ P/d}^2$ (P symbolizes the indentation load while d is the diagonal length) (Ametek, n.d.).

Vickers microhardness test has been the most common test used by modern researchers in determining the hardness of composite materials. Al-Samadani (2016), in his research about the effects of preventive agents in the surface hardness of composite restorative materials, used Vickers in getting the microhardness value of the composites. Fernandez et al. (2014) also used the Vickers microhardness tester to obtain measurements of the composite specimens and determine the composites' hardness response under various types of mouthwash. In addition, Khan et al. (2015) ascertained the impact of mouthwashes on nano-composite resin surface hardness using the Vickers microhardness test.

Methodology

Research Design

The study is a quantitative true experiment that uses pretest and a post-test. The research design establishes the cause-effect relationship among the group of variables of the research, wherein it tries to prove or disprove the hypotheses using statistical analysis. Hence, the researchers chose this research design (Table 1) to come up with an accurate result.

Table 1. Research Design

Factors	Treatments (T)	Replications (R)
Brand A	Alcohol-based mouthwash (T ₁)	T ₁ R ₁ , T ₁ R ₂ , T ₁ R ₃ , T ₁ R ₄ , T ₁ R ₅
	Non-alcohol-based mouthwash (T ₂)	T ₂ R ₁ , T ₂ R ₂ , T ₂ R ₃ , T ₂ R ₄ , T ₂ R ₅
	Organic mouthwash (T ₃)	T ₃ R ₁ , T ₃ R ₂ , T ₃ R ₃ , T ₃ R ₄ , T ₃ R ₅
	Controlled (T ₄)	T ₄ R ₁ , T ₄ R ₂ , T ₄ R ₃ , T ₄ R ₄ , T ₄ R ₅
Brand B	Alcohol-based mouthwash (T ₁)	T ₁ R ₁ , T ₁ R ₂ , T ₁ R ₃ , T ₁ R ₄ , T ₁ R ₅
	Non-alcohol-based mouthwash (T ₂)	T ₂ R ₁ , T ₂ R ₂ , T ₂ R ₃ , T ₂ R ₄ , T ₂ R ₅
	Organic mouthwash (T ₃)	T ₃ R ₁ , T ₃ R ₂ , T ₃ R ₃ , T ₃ R ₄ , T ₃ R ₅
	Controlled (T ₄)	T ₄ R ₁ , T ₄ R ₂ , T ₄ R ₃ , T ₄ R ₄ , T ₄ R ₅

Table 1 shows the research design used in the study. Two different brands of nanohybrid composite: Brand A and Brand B, were the two factors considered. Each factor was given four treatments: alcohol-based, non-alcohol-based, organic, and controlled treatment (distilled water). Each treatment was replicated five times.

Materials and Methods

Materials needed are restorative materials of brand A nanohybrid composite and brand B nanohybrid composite, mouthwashes, alcohol-based mouthwash, non-alcohol-based mouthwash, organic mouthwash, Vickers microhardness tester.

Using Vicker's hardness test method, methods were used to determine the baseline hardness of nanohybrid composites. 40 samples of specimens were prepared using customized acrylic molds with the dimensions of 3 cm x 2 cm x 1 cm. The center of the mold was created by inserting a metal rod making a 5 mm diameter and 5 mm depth well. Rod was marked at 5 mm height from the tip to ensure correct depth. Samples were incrementally packed into the mold and flattened with celluloid strip. Samples were then polymerized using a pen type light cure unit (Xlite3 w/ Broad Spectral LED, 1,100 mW/cm²) for 40 s. Samples were stored in a light-proof container immersed in distilled water for 24 h at room temperature to simulate the oral cavity.

Baseline hardness was measured and data was recorded. Force was set to 9.807 N (1kgf). Dwelling time was 10 s. Identification of the differences in the surface hardness of Brand A and Brand B nanohybrid composite immersed in 60 cycles of alcohol-based mouthwash, non-alcohol-based mouthwash, organic mouthwash and distilled water.

Five samples from Brand A and Brand B nanohybrid composites were immersed in alcohol-based mouthwash, another five in non-alcohol-based mouthwash, another five in organic mouthwash, and another five in distilled water for 30 s as recommended by mouthwashes manufacturers. Samples were washed thoroughly and dried after each immersion. This procedure was repeated 60 times and values checked. The 60 cycles correspond to twice-daily use of mouthwash in one month. Five replications were performed and data analysed.

Table 2 shows how the data was collected. Two columns are indicating the two different brands of nanohybrid composites and four rows showing the four treatments, which are alcohol-based, non-alcohol-based, organic, and the controlled group, that were used in the study. Each brand of the composite was divided into two sub-columns which are indicated for the surface hardness measurement of each sample before and after the treatment.

Table 2. *Collection of Data*

Mouthwashes	Brand A		Brand B	
	Baseline	60 cycles	Baseline	60 cycles
Alcohol-based				
Non-alcohol based				
Organic				
Control				

Analysis of Data

The mean and standard deviation (*SD*) of the surface hardness of the two brands of nanohybrid composites at the baseline and after 60 cycles were calculated. Analysis of Variance (ANOVA) test was used to measure intragroup comparison and a *t*-test was used to measure intergroup comparison. Significant differences were considered at $p < 0.0$

Findings and Discussion

Table 3 shows the surface hardness of the two brands of nanohybrid composites before and after the 60 cycles of immersion in the different mouthwashes (T_1 , T_2 , and T_3) and distilled water (T_4). The 60 cycles of treatments were equivalent to 30 s twice-daily use for one month of mouthwash. The experiment was replicated five times (R_1 , R_2 , R_3 , R_4 , and R_5).

The baseline HV of Brand A nanohybrid composites ranged from 46.1 to 62.1. After 60 cycles of immersion in the different treatments, there was a decrease in the baseline HV of Brand A. Alcohol-based mouthwash had the lowest value at 38.4; non-alcohol-based mouthwash presented its lowest at 44.4, and the organic mouthwash presented its lowest at 47.3. The controlled group also manifested a decreased HV with its lowest value at 42.9.

The table also shows the baseline HV of Brand B nanohybrid composites, which ranged from 76.0 to 96.6. After the 60 cycles of immersion in the different treatments, there was also a decrease in the baseline HV of Brand B. Alcohol-based mouthwash presented its lowest at 71.1; non-alcohol-based mouthwash presented its lowest at 84.1, and the organic mouthwash presented its lowest at 80.3. The controlled group also manifested a decreased HV with its lowest value at 73.1.

Moreover, the table reveals that the composite's surface hardness decreased after immersion in all the treatments except for T_1R_3 and T_4R_5 of Brand B, which showed increased HV value and T_3R_3 of brand A which maintained HV value.

Table 3. Surface Hardness of Brand A and Brand B Nanohybrid Composites Before and After the 60 Cycles in the Treatments

Mouthwashes (Treatments)	Replications	Brand A		Brand B	
		Baseline (HV)	60 cycles (HV)	Baseline (HV)	60 cycles (HV)
Alcohol-based (T ₁)	R ₁	54.0	52.9	85.8	85.4
	R ₂	50.6	49.4	91.5	88.1
	R ₃	55.6	38.4	89.1	89.5
	R ₄	48.1	47.4	96.1	91.5
	R ₅	52.9	50.6	76.0	71.1
Non-alcohol based (T ₂)	R ₁	52.9	51.6	91.0	89.5
	R ₂	46.1	44.4	90.0	86.7
	R ₃	50.6	49.0	94.0	84.1
	R ₄	55.6	51.9	96.6	93.0
	R ₅	54.3	50.8	91.5	88.1
Organic (T ₃)	R ₁	52.5	51.9	95.5	95.0
	R ₂	54.3	54.0	87.2	85.0
	R ₃	56.6	56.6	84.5	81.1
	R ₄	62.1	47.7	92.0	80.3
	R ₅	49.6	47.3	85.4	81.9
Control (T ₄)	R ₁	49.4	42.9	90.5	86.3
	R ₂	55.4	54.7	76.4	73.1
	R ₃	51.9	49.2	86.7	85.4
	R ₄	52.7	52.1	93.5	91.5
	R ₅	49.6	49.0	89.5	90.5

Table 4 shows the mean and *SD* of Brand A nanohybrid composites before and after the treatments. The table shows that the mean value and *SD* of the composite's surface hardness decreased after immersion in all the treatments.

Table 4. Mean and *SD* value of Brand A Nanohybrid Composites Before and After the Treatments

Treatment	Baseline		60 cycles		VI
	Mean	<i>SD</i>	Mean	<i>SD</i>	
Brand A					
T1	52.24	2.9433	47.74	5.5882	Decreased hardness
T2	51.9	3.7343	49.54	3.0867	Decreased hardness
T3	55.02	4.7135	51.5	4.0155	Decreased hardness
T4	51.8	2.4688	49.58	4.4064	Decreased hardness
Treatment	Baseline		60 cycles		VI
	Mean	<i>SD</i>	Mean	<i>SD</i>	
Brand B					
T1	87.7	7.5409	85.12	8.6206	Decreased hardness
T2	88.7	2.6687	88.28	2.6687	Decreased hardness
T3	88.9	4.6816	84.66	4.6815	Decreased hardness
T4	87.3	6.5705	85.36	6.5705	Decreased hardness

Table 4 shows that the Brand B nanohybrid composite had a higher baseline HV compared to Brand A nanohybrid composite. Brand A nanohybrid composite had a mean value ranging from 51.8 to 52.24. On the other hand, Brand B nanohybrid composite displayed mean value ranging from 87.3 to 88.9. This may be due to the Brand B nanohybrid composite's filler system which is surface-modified zirconia/silica and has comparatively $\leq 3\mu\text{m}$ size of the median particle. Non-agglomerated or non-aggregated 20 nm surface-modified particles are included in their filler system (3M ESPE, 2011).

Nanohybrid composites in all categories showed different changes in surface hardness after immersion in different mouthwashes. Therefore, water, which was the common property of alcohol-based, non-alcohol-based, organic mouthwashes, and distilled water, must be the component that caused the hardness of the nanohybrid composites to decrease in different degrees. Similar to Yanikoglu et al.'s (2019) findings, the study revealed that there was no difference in the response of alcohol-containing mouthwash and distilled water on the surface hardness of the composite.

Table 4 also shows that Brand A composites immersed in alcohol-based mouthwash showed greater deviation from baseline HV, which signifies a greater decrease in hardness among the group. Meanwhile, organic mouthwash showed the greatest surface hardness of mean HV of 51.5. On the other hand, Brand B composites that were immersed under alcohol-based mouthwash showed the greatest deviation from the baseline HV, while non-alcohol-based mouthwash manifested the highest surface hardness with mean VHN of 88.28.

Brand A HV after immersion in different mouthwashes was not far from each other which showed only one to two HV differences from each other, which would mean that alcohol-based, non-alcohol-based, organic mouthwashes and distilled water affected Brand A composite in almost the same manner. Brand B, however, showed a higher mean HV difference from other treatments. Alcohol-based mouthwash presented the highest standard deviation from 8.62 HV. Non-alcohol-based mouthwash showed at least six HV difference (2.67), organic mouthwash presented at least four HV difference (4.68) and distilled water had at least two HV difference (6.57) from alcohol-based mouthwash. The result showed that Brand B composite was greatly affected by alcohol-based mouthwash compared to other treatments.

Table 5 shows the difference in the surface hardness of Brand A nanohybrid composite immersed in alcohol-based, non-alcohol-based, organic mouthwashes, and distilled water. Composites immersed in alcohol-based mouthwash displayed the highest mean difference of 4.5 HV. Composites immersed in organic mouthwash came second with a mean difference of 3.52 and composites immersed in non-alcohol-based mouthwash came third with a mean difference of 2.36. On the other hand, composites immersed in distilled water presented the lowest mean difference of 2.22 HV. There was no statistically significant difference in microhardness value ($p = 0.868$) of composites immersed in the mentioned different mouthwashes and distilled water.

Table 5. Mean Difference in the Surface Hardness of Brand A Nanohybrid Composites Before and After the Treatment

Brand	Treatment	N	Mean Difference	SD	p - value	VI
A	T1	5	4.5	7.12	0.868	NS
	T2	5	2.36	1.14		
	T3	5	3.52	6.15		
	T4	5	2.22	2.55		
Brand	Treatment	N	Mean Difference	SD	p - value	VI
B	T1	5	2.58	2.44	0.546	NS
	T2	5	4.34	3.22		
	T3	5	4.26	4.33		
	T4	5	1.96	2.00		

The table also shows that Brand A nanohybrid composite immersed in alcohol-based and organic mouthwashes significantly deviated compared to non-alcohol-based mouthwash and distilled water, with at least three to four HV difference. On the other hand, Brand B nanohybrid composites presented approximately the same deviation with only one to two HV difference. Brand A nanohybrid composite showed to be more susceptible to decrease in hardness when immersed in alcohol-based mouthwash compared to non-alcohol-based and organic mouthwash while Brand B nanohybrid composite showed to be more susceptible to decrease in hardness with non-alcohol-based mouthwash and organic mouthwash as compared to alcohol-based.

Table 6 shows that Brand A and Brand B nanohybrid composites immersed in alcohol-containing mouthwash have no statistically significant difference in microhardness value ($p = 0.656$). The table also presents that Brand A nanohybrid composite displayed a higher decrease in the microhardness value of 4.5 HV compared to Brand B Nanohybrid composites with a value of 2.58 HV. With this, the researchers conclude that Brand A nanohybrid composite was more susceptible to decrease in hardness when immersed in an alcohol-based mouthwash.

There was no statistically significant difference in microhardness value ($p = 0.286$) between Brand A and Brand B nanohybrid composites immersed in non-alcohol-containing mouthwash. Brand A and Brand B nanohybrid composites immersed in organic mouthwash presented no statistically significant difference in microhardness value ($p = .512$). The table shows that Brand B nanohybrid composites manifested a higher decrease in VHN value compared to Brand A nanohybrid composites.

The control group showed no statistically significant difference in microhardness value ($p = 0.799$) between Brand A and Brand B nanohybrid composites. Both brands of composites presented almost the same value of the decrease in the surface hardness.

Alcohol-based mouthwash showed at least four VHN difference in SD between Brand A nanohybrid composites (7.12) and Brand B nanohybrid composites. Non-alcohol-based mouthwash and organic mouthwash showed only around two HV difference in SD between Brand A and Brand B nanohybrid composites. Distilled water showed less than one HV between the two brands of composites. The study revealed that Brand A nanohybrid composites exhibit the lesser deviation of HV from the baseline when immersed in non-alcohol-based mouthwash, thus non-alcohol-based mouthwash is recommended for Brand A nanohybrid composite. Meanwhile, Brand B nanohybrid composite displayed the lowest deviation of HV when immersed in alcohol-based mouthwash, making alcohol-based mouthwash more applicable for Brand B nanohybrid composites.

Table 6. *Mean Difference Between the Surface Hardness of Brand A and Brand B Nanohybrid Composites*

Treatment	Brand	Mean Difference	N	SD	p - value	VI
T1	DIFFA	4.5	5	7.12	0.656	NS
	DIFFB	2.58	5	2.44		
T2	DIFFA	2.36	5	1.14	0.286	NS
	DIFFB	4.34	5	3.22		
T3	DIFFA	3.52	5	6.15	0.512	NS
	DIFFB	4.26	5	4.33		
T4	DIFFA	2.22	5	2.55	0.799	NS
	DIFFB	1.96	5	2.00		

The results show no statistically significant difference in the surface hardness of both Brand A and Brand B nanohybrid composites. This may be due to the total duration of immersion, which is equivalent to only 30 m total exposure. Therefore, consistent use of mouthwash for 30 s twice daily for one month may not significantly affect an existing composite restoration. However, since the results showed a decrease in surface hardness clinically, it may cause an adverse effect in the long run. Concerning the study of Fernandez et al. (2014), there was a significant decrease in the hardness of composites after undergoing treatments for 24 h; and the study of Al-Samadani (2016) which presented a significant difference in the surface hardness after 24, 48 and 72 h of immersion.

Limitations and Implications

The study was limited to only three kinds of mouthwashes with different brands per category: alcohol-based, non-alcohol-based and organic and two different brands of nanohybrid composite materials: Brand A and Brand B.

The composites used were two different brands of nanohybrid: Brand A and Brand B. Neither the shelf life nor how the composite was stored prior to the testing was considered. This study was only limited to the comparison of surface hardness of the composites as influenced by the mouthwash and did not include the effect of water sorption on the material.

The mouthwashes used were alcohol-based, non-alcohol based, and organic. The study did not consider the effect of the storage or shelf life of the mouthwashes on its formulation and did not include the effect of pH of mouthwash on the composite material.

Conclusion

The results of the study did not show a statistically significant difference in the surface hardness between Brand A and Brand B nanohybrid composites immersed in alcohol-based, non-alcohol-based, organic mouthwashes, and distilled water. However, clinically, both nanohybrid composites presented a decrease in surface hardness. Hence, the study confirmed that mouthwashes affect the surface hardness of the composites to a certain degree.

All samples showed a decrease in VHN value after immersion in different types of mouthwashes. Upon investigation, water appeared to be a common denominator in all mouthwashes used in the study. Thus, water contributed to decreasing the surface hardness of the composites, whether it be directly or indirectly.

The two brands of nanohybrid composites corresponded differently, with regards to surface hardness, when immersed in each of the mouthwashes. Brand A nanohybrid composites were greatly affected by alcohol-based mouthwashes. Meanwhile, Brand B nanohybrid composites were greatly affected by non-alcohol-based mouthwashes.

The study revealed that non-alcohol-based mouthwash had a lesser effect on the surface hardness of Brand A nanohybrid composites. Therefore, non-alcohol-based mouthwashes were more workable in Brand A nanohybrid composites. On the other hand, alcohol-based mouthwash had a lesser effect on the surface hardness of Brand B nanohybrid composites. Therefore, alcohol-based mouthwashes were more workable in Brand B nanohybrid composites.

Recommendations

It is recommended that another study be conducted with a longer duration of treatment. Since the current study only performed 60 cycles that correspond to a duration of 60 minutes, a longer cycle and duration may give a different result or may even give a more decreased VHN. Thus, an additional study will be beneficial in confirming the effects of mouthwashes on the surface hardness of nanohybrid composites.

The researchers would like to recommend a continuation of the study in combination with testing the influence of water sorption on the composites. This is related to the conclusion that there was a decrease in VHN in both brands of composite regardless of the treatments used, water being the common denominator present in all. Thus, a further study which tests the influence of water present in the mouthwashes will be instrumental in determining its effects on the surface hardness of composites.

The researchers would also like to recommend a comparative study of other brands of composites in the same category since the two brands of nanohybrid composites used presented various changes in the surface hardness treated with the different mouthwashes. There are plenty of various types of composites available in the market, so a study comparing the effects of mouthwash on the surface hardness of the different composites will further identify which composites have the best quality. The results may aid dentists when recommending efficient and beneficial type of composite. This will also help the manufacturers of composite materials reinforce and improve their products.

The researchers would like to recommend the composite manufacturing companies to indicate in their packaging information whether their product is susceptible to a significant decrease in surface hardness when used with either alcohol-based, non-alcohol-based, or organic mouthwashes.

The researchers would also like to recommend the replication of the study using a manual microhardness testing method. This is to compare the results between a modern and a manual microhardness tester. The results may add greater validity and credibility to the study.

References

- [1] 3M ESPE. (2011). *Paradigm nano hybrid universal restorative: Technical data sheet*. <https://multimedia.3m.com/mws/media/7247410/3m-paradigm-nano-hybrid-universal-restorative-technical-data-sheet.pdf>
- [2] Adler, C. J., Browne, G. V., Sukumar, S., & Hughes, T. (2017). Evolution of the oral microbiome and dental caries. *Current Oral Health Reports*, 4(3), 264-269. <https://doi.org/10.1007/s40496-017-0151-1>.

- [3] Al-Samadani, K.H. (2016). Surface hardness of dental composite resin restorations in response to preventive agents. *The Journal of Contemporary Dental Practice*, 17(12), 978-984.
- [4] Alzraikat, H., Maghaireh, G., Burrow, M., & Taha, N. (2018). Nanofilled resin composite properties and clinical performance: A review. *Operative Dentistry*, 43(4), E173-E190.
- [5] American Dental Association (2017). *Mouthwash (mouthrinse)*. <https://www.ada.org/en/member-center/oral-health-topics/mouthrinse>.
- [6] Ametek (n.d.). *Vickers hardness testing*. <https://www.hardnesstesters.com/test-types/vickers-hardness-testing?fbclid=IwAR3uW9QPvunvjNFBjIB0JhdmqYFfbMEi3QDILVFRY6KaCKZXj4Ao99m4Sv0>
- [7] Arhun, N., Celik, C., & Yamanel, K. (2010). Clinical evaluation of resin-based composites in posterior restorations: Two-year results. *Operative Dentistry*, 35(4), 397- 404.
- [8] Armas-Vega, A., Casanova-Obando, P., Taboada-Alvear, M.F., Aldas-Ramírez, J.E., Montero-Oleas, N., & Viteri-García, A. (2018). Effect of mouthwashes on the integrity of composite resin and resin modified glass ionomer: In vitro study. *J Clin Exp Dent*, 11(2), e179-84.
- [9] Asadoorian, J. (2016). Therapeutic oral rinsing with commercially available products: Position paper and statement from the Canadian dental hygienists association. *Canadian Dental Hygienists Association*, 50(3), 126-139.
- [10] Askikfajaj, V., Hainety, F., & Hainety, A. (2011). *Filtek™ Z250 XT nano hybrid universal restorative: Technical data sheet*. https://multimedia.3m.com/mws/media/8624580/filtek-z250xt.pdf?&fn=Filtek_Z250XT_TDS_6pg_A4_single_
- [11] Barnett, M. (2006). The rationale for the daily use of an antimicrobial mouthrinse. *J Am Dent Assoc*, 137, Suppl:16S-21S.
- [12] Barzszczewska-Rybarek, I., & Jurczyk, S. (2015). Comparative study of structure-property relationships in polymer networks based on Bis-GMA, TEGGDMA and carious urethane-dimethacrylates. *Materials (Basel)*, 8(3), 1230-1248. <https://doi.org/10.3390/ma8031230>.
- [13] Biradar, B., Biradar, S., & MS, A. (2012). Evaluation of the effect of water on three different light cured composite restorative materials stored in water: An in vitro study. *International Journal of Dentistry*. <https://doi.org/10.1155/2012/640942>.
- [14] Charugundla, B., Anjum, S., & Mocherla, M. (2015) Comparative effect of fluoride, essential oil and chlorhexidine mouthrinses on dental plaque and gingivitis in patients with and without dental caries: A randomized controlled trial. *Int J Dent Hygiene* 13, 104–109. <https://doi.org/10.1111/idh.12094>.
- [15] Chun, K. & Lee, J. (2014). Comparative study of mechanical properties of dental restorative materials and dental hard tissues in compressive loads. *Journal of Dental Biomechanics*, 5, 1–6. <https://doi.org/10.1177/1758736014555246>.
- [16] Cortelli, J.R., & Thénoux, R.E. (2007). *The effect of mouthrinses against oral microorganisms*. <https://doi.org/10.1590/S1806-83242007000500005>.
- [17] Dagli, N., Dagli, R., Mahmoud, R.S., & Baroudi, K. (2015). Essential oils, their therapeutic properties, and implication in dentistry: A review. *J Int Soc Prev Community Dent*, 5(5), 335-40. <https://doi.org/10.4103/2231-0762.165933>.
- [18] Dash, S. & Kallepalli, S. (2015). An evaluation of the effect of alcohol and non-alcohol based mouth rinses on the microhardness of two esthetic restorative materials - an in vitro study. *International Journal of Applied Dental Sciences*, 1(2), 27-31.
- [19] Demarco, F. F., Baldissera, R. A., Madruga, F. C., Simões, R. C., Lund, R. G., Correa, M. B., & Cenci, M. S. (2013). Anterior composite restorations in clinical practice: Findings from a survey with general dental practitioners. *J Appl Oral Sci*, Nov-Dec, 21(6), 497–504.
- [20] DePaola, L. & Spolarich, A. (2007). Safety and efficacy of antimicrobial mouthrinses in clinical practice. *Journal of dental hygiene: JDH/American Dental Hygienists' Association*, 81(5).

- [21]Enone, L., Awotile, A., Adegbulugbe, C., Agbaje, L., Odogun, L. & Oyapero, A., (2017). One-year clinical evaluation of nanohybrid composite in the restoration of occlusal and proximo-occlusal cavities in Nigeria. *Advances in Human Biology*, 7(3).
- [22]Ivoclar Vivadent (2019). *Tetric N-ceram: Efficient restoration for anterior and posterior teeth*. <https://highlights.ivoclarvivadent.com/dentist/en-asian/tetric-n-ceram>
- [23]Fernandez, R.A.A., Araby, M.E., Siblini, M., & Al-Shehri, A. (2014). The effect of different types of oral mouth rinses on the hardness of silorane-based and nano-hybrid composites. *Saudi Journal of Oral Sciences*, 1(2), 105-109.
- [24]Fischman S.L. (1997). The history of oral hygiene products: how far have we come in 6000 years? *Periodontology*, 15, 7–14. <https://doi.org/10.1111/j.1600-0757.1997.tb00099.x>
- [25]Gajewski, V.E.S., Pfeifer, C.S., Fróes-Salgado, N.R.G., Boaro, L.C.C., & Braga, R.R. (2012). Monomers used in resin composites: degree of conversion, mechanical properties and water sorption/solubility. *Brazilian Dental Journal*, 23(5), 508-514. <https://doi.org/10.1590/S0103-64402012000500007>.
- [26]George, R. & Kavyashree, G. (2017). Effect of four mouth rinses on microhardness of esthetic restorative material: An in vitro study. *Journal of International Oral Health*, 9(2), 55-59.
- [27]Heymann, H., Swift, E. & Ritter, A. (2013). *Sturdevant's art and science of operative dentistry* (6th ed.). Elsevier/Mosby.
- [28]Jeddy, N., Ravi, S., Radhika, T., & Sai Lakshmi, L. J. (2018). Comparison of the efficacy of herbal mouth rinse with commercially available mouth rinses: A clinical trial. *J Oral Maxillofac Pathol*, 22, 332-4.
- [29]Jyothi, K.N., Crasta S., & Venugopal, P. (2012) Effect of five commercial mouth rinses on the microhardness of a nanofilled resin composite restorative material: An in vitro study. *J Conserv Dent*, 15, 214-7.
- [30]Katona, A., & Barrak, I. (2016). Comparison of composite restoration techniques. *Interdisciplinary Description of Complex Systems* 14(1), 101-115.
- [31]Keukenrneester, R., Slot, D., Rosema, N., & Van der Weijden, G. (2012). Determination of a comfortable volume of mouthwash for rinsing. *International Journal of Dental Hygiene*, 10(3), 169–174.
- [32]Khan, A., Siddiqui, A., Moshin, S., & Al-Kheraif, A. (2015). Influence of mouth rinses on the surface hardness of dental resin nano-composite. *Pakistan Journal of Medical Sciences*, 31(6), 1485-1489.
- [33]Lee, A. (2005). Dilemmas in herbal medicine: the clinician's viewpoint. *Thromb Res*. 117(1-2), 103-11.
- [34]Leal, J., da Silva, J., Leal, R., Oliveira-Júnior, C., Prado, V., & Vale, G. (2017). The effect of mouthwashes on solubility and sorption of restorative composites. *International Journal of Dentistry*. <https://doi.org/10.1155/2017/5865691>.
- [35]Lexico. (n.d.). *Compressive strength*. https://lexico.com/definition/compressive_strength.
- [36]Luis, H., Luis, L., & Bernardo, M. (2016). In vitro study of the effect of an essential oil and a delmopinol mouth rinse on dental plaque bacteria. *Indian Journal of Dental Research*, 27(6), 648.
- [37]Manipal, S., Hussain, S., Wadgave, U., Duraiswamy, P., & Ravi, K. (2016). The mouthwash war - chlorhexidine vs. Herbal mouth rinses: a meta-analysis. *J Clin Diagn Res*, 10(5), ZC81-3. <https://doi.org/10.7860/JCDR/2016/16578.7815>.
- [38]Osso, D. & Kanani, N. (2013). Antiseptic mouth rinses: an update on comparative effectiveness, risks and recommendations. *The Journal of Dental Hygiene*, 87(1).
- [39]Oxford Dictionary of Dentistry. (2016). Vickers hardness number. *Oxford, England: Oxford University Press*.
- [40]Ozaki, F., Pannuti, C.M., Imbronito, A.V., Pessotti, W., Saraiva, L., de Freitas, N.M., Ferrari, G., & Cabral, V.N. (2006). Efficacy of a herbal toothpaste on patients with established gingivitis-a randomized controlled trial. *Braz Oral Res*, 20(2), 172-7s.

- [41]Ozer, S., Tunc, E., Tuloglu, N., & Bayrak, S. (2014). Solubility of two resin composites in different mouthrinses. *BioMed Research International*.
<https://doi.org/10.1155/2014/580675>.
- [42]Pradeep, K. & Athiban, R. (2015). Effects of alcohol containing mouthwash on oral tissue: a review. *International Journal of Science and Research*, 6(6), 1584-7.
- [43]Rajasekhar, R., James, B., Johny, M.K., Jacob, J. (2019). Evaluation of the effect of two commercially available non-alcoholic mouth rinses on the microhardness of composite material: An invitro study. *Current Dental Research Journal* 1(1), 14-21.
<https://doi.org/10.12944/CDRJ.01.01.03>.
- [44]Ramachandran, D. (2013). *Fillers in composite resin*.
<https://www.slideshare.net/deepthipramachandran/fillers-in-composite-resins>.
- [45]Shetty, P., Setty, S., Kamat, S., Aldarati, A., & Shridhar (2013). Comparison of the antingivitis and antiplaque efficacy of the herboral (herbal extract) mouthwash with chlorhexidine and listerine mouthwashes: a clinical study. *Pakistan Oral & Dental Journal*, 33(1), 76-81.
- [46]Somaraj, V., Shenoy, R., Panchmal, Kumar, V., Jodali, P. & Sonde, L. (2017). Effect of herbal and fluoride mouth rinses on streptococcus mutans and dental caries among 12-15-year-old school children: a randomized controlled trial. *International Journal of Dentistry*, 2017(4), 1-8.
- [47]Thirunavakarasu, R., & Nasim, I. (2019). Effect of mouthwashes on different composite resin: An in vitro study. *Drug Invention Today*, 11(11), 3027-3031.
- [48]Van Zyl A. & Van Heerden, W. (2010). Mouthwash: a review for South African health care workers. *South African Family Practice*, 52(2), 121-127.
<https://doi.org/10.1080/20786204.2010.10873950>
- [49]Velo, M., Amarai, F., Basting, R. & Franca, F. (2016). Longevity of restorations in direct composite resin: Literature review. *RGO, Rev Gaúch Odontol, Porto Alegre*, 64(3), 320-326.
- [50]Yanikoglu, N., Duymus, Z., & Yilmaz, B. (2009). Effects of different solutions on the surface hardness of composite resin materials. *Dental Materials Journal* 2009, 28(30), 344- 351.
- [51]Yap, A., Tan, S., Wee, S., Lee, C., Lim, E., & Zeng, K. (2001). Chemical degradation of composite restoratives. *Journal of oral rehabilitation*, 28, 1015-21.
<https://doi.org/10.1111/j.1365-2842.2001.00760.x>.
- [52]Yousefimanesh, H., Amin, M., Robati, M., Goodarzi, H., & Otoufi, M. (2015). Comparison of the antibacterial properties of three mouthwashes containing chlorhexidine against oral microbial plaques: An in vitro study. *Jundishapu J Microbiol*, 8(2).
<https://doi.org/10.5812/jjm.17341>
- [53]Yuksel, I. (2018). Blast-furnace slag. *Waste and Supplementary Cementitious Materials in Concrete*, 361–415. <https://doi.org/10.1016/b978-0-08-102156-9.00012-2>.
- [54]Zimmerli, B., Strub, M., Jeger, S., Stadler, O. & Lussi, A. (2010). Composite materials: Composition, properties and clinical applications. A literature review. *Schweiz Monatsschr Zahnmed*,

A Study on the Short-Term Memory-Enhancing Capabilities of Tryptophan

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Abstract: Research on the relationship between biological molecules and their cognitive abilities has garnered much attention. It is known that tryptophan, a molecule found in many plants and animals, plays an important role in improving cognitive performance by acting as a precursor to several neurotransmitters. Additionally, tryptophan may help prevent cognitive decline by decreasing brain inflammation, which is commonly linked with cognitive disabilities like Alzheimer's. This study demonstrates the effects of *Musa acuminata* (banana), a tryptophan-containing compound, on short-term memory. Specifically, this study examines if tryptophan intake enhances short-term memory, the duration of time during which tryptophan acts most effectively, and whether there is a deviation in effectiveness between genders. There are 32 participants (18 males and 14 females). Of these participants, 17 were taken from Muak Lek, Thailand, and 15 from Louis Trichardt, South Africa. Their ages range from 19 to 25. A forward six-digit span test was conducted after the examiner obtained consent to collect basic demographic data (age and gender) from the participant. The test was performed before consuming *Musa acuminata* (banana), immediately after consumption, 5 minutes after consumption, and 10 minutes after consumption. The examiner recorded the correct numbers uttered by each participant for each forward six-digit span test. Using the Tukey post hoc test, it was demonstrated that the average memory test results were significantly higher 10 minutes after consuming the banana than before consumption ($5.63 \pm .942$ points, $p = .015$). No statistically significant difference was found between the groups that took the test before and immediately after eating the banana ($p = .206$). A statistically significant difference was not found between groups that took the test before eating the banana and 5 minutes after eating the banana ($p = .139$). A comparison of means across the four forward six-digit span tests and genders shows no statistically significant differences ($p = .523$, $p = .987$, $p = .932$, $p = .403$ respectively).

Keywords: *Musa acuminata*, tryptophan, short-term memory, working memory, digit span

Introduction

The study of memory has played a fundamental role in analyzing biological compounds within the field of biochemistry and psychology. Understanding how certain chemical compounds influence the human mind has puzzled many scientific minds throughout history. It has led to many research projects to understand the effects of certain compounds in certain foods, which interact with the human physique and psyche. Foods have been analyzed for specific compounds, such as vitamins, minerals, organic, and inorganic compounds, to identify certain nutritional benefits. It has led to the culmination of human diet information (Sidhu & Zafar, 2018).

Certain compounds found in fruits and fruit products allow for the prevention of several diseases. These diseases include but are not limited to heart diseases, stroke, gastrointestinal disorders, cancer, hypertension, macular degeneration, cataracts, skin diseases, LDL reduction, and immune function (Sidhu & Zafar, 2018). Therefore, due to these characteristics that certain fruits have, fruits are an essential part of diet and lifestyle for healthy living. These studies have paved the way for expanding humanity's knowledge of the amount and type of foods necessary for healthy well-being.

All these studies have also coincided with what is known about the three types of macronutrients. Macronutrients comprise carbohydrates, proteins, and fats, each with specific functions that allow the body to regain homeostasis. Concerning this paper, amino acids found in protein play an essential role in synthesizing specific products in the body. These products include but are not limited to nitric oxide,

polyamines, creatine, glutathione, nucleotides, glucosamine, hormones, and neurotransmitters (Watford & Wu, 2018).

There are 20 known amino acids subdivided into two groups. The first group, 11 being the non-essential amino acids, as they can be synthesized in adult humans, and the second group, 9 being the essential amino acids, which on the other hand, cannot be synthesized in adult humans (Watford & Wu, 2018). The nine essential amino acids consist of leucine, valine, isoleucine, histidine, lysine, methionine, threonine, phenylalanine, and tryptophan. As these amino acids cannot be synthesized within the body, consuming foods containing these amino acids is essential for human health.

Statement of the Problem

Understanding the relation between diet and memory lies within further research into amino acids and their function in synthesizing neurotransmitters. Neurotransmitters are essential in transferring synaptic signals between central and peripheral nervous systems (Reddy, 2017).

tryptophan is an amino acid that acts as a precursor for several neurotransmitters essential for brain function, such as dopamine (Roth et al., 2021). Tryptophan is also present in high dosages in *Musa acuminata* (banana), (Hulsken et al., 2013). The main question to be addressed is if there is a difference in the memory test result considering the time before and after the participant ate a banana.

Theoretical Framework

Tryptophan

Tryptophan is an amino acid that acts as a precursor for several neurotransmitters essential for brain function, such as dopamine (Roth et al., 2021). It has several positive, beneficial effects on neurological function in memory, cognition, and emotional regulation (Sidhu & Zafar, 2018). Tryptophan is also present in high dosages in *Musa acuminata* (banana), which will be the focus of this study due to its easy accessibility and convenience (Hulsken et al., 2013).

Available evidence suggests that tryptophan-related peptides, or foods containing tryptophan-related peptides, may act as a preventive strategy for cognitive decline and dementia that is associated with inflammation (Ano et al., 2018). A study conducted has shown that one dose of dipeptides that contain tryptophan in the N-terminal induced improvements in memory impairment through modulation of the dopamine system (Ano et al., 2019).

Microglial activity is thought to be silenced by the entry of tryptophan-methionine peptides into the brain. Microglia is a type of parenchymatic macrophage present in the central nervous system, and it makes 5 to 10 percent of all brain cells (Li & Barres, 2018). Inflammation in the brain is partly mediated by microglia, and microglia activation has been linked to Alzheimer's disease. The pathology of dementia is thought to be advanced by inflammation in the brain. The tryptophan-methionine peptide may decrease inflammation in the brain, contributing to memory improvement (Ano et al., 2018).

The oral intake of tryptophan–tyrosine and tryptophan–methionine was shown to suppress the action of monoamine oxidase B (MAO-B) in the brain, thus inhibiting brain inflammation (Ano et al., 2018). Monoamine neurotransmitters like dopamine, serotonin, and noradrenaline modulate neuronal signals in the brain. A decrease in amine levels is associated with dementia, addiction, and aggression, symptoms of monoamine system dysfunction. Monoamine oxidases (MAO) affect monoamine levels in the brain by disrupting neurotransmitters. MAO is a critical target in neuro-psychopharmacology as it disrupts the normal function of neurotransmitters. MAO suppressants have been used to treat depression for over 50 years and have been shown to increase levels of brain amines (Ramsay, 2016).

Short-term memory

Sensory memory is divided into short-term, working, and long-term memory based on the time that information can be preserved. The different types of information that we store in memory can also be categorized into spatial, visual, auditory, haptic, and taste (Soleymani & Zadegan, 2020). Cowan (2017) asserts that working memory (WM) is essential to understanding short-term memory (STM). Among the many definitions of working memory, WM is the mechanism whereby the brain temporarily makes information available for ongoing processing. In other words, if a set of multiple simple matters is presented over a short period and immediately followed by a recall task, this will lead to better achievement as compared to recall after a longer or disturbance-filled period. Memory that lasts over a short period, whether active or passive, is referred to as short-term memory.

Furthermore, STM can be understood considering long-term memory (LTM). While some distinctions may exist between short- and long-term recall, STM can be enhanced by long-term memory. Short-term stores are temporary activations of long-term stores (Norris, 2017).

The impairment of STM occurs when a patient forgets information he or she has recently encountered. A person losing STM asks the same questions and struggles to recall recent events or things he just encountered. The phenomenon observed is also known as fixation amnesia. Clinically, STM loss can exist in different forms depending on the root cause of the memory decline. Visual and verbal memory loss are among the many forms of STM impairment (Casella & Al Khalili, 2019).

It was determined through further study that tests such as digit span can be used to measure short-term memory. In verbal short-term memory, the digit span is the standard test (Jones & Macken, 2015). WM and attention are both assessed using the digit span. Neuropsychological assessments and mental state examinations commonly incorporate this quick, convenient, accessible tool. To perform well on the Digit span test, one must possess short-term verbal memory and attention to auditory detail (Tripathi et al., 2019).

It was mentioned in the study of Mahmoudi Aghdam et al., 2020, that from the age of 21 onwards, active visual memory declines, which led this study to identify and search for participants between the ages of 19-24 years old.

The primary neurotransmitter found in low levels in memory-related disorders is serotonin. Serotonin plays an essential role in the regulation of mood and cognition. In scientific studies, the alteration of the essential amino acid tryptophan has allowed for modifying serotonin levels within the central and peripheral nervous system (Jenkins et al., 2016). It has also allowed us to identify the positive correlation between serotonin levels and memory function.

Methodology

This comparative study investigated the difference in the memory test result of the consumption of *Musa acuminata* (bananas) on the short-term memory of 32 university students in two distinct locations namely, Muak Lek, Thailand, and Louis Trichardt, South Africa. All participants gave consent to participate in the experiment and gave consent to the use of the results for publication. The participants were randomly selected.

To initiate the research study on a sample participant, the examiner first requested the consent to know their basic demographic information: age and gender. Then, proceeding with the study, the examiner conducted the forward six digit-span test four times for each participant. It was taken:

Once before eating the medium-sized *Musa acuminata* (Banana)

Once immediately after eating the medium-sized *Musa acuminata* (Banana)

Once after 5 minutes after eating the medium-sized *Musa acuminata* (Banana)

Once after 10 minutes after eating the medium-sized *Musa acuminata* (Banana)

Each time the forward six digit-span tests were conducted; the examiner took note of the correct numbers announced by each participant to capture the relevant results.

Results and Discussion

The study involved a total of 32 participants. 17 participants were taken from Muak Lek, Thailand, and 15 from Louis Trichardt, South Africa. The participants taken were from the range of 19 to 25 years old. 18 individuals were male, while 14 individuals were female. The primary demographic details of the participants were noted and coded appropriately by the examiner. The results from the six-digit span tests were coded and noted down according to the number of correct answers the participants got right. The raw sample data encoded by the examiner is shown in figure 1.

PT	A	G	DF1	DF2	DF3	DF4
1	21	0	4	6	6	6
2	20	0	6	6	6	6
3	21	0	6	6	6	6
4	22	1	6	6	6	6
5	21	0	4	6	6	6
6	20	1	6	6	6	6
7	25	0	6	6	6	6
8	19	1	1	6	6	6
9	21	0	6	6	6	6
10	23	0	0	6	4	6
11	19	0	6	4	6	2
12	19	1	6	6	6	6
13	22	0	5	6	6	6
14	21	1	5	6	6	6
15	21	0	3	6	6	6
16	23	0	5	6	6	6
17	20	1	6	6	6	6
1	19	1	4	6	4	6
2	21	1	4	2	6	5
3	22	1	4	4	4	6
4	22	1	6	6	4	6
5	22	0	5	5	3	3
6	22	0	6	5	6	5
7	19	0	4	3	2	6
8	21	0	4	6	2	5
9	21	0	5	4	6	6
10	19	1	4	6	5	4
11	22	0	4	6	6	6
12	20	1	6	6	6	6
13	21	1	6	2	6	6
14	20	0	2	2	6	6
15	19	1	4	6	5	6

Table 1. Raw Sample Data. Where PT represents the participant number (participants 1-17 are from Muaklek, Thailand, and participants 1-15 are from Louis Trichardt, South Africa), A represents the

age of the participants, *G* represents the gender of the participants (0-male; 1-female), DF1, DF2, DF3, and DF4 show the correct numbers announced by each participant before eating the banana (DF1), immediately after eating the banana (DF2), 5 minutes after eating the banana (DF3), and 10 minutes after eating the banana (DF4).

Descriptives

		N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
						Lower Bound	Upper Bound		
DF1	.00	15	4.5333	1.12546	.29059	3.9101	5.1566	2.00	6.00
	1.00	17	4.7647	1.85504	.44991	3.8109	5.7185	.00	6.00
	Total	32	4.6563	1.53685	.27168	4.1022	5.2103	.00	6.00
DF2	.00	15	4.6000	1.63881	.42314	3.6925	5.5075	2.00	6.00
	1.00	17	5.8824	.48507	.11765	5.6330	6.1318	4.00	6.00
	Total	32	5.2813	1.32554	.23432	4.8033	5.7592	2.00	6.00
DF3	.00	15	4.7333	1.48645	.38380	3.9102	5.5565	2.00	6.00
	1.00	17	5.8824	.48507	.11765	5.6330	6.1318	4.00	6.00
	Total	32	5.3438	1.20775	.21350	4.9083	5.7792	2.00	6.00
DF4	.00	15	5.4667	.91548	.23637	4.9597	5.9736	3.00	6.00
	1.00	17	5.7647	.97014	.23529	5.2659	6.2635	2.00	6.00
	Total	32	5.6250	.94186	.16650	5.2854	5.9646	2.00	6.00

Table 2: Descriptive statistics of the dependent variable (results of the DF tests) for each location (Louis Trichardt, South Africa = 0 and Muak Lek, Thailand = 1). It also shows the descriptives for when the results are combined.

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
DF1	Between Groups	.427	1	.427	.176	.678
	Within Groups	72.792	30	2.426		
	Total	73.219	31			
DF2	Between Groups	13.104	1	13.104	9.504	.004
	Within Groups	41.365	30	1.379		
	Total	54.469	31			
DF3	Between Groups	10.521	1	10.521	9.096	.005
	Within Groups	34.698	30	1.157		
	Total	45.219	31			
DF4	Between Groups	.708	1	.708	.793	.380
	Within Groups	26.792	30	.893		
	Total	27.500	31			

Table 3. One-way ANOVA analysis between DF test results and location

We can observe that the significant value of DF2 and DF3 are 0.004 and 0.005, respectively. It shows a statistically significant difference in the mean results of the 2nd and 3rd Digit Forward test and the location. As for the 1st and 4th Digit Forward tests, the results show no statistically significant difference between the mean results and the location (0.678 and 0.380).

Descriptives

M

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Before	32	4.66	1.537	.272	4.10	5.21	0	6
Immediately After	32	5.28	1.326	.234	4.80	5.76	2	6
5 Minutes After	32	5.34	1.208	.214	4.91	5.78	2	6
10 Minutes After	32	5.63	.942	.166	5.29	5.96	2	6
Total	128	5.23	1.305	.115	5.00	5.45	0	6

Table 4. Descriptive statistics of the results of DF tests for each time interval (Before, Immediately After, 5 Minutes After, and 10 Minutes after). It also shows the descriptives for when the results are combined.

ANOVA

M

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	16.023	3	5.341	3.305	.023
Within Groups	200.406	124	1.616		
Total	216.430	127			

Table 5. One-way ANOVA analysis between DF test results and time interval

We observe that the significant value of the comparison is 0.23, which shows a statistically significant difference in the mean results of each time interval.

Multiple Comparisons

Dependent Variable: M

Tukey HSD

(I) T	(J) T	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Before	Immediately After	-.625	.318	.206	-1.45	.20
	5 Minutes After	-.688	.318	.139	-1.52	.14
	10 Minutes After	-.969 [*]	.318	.015	-1.80	-.14
Immediately After	Before	.625	.318	.206	-.20	1.45
	5 Minutes After	-.063	.318	.997	-.89	.77
	10 Minutes After	-.344	.318	.701	-1.17	.48
5 Minutes After	Before	.688	.318	.139	-.14	1.52
	Immediately After	.063	.318	.997	-.77	.89
	10 Minutes After	-.281	.318	.813	-1.11	.55
10 Minutes After	Before	.969 [*]	.318	.015	.14	1.80
	Immediately After	.344	.318	.701	-.48	1.17
	5 Minutes After	.281	.318	.813	-.55	1.11

*. The mean difference is significant at the 0.05 level.

Table 6. Tukey Post hoc test between selected time intervals against Memory (M)

The Tukey post hoc test results revealed that the average memory test results were statistically significantly higher 10 minutes after the banana was eaten compared to when the memory test was taken before the banana was eaten ($5.63 \pm .942$ points, $p = .015$). There was no statistically significant difference between the groups that took the test before eating the banana and immediately after ($p = .206$). There was no statistically significant difference between the groups that took the test before eating the banana and 5 minutes after eating the banana ($p = .139$).

Descriptives									
		N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
						Lower Bound	Upper Bound		
DF1	Male	18	4.50	1.618	.381	3.70	5.30	0	6
	Female	14	4.86	1.460	.390	4.01	5.70	1	6
	Total	32	4.66	1.537	.272	4.10	5.21	0	6
DF2	Male	18	5.28	1.227	.289	4.67	5.89	2	6
	Female	14	5.29	1.490	.398	4.43	6.15	2	6
	Total	32	5.28	1.326	.234	4.80	5.76	2	6
DF3	Male	18	5.28	1.447	.341	4.56	6.00	2	6
	Female	14	5.43	.852	.228	4.94	5.92	4	6
	Total	32	5.34	1.208	.214	4.91	5.78	2	6
DF4	Male	18	5.50	1.150	.271	4.93	6.07	2	6
	Female	14	5.79	.579	.155	5.45	6.12	4	6
	Total	32	5.63	.942	.166	5.29	5.96	2	6

Table 7. Descriptive statistics for each of the results of DF tests for each gender (Male, Female)

ANOVA						
		Sum of Squares	df	Mean Square	F	Sig.
DF1	Between Groups	1.004	1	1.004	.417	.523
	Within Groups	72.214	30	2.407		
	Total	73.219	31			
DF2	Between Groups	.000	1	.000	.000	.987
	Within Groups	54.468	30	1.816		
	Total	54.469	31			
DF3	Between Groups	.179	1	.179	.119	.732
	Within Groups	45.040	30	1.501		
	Total	45.219	31			
DF4	Between Groups	.643	1	.643	.718	.403
	Within Groups	26.857	30	.895		
	Total	27.500	31			

Table 8. One-way ANOVA analysis between DF test results and gender

We observe that there are no statistically significant differences in the mean results for each DF test and gender ($p = .523$, $p = .987$, $p = .932$, $p = .403$ respectively).

The researchers theorize that the reason why tryptophan shows more effectiveness after 10 minutes is due to the well-known fact that it takes time to digest and absorb nutrients by the body. This fact

may explain why there are no statistically significant differences between the DF1 and DF2, and DF3 tests. However, based on the increasing means from DF1 ($4.66 \pm .272$ points), DF2 ($5.28 \pm .234$ points), DF3 ($5.34 \pm .214$ points), and DF4 ($5.63 \pm .942$ points), there suggests other factors that are influencing the increasing mean scores, apart from ingestion of bananas.

Conclusion and Recommendation

Based on the one-way ANOVA analysis and results, the DF4 test shows statistically significant differences in the mean values against the DF1 test. As it is observed that the mean difference between DF4 and DF1 is $+ 0.969$, there is conclusive evidence that tryptophan is most effective in increasing the effectiveness of short-term memory at 10 minutes. It is also observed that there are no statistically significant differences between each DF test and gender, showing conclusive evidence that gender does not play a role in changing the effectiveness of tryptophan. Therefore, the research results are conclusive in proving that tryptophan intake through *Musa acuminata* improves short-term memory after a 10-minute interval and that there are no significant differences in effects between genders.

This study can inform individuals preparing for tests, examinations, and other forms of assessments dependent on memory function to intake a healthy portion of *Musa acuminata*. It will help enhance short-term memory and working memory function to provide optimal performance in time-limited activities for the age group studied.

Although one of the objectives of this study was to determine the interval of time in which tryptophan shows its most effectiveness, we recommend that further studies analyzing more time intervals for which tryptophan shows its most effectiveness should be conducted. Additionally, this study looked at the effects of tryptophan present in *Musa acuminata* on short-term memory. Further studies that will investigate different sources of tryptophan and their effects on short-term memory can be carried out. Furthermore, an investigation on the appropriate and most effective tryptophan dosage can be carried out.

References

- [1] Ano, Y., Ayabe, T., Kutsukake, T., Ohya, R., Takaichi, Y., Uchida, S., ... & Nakayama, H. (2018). Novel lactopeptides in fermented dairy products improve memory function and cognitive decline. *Neurobiology of aging*, 72, 23-31.
- [2] Ano, Y., Ayabe, T., Ohya, R., Kondo, K., Kitaoka, S., & Furuyashiki, T. (2019). Tryptophan-tyrosine dipeptide, the core sequence of β -lactolin, improves memory by modulating the dopamine system. *Nutrients*, 11(2), 348.
- [3] Ano, Y., Yoshino, Y., Uchida, K., & Nakayama, H. (2019). Preventive Effects of Tryptophan–Methionine Dipeptide on Neural Inflammation and Alzheimer's Pathology. *International journal of molecular sciences*, 20(13), 3206.
- [4] Cowan, N. (2017). The many faces of working memory and short-term storage. *Psychonomic bulletin & review*, 24(4), 1158-1170.
- [5] Cascella, M., & Al Khalili, Y. (2019). *Short term memory impairment*. StatPearls Publishing.
- [6] Friedman, M. (2018). Analysis, nutrition, and health benefits of tryptophan. *International Journal of Tryptophan Research*, 11, 117864691880228. <https://doi.org/10.1177/1178646918802282>
- [7] Hulsken, S., Martin, A., Mohajeri, M. H., & Homberg, J. R. (2013). Food-derived serotonergic modulators: Effects on mood and cognition. *Nutrition Research Reviews*, 26(2), 223–234. <https://doi.org/10.1017/s0954422413000164>

- [8] Jones, G., & Macken, B. (2015). Questioning short-term memory and its measurement: Why digit span measures long-term associative learning. *Cognition*, 144, 1-13.
- [9] Li, Q., & Barres, B. A. (2018). Microglia and macrophages in brain homeostasis and disease. *Nature Reviews Immunology*, 18(4), 225-242.
- [10] Norris, D. (2017). Short-term memory and long-term memory are still different. *Psychological bulletin*, 143(9), 992.
- [11] Ramsay, R. R. (2016). Molecular aspects of monoamine oxidase B. *Progress in neuro-psychopharmacology and biological Psychiatry*, 69, 81-89.
- [12] Roth, W., Zadeh, K., Vekariya, R., Ge, Y., & Mohamadzadeh, M. (2021). Tryptophan metabolism and gut-brain homeostasis. *International Journal of Molecular Sciences*, 22(6), 2973. <https://doi.org/10.3390/ijms22062973>
- [13] Sidhu, J. S., & Zafar, T. A. (2018). Bioactive compounds in banana fruits and their health benefits. *Food Quality and Safety*, 2(4), 183–188. <https://doi.org/10.1093/fqsafe/fyy019>
- [14] Soleymani, E., & Issa Zadegan, A. (2020). The Effect of Working Memory Rehabilitation on Visual Memory and Memory Span. *Elderly Health Journal*, 6(2), 109-115.
- [15] Tripathi R, Kumar K, Bharath S, P M, Rawat VS, Varghese M. Indian older adults and the digit span A preliminary report. *Dement Neuropsychol*. 2019;13(1):111-115. doi:10.1590/1980-57642018dn13-010013

Identification and Assessment of Sensitive and Robust Plants Species to Volcanic Ashes

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Abstract: Volcanic eruption is a life-threatening natural phenomenon occurring in various parts of the world. Two years ago, the Taal volcano erupted, and volcanic ashes covered areas of the CALABARZON, including the AUP campus. This study determined the physicochemical characteristics of four selected sites (S1, S2, S3, and S4) at the AUP campus and identified sensitive and robust plant species to ashfall. ANOVA results showed significant differences ($p < 0.05$) in the physicochemical characteristics of the four selected sites. The volcanic ash was significantly acidic compared to the soil pH. Temperatures ranged from 27.93 °C to 31.03 °C, while relative humidity ranged from 52.7% to 66.2%. Carbon dioxide levels ranged from 421- 442 ppm. Sixteen sensitive and four robust species to ashfall were identified. Chlorosis and necrotic spots were prominent on susceptible plant species. The results of the study provided baseline physicochemical data of the four sites at AUP after the ashfall and identified robust plants that could be utilized as candidate species in rehabilitating ashfall-affected areas.

Keywords: *volcanic ash, physicochemical, air quality, robust species, sensitive species*

Introduction

Volcanic eruption is one of the most life-threatening natural phenomena in various parts of the world. According to USGS (United States Geological Survey), about 1,500 potentially active volcanoes worldwide, and about 500 erupted in historical time. Volcanoes are more active in countries near the ring of fire like the Philippines. The Philippines is an archipelago of more than 7100 islands. Most of these islands are of volcanic origin. The Philippines lies between the Pacific and Eurasian Plates, which makes it highly vulnerable to typhoons, floods, landslides, volcanic eruptions, and earthquakes.

There are 300 volcanoes in the Philippines. Fifty-three (53) of these are active, while the more significant percentage remains dormant. The majority of the active volcanoes are located on the island of Luzon. The six most active volcanoes are Mayon, Hibok-Hibok, Pinatubo, Taal, Kanlaon, and Bulusan. The volcanoes of the Philippines rank as the most destructive in the world. About 13% of its eruptions have caused fatalities, most notably at Taal and Mayon, and 22% caused significant damage (Philippine Institute of Volcanology and Seismology, 2008). Eruptions bring chaos and affect the income source of many people living near the area. The attritional effects of volcanic ash negatively impact livelihood trajectories via loss of income and nutrition from agriculture and increased maintenance of critical infrastructure. This situation forces the community to look for other sources of income, and it causes panic in the communities near volcanoes.

Last January 12, 2020, the second most active volcano in the Philippines erupted. The Taal Volcano is in the province of Batangas, located around 50 kilometers away from Manila, the capital of the Philippines. It is a [complex volcano](#) in the middle of Taal Lake and is often called an island within a lake; as well as one of the lowest volcanoes in the world, being 311 meters in elevation. It offers a very spectacular view seen from Tagaytay Ridge.

Being part of the Pacific Ring of Fire, Taal Volcano has caused a loss of lives, with estimations ranging between 5,000 to 6,000, based on the 33 recorded eruptions from 1572 to 2011, and thus is closely

monitored. The volcano island is made of multiple and overlapping cones and craters. Only 47 have been identified, which are 26 tuff cones, five cinder cones, and four maars. An increasing seismic activity under Taal was recorded in November 2006, followed by an increase in hot water springs in the crater in April 2007 (Philippine Institute of Volcanology and Seismology, 2008).

However, despite several risk warnings issued by the Philippine government agency PHILVOCS (Philippine Institute of Volcanology and Seismology), people still settle around the volcano and earn their living by farming crops in the rich volcanic soil. They also fish mainly tilapia, one of the sought-after freshwater fish in the Philippine market. The Taal volcano has also become one of Batangas's most visited tourist spots. The community put up several businesses to attract tourists. They raise horses for tourist transportation near the crater. The community lived peacefully on the volcano island for 43 years until January 12, 2020, when the volcano suddenly erupted. Authorities warned the community that a tsunami was possible in the volcano's freshwater lake. The National Disaster Risk Reduction Management Council, the Philippines' disaster-response agency, said 13,000 villagers had moved away from the area to evacuation centers in Batangas and Cavite provinces. Nearly 25,000 people were displaced by the eruption (National Disaster Risk Reduction & Management Council, 2020).

Some residents refused to leave their houses and farms. At the same time, others could not evacuate due to lack of transportation and poor visibility. The Volcanology Institute cautioned that fine ashfall could cause breathing problems, especially among young children and the elderly. The public was also advised to use face masks or wet towels to protect themselves. Ash clouds stretched 62 miles north, forcing authorities to shut down Ninoy Aquino International Airport and causing the cancellation of more than 500 international and domestic flights.

In the recent report, there were 39 recorded deaths during the evacuation and disaster response since Taal Volcano erupted on January 12, 2020. Several evacuees were reported to have died of a heart attack during evacuation.

Ashes from the volcano affected the entire CALABARZON region, which led to school suspension and delayed enrollment. One of the areas that was affected by the said eruption is the Adventist University of the Philippines campus. Ash covered the entire campus for two weeks, and some students with health issues were evacuated. Many of the flora inside the campus was affected, and some did not survive. Sulfuric gas also reached the campus, causing health issues for some students. The university is outside the 14 km radius of impact, but the effect of the Taal volcano eruption was evident as the once green surrounding turned gray.

Due to these events, we wanted to study the response of Adventist University of the Philippines flora to volcanic ashes. The study also determined the pH of the soil and volcanic ash and taxonomically identified the AUP flora.

Materials and Methods

Research Design

The study utilized an experimental design. The data were analyzed using STATISTICA.

Taal Eruption Data

Data were collected from the PHIVOLCS, which included the Sulfur dioxide spewed from the first day of its eruption until January 26, 2020.

Selected Sites

Creeside (14.217498, 121.038714), Driving Range (14.221790, 121.038161), and AUP Elementary School (14.213284, 121.035283), and Motor Pool (14.219512, 121.045496) were selected sites after the random sampling.

Collection of Plants Sample

The plant specimens were stored and preserved using the Pressing and Drying technique. To make it available for classification, it was arranged in the agreed sequence for a referral or other scientific study (Lawrence, 2005). Different species of plants from seed plants and embryophytes were collected. The leaves were pressed in paper and placed in an oven for three days at 60°C. The collected leaf sample was prepared for identification and was submitted to UPLB for further classifications.

Ash Samples

The collected suspended ashes from the leaves were delicately brushed off and placed in a labeled plastic bag for further analysis, which includes the pH level. This technique used a 2:1 soil to water ratio. Before proceeding, the pH meter was calibrated with two types of buffer, the solution of pH 4.00 and pH 7.00.

Soil Samples

We dug at least 15-20cm deep to collect the desired soil sample, then placed it in a clean plastic bag and labeled it for pH analysis. The soil pH value had a direct influence on the production of nutrients. The plants grow best in various soil pH levels (Jensen, 2010). This technique employed a 2:1 soil to water ratio. The pH meter was calibrated using two types of buffer, the solution of pH 4.00 and pH 7.00.

Air Quality

The air quality was tested using a device DT-802d, which comes with the Humidity and Air Temperature. We placed it on the four randomly picked locations inside the campus, and all areas are in "Good" quality reading at 421-423 ppm (400 - 1,000 ppm: typical level found in occupied spaces with good air exchange). Air temperature ranged from 28-31 °C from each site, and Relative Humidity ranged from 61-68% (Sticky-Uncomfortable).

Statistical Analyses

The data were analyzed using the T-Test, ANOVA, and Tukey test.

Results and Discussion

On January 12, 2020, at 2:30 pm, the Philippine Institute of Volcanology and Seismology (PHIVOLCS) recorded an increased activity level of the Taal volcano. DOST-PHIVOLCS raised the alert status of Taal from Alert Level 1 to Alert Level 2, indicating a probable magmatic intrusion that may or may not lead to an eruption. At 4 pm, Phivolcs raised the status to Alert Level 3, exhibiting "magmatic unrest." The ash column reached one kilometer high, and PHIVOLCS raised the status to Alert Level 4 (hazardous eruption imminent) at 7:30 pm. The ash and rock fragments column reached up to 10-15 kilometers due to continuous eruption. Volcanic lightning was also frequently observed.

By Sunday night, ashfall from Taal Volcano had reached Calabarzon and Metro Manila. Several areas near Taal Volcano also experienced power outages. The public was reminded that the Main Crater should be strictly off-limits because sudden steam explosions could occur and high concentrations of lethal volcanic gases could be released.

After a brief warning of activity following lava fountaining from between 2:49–4:28 am of January 13, 2020, Taal's eruption resumed immediately with sporadic weak lava fountaining and hydrovolcanic

activity at the Main Crater that generated steam-laden plumes approximately 2km tall. New lateral vents opened up on the northern flank where short 500m lava fountains emanate. Heavy ashfall from the ongoing eruptions of Taal reportedly fell southwest of the volcano island in Cuenca, Lemery, and Taal, Batangas.

The Philippine Seismic Network recorded a total of one hundred forty-four (144) volcanic earthquakes in the Taal region since 1:00 pm, January 12, 2020. Forty-four (44) earthquakes ranged from Intensity I – V in Tagaytay City, Alitagtag, Lemery, Santo Tomas, and Talisay, Batangas. Such intense seismic activity probably signifies continuous magma intrusion beneath the Taal edifice, which may lead to further eruptive activity. Sulfur dioxide (SO₂) emission was measured at an average of 5299 tonnes/day on January 13 2020.

On January 14, 2020, the eruption continued, and the number of affected residents increased. Taal Volcano's activity was characterized by the continuous eruption of the Main Crater due to magmatic and hydrovolcanic activity. The ongoing eruption generated 500-meter tall lava fountains topped with dark gray steam-laden plumes reaching approximately 2 kilometers high. The ash dispersed to the southwest and west of the Main Crater. Flashes of volcanic lightning were observed at the base of the degassing plumes. The Philippine Seismic Network recorded two hundred twelve (212) volcanic earthquakes in the Taal region since 2:00 am, January 14, 2020. Eighty-one (81) of these earthquakes were felt with intensities ranging from Intensity I – V in Tagaytay City, Cavite. Such intense seismic activity probably signified continuous magmatic intrusion beneath the Taal edifice, which may lead to further eruptive activity. Alert level 4 remained in effect over Taal Volcano. Sulfur dioxide (SO₂) emission was measured at an average of 1686 tonnes/day.

January 15, 2020, Taal Volcano's activity was characterized by a continuous but generally weaker eruption of the Main Crater. It generated dark gray steam-laden plumes that reached approximately 1000 meters high and dispersed ash southwest of the Main Crater. New fissures or cracks were observed in Sinisian, Mahabang Dahilig, Dayapan, Palanas, Sangalang, Poblacion, Mataas na Bayan, Lemery; Pansipit, Bilibinwang, Agoncillo; Poblacion 1, Poblacion 2, Poblacion 3, Poblacion 5, Talisay and Poblacion, San Nicolas. Alert level 4 is still in effect over the Taal volcano. This indicated that hazardous explosive eruption was still possible. In its 5 pm update, PHIVOLCS said portions of Pansipit River had dried up. On the other hand, the alert status remained at Level 4. Sulfur dioxide (SO₂) emission was measured at an average of 4186 tonnes/day.

On January 16, 2020, Taal Volcano showed "weak" emission, but "intense" tremors persisted as magma rose. No additional cracks on the ground were reported, while the alert status remained at Level 4. PHIVOLCS said a total of 9 "discrete weak explosions" were recorded from 9 am to 5 pm. The agency also mentioned that they were looking at the possibility of a lull for a considerable period.

On January 24, 2020, activities in the Main Crater were characterized by weak to moderate emission of white steam-laden plumes of 50 to 500 meters high arising out of the Main Crater that drifted southwest. The Philippine Seismic Network (PSN) plotted seven hundred thirty-eight (738) volcanic earthquakes from 1:00 pm, January 12, 2020. One hundred seventy-six (176) of these registered at magnitudes M1.2-M4.1 and were felt at Intensities I-V. From 5:00 am on January 23, 2020, until 5:00 am on January 24, 2020, seven (7) volcanic earthquakes were plotted that registered at magnitudes M1.2-M2.7 with no felt event. The Sulfur dioxide (SO₂) emission was measured at an average of 224 tonnes/day.

On January 26, 2020, PHIVOLCS reported that the volcanic activity of Taal was significantly decreasing. The agency lowered the alert level from level 4 to level 3. Alert Level 3 indicates a reduced tendency

toward hazardous explosive eruption but should not be interpreted as that unrest has ceased or the threat of a dangerous eruption has disappeared.

Taal's volcanic activity was still monitored as of March 10, 2021. The alert level was raised to alert level 2. An evacuation was not yet recommended. However, the public was reminded that Taal Volcano Island is a Permanent Danger Zone (PDZ). That entry into TVI, especially the vicinities of the Main Crater and the Daang Kastila fissure, was to remain strictly prohibited.

Effects of Ashfall on Plants

A morphological deformity was seen from sensitive floras. Necrotic spots and Chlorosis were visible (Figure 5a-d). Other factors were also observed, such as the weight of ashes suspended on their leaves (Figure 2d) blocking the essential metabolic process of plants (Neild J, 2004). Of all the specimens we gathered, four were robust, and 16 were sensitive to the damage brought by the ashfall (See Table 1). The sulfur dioxide (SO₂) penetrated the mesophyll tissue through the stomata, which caused the injury. When the SO₂ mixed with water inside the plant, chemical reactions occurred, which burnt the plant from the inside out.



Figure 1. Plants from Site 1 showed a robust response against ashfall. All their leaves remained green and free from damage. (A. Chinese evergreen, B. Pakong Buwaya, C. Majestic palm)

Sensitive and Robust Plant Species

Volcanic ashfall contains a significant amount of SO₂ in the levels of 0.05 to 0.5 ppm for 8 hours or 1 to 4 ppm for 30 minutes, causing damage to sensitive plants. Plants more robust to SO₂ needed doses of two ppm for 8 hours or ten ppm for 30 minutes. Flora observed to be susceptible were Kamansi (*Artocarpus sp.*), Anahaw (*Saribus sp.*), Daisy (*Gerbera jamesonii*), Guava (*Psidium guajava L.*), Aratiles, (*Muntingia calabura L.*), White mulberry (*Morus alba L.*), Rambutan (*Nephelium lappaceum*), Sampaloc (*Tamarindus indica*), Pomelo (*Citrus grandis*), Binunga (*Macaranga sp.*), Para grass (*Brachiaria mutica*) Pineapple (*Ananas comosus*), Madre de cacao (*Gliricidia sepium*), Chico (*Manilkara zapota*), Eugenia (*Eugenia uniflora L.*) (Figures 2-6). The robust plants include Pakong buwaya (*Cyathea contaminants*), Chinese evergreen (*Aglaonema nitidum*), Majestic Palm (*Ravenea rivularis*), Dalandan (*Citrus nobilis*), and Calamansi (*Citrus microcarpa*) (Figure 1).

Table 1. Identified plant. List of sensitive and robust identified plant species.

LOCATION	FAMILY NAME	SCIENTIFIC NAME	COMMON NAME	RESPONSE
AUP Creek				
14.217476, 121.038619	Cyatheaceae	<i>Cyathea contaminans</i>	Pakong buwaya	Robust
14.217546, 121.038359	Araceae	<i>Aglaonema nitidum</i>	Chinese evergreen	Robust
14.217501, 121.038232	Arecaceae	<i>Ravenea rivularis</i>	Majestic palm	Robust
14.217286, 121.037913	Moraceae	<i>Artocarpus sp.</i>	Kamansi	Sensitive
14.216839, 121.037565	Arecaceae	<i>Saribus sp.</i>	Anahaw	Sensitive
AUP Elementary School				
14.212852, 121.034967	Asteraceae	<i>Gerbera jamesonii</i> <i>Bolus ex Hook. f.</i>	Daisy	Sensitive
14.213677, 121.035295	Sapotaceae	<i>Manilkara zapota</i>	Chico	Sensitive
14.213380, 121.035496	Rutaceae	<i>Citrus nobilis</i>	Dalandan	Robust
14.213383, 121.035596	Rutaceae	× <i>Citrus microcarpa</i>	Calamansi	Robust
14.213518, 121.035767	Myrtaceae	<i>Psidium guajava L.</i>	Guava	Sensitive
AUP Motorpool				
14.220522, 121.045018	Muntingiaceae	<i>Muntingia calabura L.</i>	Aratiles	Sensitive
14.220751, 121.045254	Moraceae	<i>Morus alba L.</i>	White mulberry	Sensitive
14.220897, 121.044921	Sapindaceae	<i>Nephelium lappaceum</i>	Rambutan	Sensitive
14.220449, 121.044621	Fabaceae	<i>Tamarindus indica</i>	Sampaloc	Sensitive
14.220148, 121.044857	Rutaceae	<i>Citrus grandis</i>	Pomelo	Sensitive
AUP Driving Range				
14.221989, 121.038597	Fabaceae	<i>Gliricidia sepium</i>	Madre de cacao	Sensitive
14.221921, 121.038923	Euphorbiaceae	<i>Macaranga sp.</i>	Binunga	Sensitive
14.221284, 121.038431	Poaceae	<i>Brachiaria mutica</i>	Para grass	Sensitive
14.221080, 121.038202	Bromeliaceae	<i>Ananas comosus</i>	Pineapple	Sensitive
14.221742, 121.039127	Myrtaceae	<i>Eugenia uniflora L.</i>	Eugenia	Sensitive

**Figure 2.** Plants from Site 1 showed a sensitive response against ashfall (D. Kamansi, E. Anahaw).

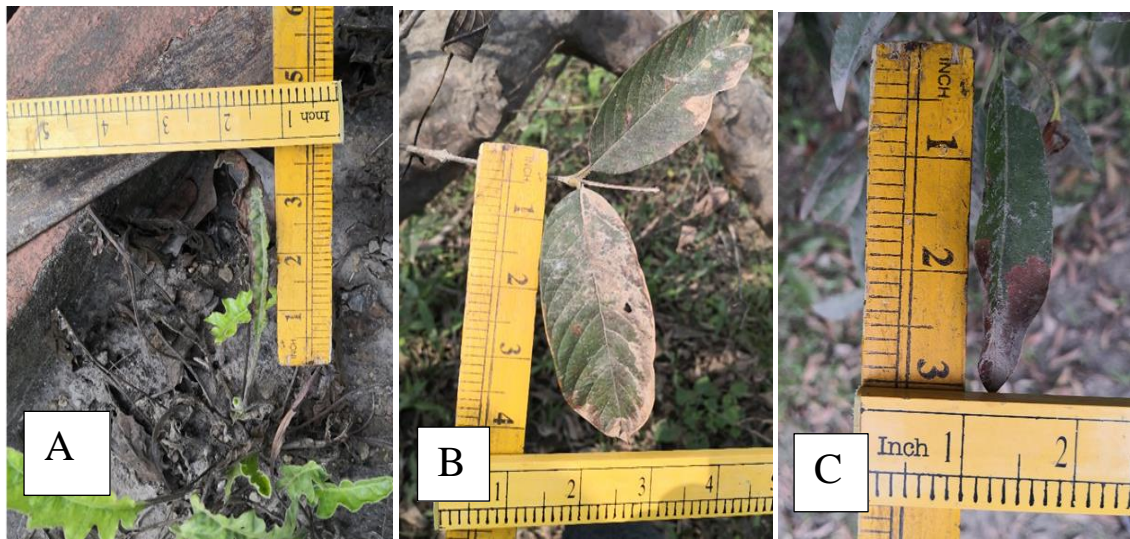


Figure 3. *Plants from Site 2 showed a sensitive response against ashfall (A. Daisy, B. Guava, C. Chico).*

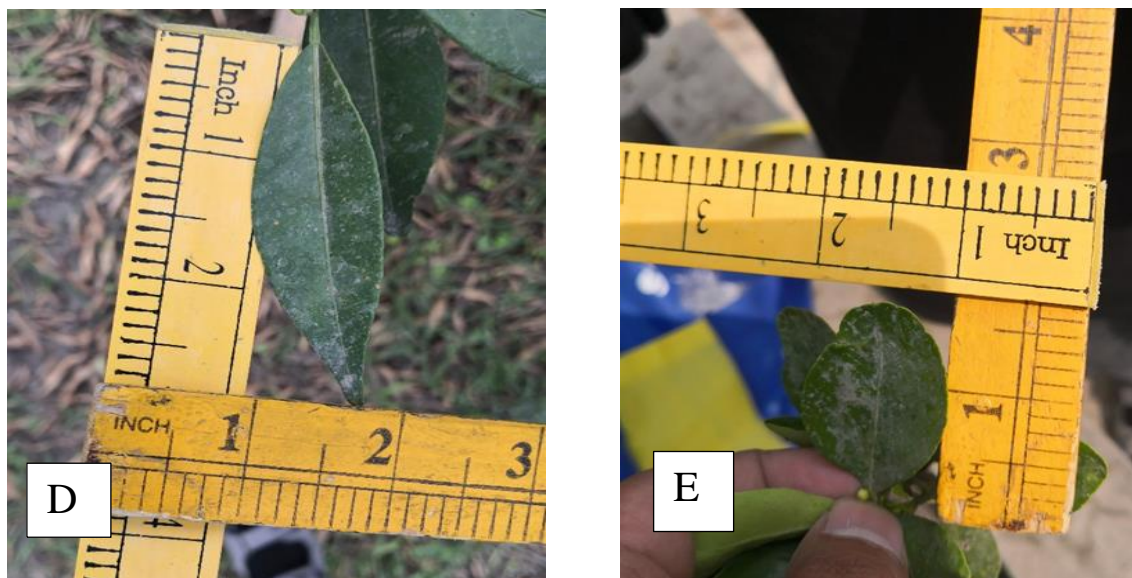


Figure 4. *Plants from Site 2 showed a sensitive response against ashfall.*

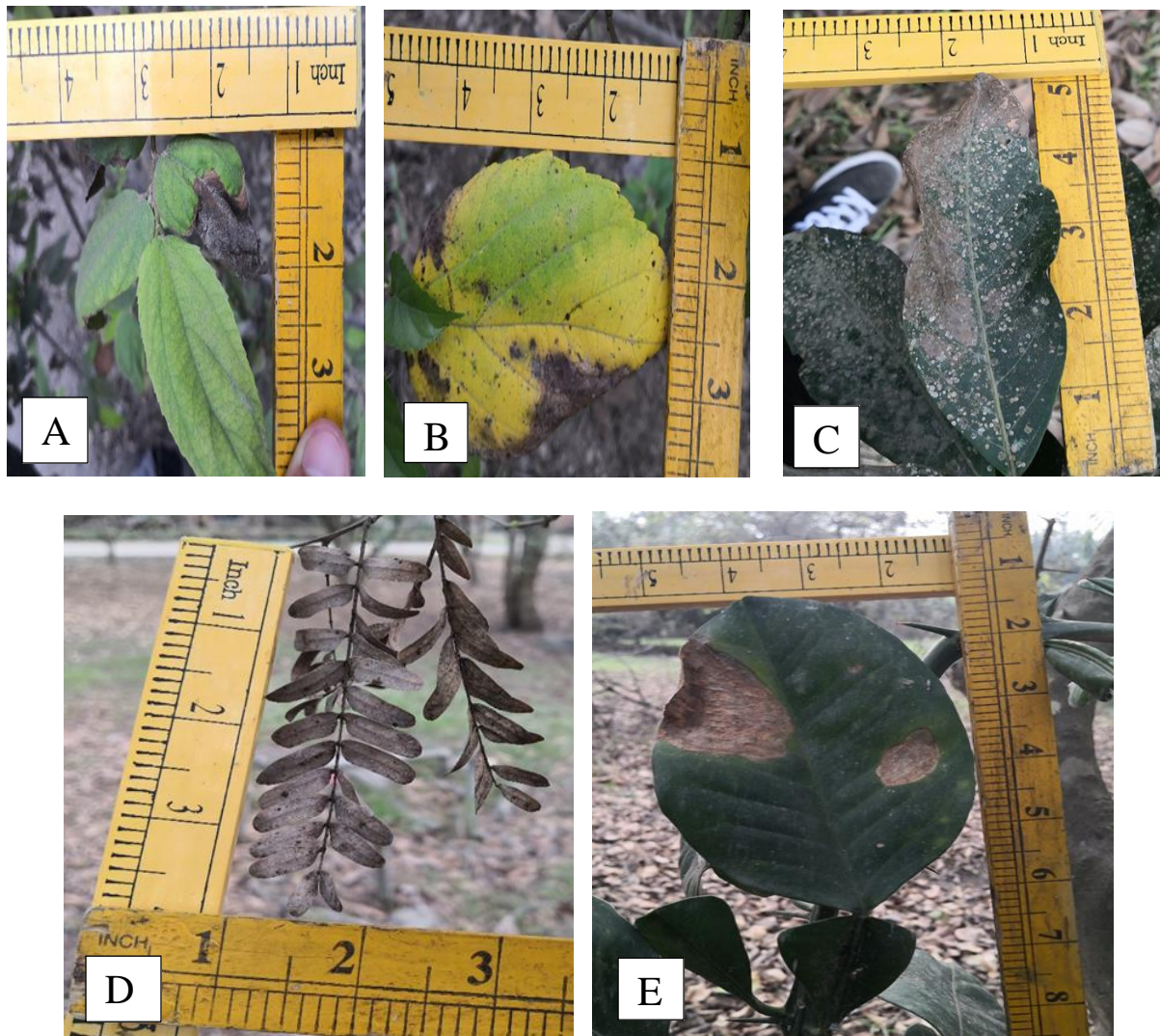


Figure 5. Plants from Site 3 showed a sensitive response against ashfall (A. Aratiles, B. White mulberry, C. Rambutan, D. Sampaloc, E. Pomelo).



Figure 6. Plants from Site 2 showed a sensitive response against ashfall (A. Daisy, B. Guava, C. Chico D. Madre De Cacao, E. Eugenia)

Soil pH

The acidity and nature of the ash may vary from volcanoes and eruptions. Ashfalls can lead to elevated soil sulfur levels and lowered soil pH. These changes in soil composition can reduce the availability of phosphate and other essential minerals and alter the soil's characteristics so that arable crops and pasture plants will not survive. Acidity in soils is the measurement of hydrogen ion concentration (H⁺), expressed as pH. A soil with a neutral pH has a pH value of 7. As hydrogen ion concentration (H⁺) increases, the pH drops below 7. Although recommended pH ranges vary with variety and soil type, most blueberry plants grow best when pH is maintained between 4.0 and 5.2 (Williamson et al. 2006), and recommended soil pH is 4.5–5.0 for continental soils (Hanson and Hancock 1996). Tea also prefers

acidic soils with a pH of between 4.5 and 5.0 (Zee et al. 2003). Acid-loving plants grown in soil with higher pH ranges can suffer nutrient (i.e., iron and zinc) deficiencies that result in poor growth. At the Adventist University of the Philippines, the campus has several types of plants. Each plant responds differently to volcanic ash; some plants are sensitive and robust, while others are either/or.

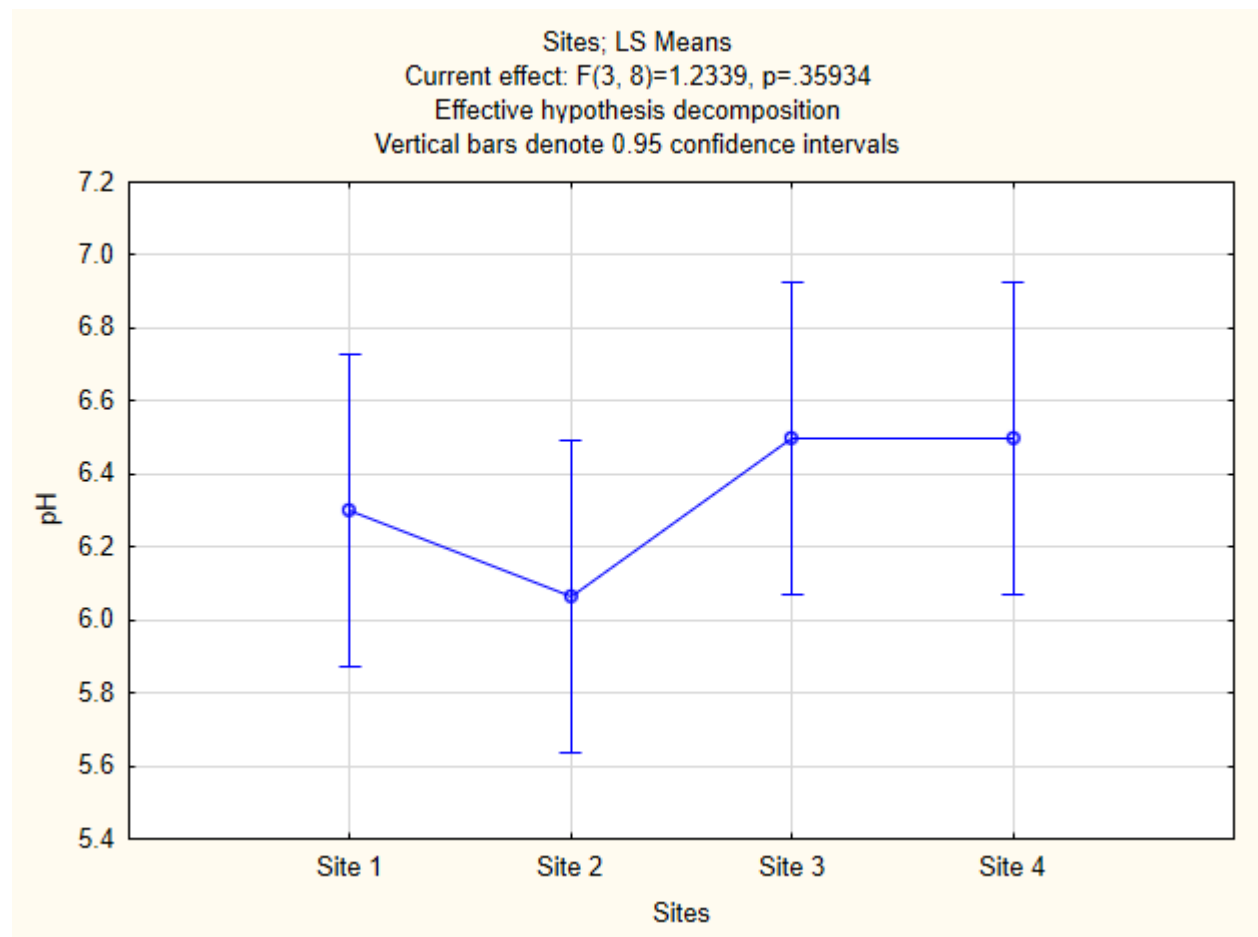


Figure 7. Soil pH of four different sites

Four sites inside the campus were surveyed. Soil samples were collected, and pH values were determined and analyzed. On-site 1 (Creekside (14.217498, 121.038714), the soil sample ranged from pH 5.4 to 7.5. According to the U.S. Department of Agriculture (USDA) natural resources conservation service, a 5.4 pH value is strongly acid, and a 7.5 pH value is slightly alkaline. Site 2 (CST Gate Garden (14.221836, 121.038432)) had a pH range of 5.7 to 6.6. 5.7 pH value is considered to be moderately acid, and 6.6 pH is considered to be neutral. Site 3 (AUP Elementary School (14.213284, 121.035283), had a pH range of 6 (moderately acid) to 7.3 (neutral). At site 4 (Motor Pool; 14.219512, 121.045496), the pH ranged from 4.8 to 7.3. 4.4 pH is considered a very strong acid, and 7.3 pH is considered neutral. Based on the soil sample analysis that we conducted, the pH level value of the soil ranged from very strongly acid (4.8 pH) to slightly alkaline (7.5 pH). According to the standard soil pH of the U.S. department of agriculture, a pH range of 6 to 7 is generally most favorable for plant growth because most plant nutrients are readily available in this range. However, some plants have soil pH requirements above or below this range.

Volcanic Ash pH

The same procedure used for measuring soil pH was used to analyze pH of the volcanic ash sample. Volcanic ash naturally contains a high amount of SO₂ that comes mainly from burning sulfur-containing fuels (Sullivan et al., 2006). SO₂ particles are hygroscopic and tend to grow larger with increasing hydration of the atmosphere (Sullivan et al., 2006). SO₂ irritates the eyes, nose, and airways, and its odor is detected at concentrations as low as 0.5 ppm. At 0.6 ppm, exposure to sulfur can cause tearing, runny nose, cough, bronchospasm, and shortness of breath. The additional chronic effect from prolonged exposure at lower exposure concentrations include cough, mucus hypersecretion, and frequent clearing of the throat; these reflect airway inflammation and chronic bronchitis. Massive exposure can induce severe, permanent pulmonary damage (Sullivan et al., 2006). Low-level prolonged human exposures correlate well with bronchial asthma.

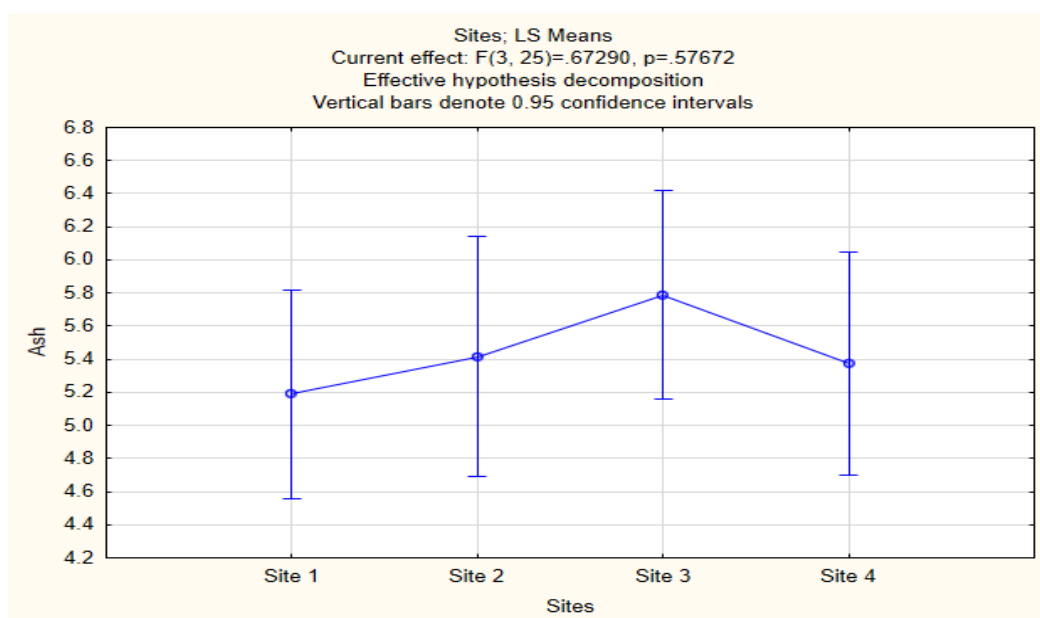


Figure 8. Volcanic ash pH of four sites

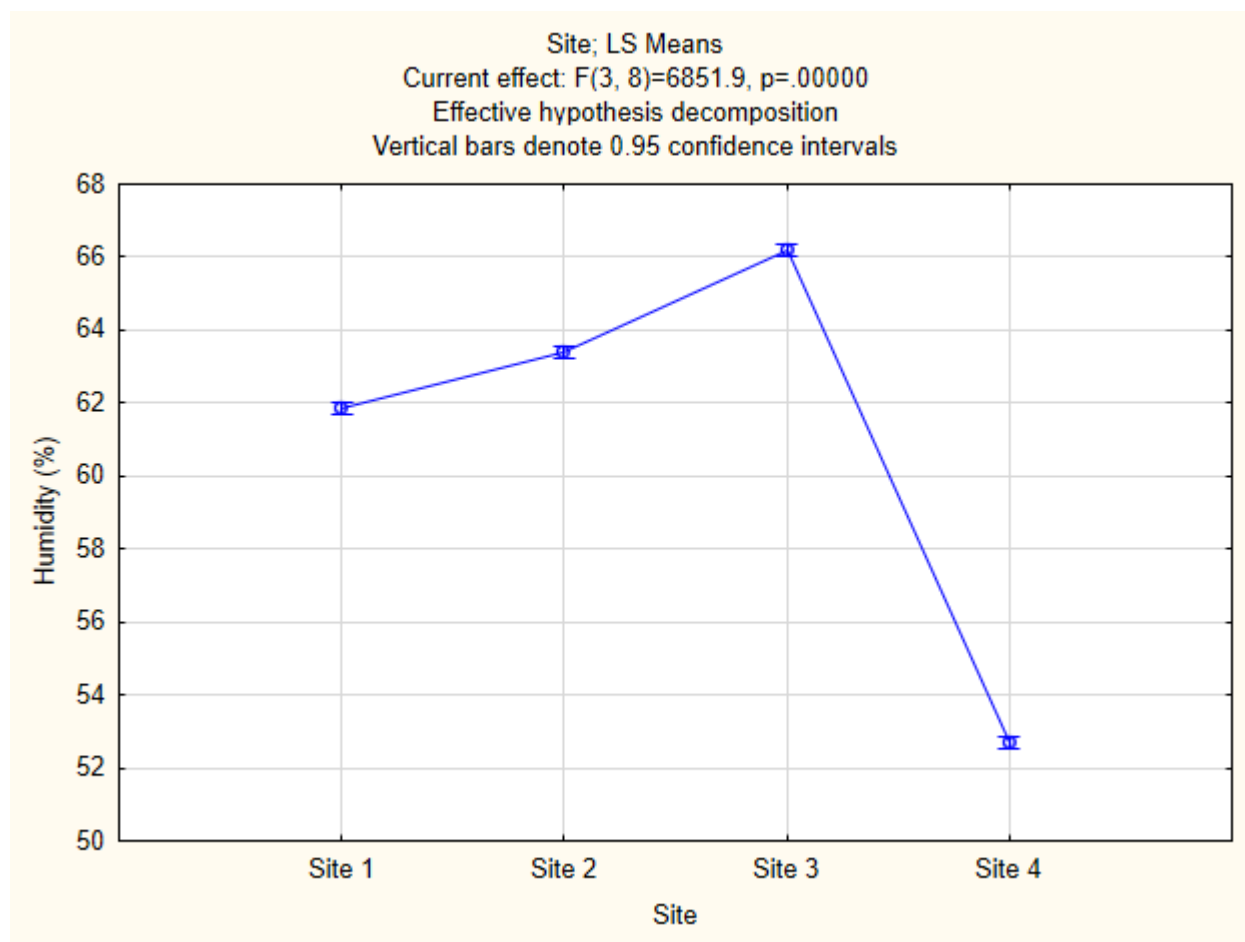
The pH values from site 1 (Creekside) ranged from 4.1 to 5.9 pH value. According to the USDA, 4.1 pH is considered highly acid, and 5.9 pH is considered moderately acid. Site 4 (Motorpool) had pH values that ranged from 4.3 pH (extremely acid) to 6.9 pH (neutral). The result of the pH value test on the volcanic ash sample shows that the ash is extremely acidic, which is not suitable for plant growth. However, some plants such as *Cyathea contaminans*, *Aglaonema nitidum*, *Ravenea rivularis*, *Citrus nobilis*, and *Citrus microcarpa* can still flourish despite extreme acidity. These types of plants can easily adapt to the extreme environment (see Table 1)

Table 2. *Air quality of sampling sites*

LOCATION	RESULT			
	Air Temperature	Relative Humidity	CO ₂	Air Quality
SITE 1 - CREEK (14.217756, 121.038626)	28.9	61.8	441ppm	Good
SITE 2 - DRIVING RANGE (14.221790, 121.038161)	31.3	52.7	421.33ppm	Good
SITE 3 - ELEMENTARY SCHOOL (14.213402, 121.035519)	28.2	63.6	422.67ppm	Good
SITE 4 - MOTOR POOL 14.219806, 121.043983	28.9	66.2	421.33ppm	Good

We evaluated the air quality on the same sites we did all the samplings. These results are shown in Table 2. All results are in the range of Good Quality based on the manual and the Global Air Quality Index: Good 0 – 800 ppm, Normal 800 – 1200 ppm, and Poor >1200ppm. The rich biodiversity on the campus helped maintain the desired air quality. *Without these technologies today, expert judgment or modeling may provide the appropriate predictions for airborne concentrations, dependent on previous eruptions' experiences (William Mueller, 2020).*

Air Temperature is an important environmental factor that controls plant growth. All physiological processes in plants are influenced by temperature. Attributed to the eruption of the Taal Volcano, the air temperature was affected, especially those plants covered with ashes. The ground soil was also covered, affecting the natural cycles occurring in plants. Heat is transferred between layers of air covering plant parts through convection and conduction. Plants strive to achieve their ideal temperature, a combination of air and soil temperature (Jerry L.Hatfield, 2016). Most plants can withstand natural temperature variations. In tropical countries, plants and trees are adapted to high-temperature stresses, but in this case, ash was present affecting the plants' ability to adapt to the stressors. The air temperature varied between 27.93°C to 31.03°C, and it was measured on January 29, 2020, from 3:00 pm – 5:00 pm. Typically, January is the coldest month, with average maximum temperatures of 30°C (86°F) (Pratikshya Bohra-Mishra, 2017).



Relative Humidity (R.H.) was measured alongside the air temperature. It is the amount of water vapor in the air as a proportion of the amount needed for saturation at the same temperature. Humidity saturates leaves with water vapor as plants transpire. The timing and manner in which plants open the stomata on the undersides of their leaves are influenced by relative humidity levels. The optimum level of R.H. for outdoor plants to survive is between 40% to 80%. A 52.7% to 66.2% R.H. is in the comfort zone for most plants.

Summary and Conclusion

Volcanic activities are inevitable, but further damage can be reduced with the government's help and private agencies monitoring Taal Volcano's activity, as well as CO₂, and SO₂ levels. The above gases are prominently harmful to humans, animals, and vegetation.

Soil samples collected from each site showed that the soil is still sustainable for plants. The pH values vary within the normal scale. However, ash from the suspended leaves showed a strong to moderate pH result, which may not be sustainable for some species of plants.

Identified species were classified as robust or sensitive. 80% of the sample were sensitive, and 20% were Robust. The sensitive floras showed chlorosis, blight, and necrosis. Air temperature from Site 1 – 3 varied from 27.93 - 28.83°C, while site 4 was slightly higher at 31°C compared to the normal temperature of the area. Relative humidity of sites 1 – 3 varied from 61.83 - 66.2%, while site 4 was the least humid area at 52.67%. CO₂ levels were at the normal range for sites 2 – 3, 421.33 - 422.67ppm but higher for site 1 at 441 ppm. The lush vegetation around the Adventist University of the Philippines helped stabilize the CO₂ level in the area.

This study showed that volcanic ash has high pH values. Ash suspended on the plant's leaves which is highly acidic, caused several leaf injuries. 80% percent of the flora were sensitive, and 20% were robust. Air Quality was still normal and tolerable for humans and vegetation. The air temperature varied between 27.93°C to 31.03°C. Relative humidity was in the normal range. The relative humidity inside the campus ranged from 52.7% to 66.2%, which is tolerable for plants, and CO₂ levels were in the normal range.

The results of the study provided baseline physicochemical data of the four sites at AUP after the ashfall. The study also identified the sensitive plants and the promising and robust species to ashfall. These robust plant species to ashfall are candidates species for rehabilitating ashfall-affected areas.

References

- [1] Aljahdali, Mohammed & Bisher, A (2008). Sulfur Dioxide (SO₂) Accumulation in Soil and Plant's Leaves around an Oil Refinery: A Case Study from Saudi Arabia. *American Journal of Environmental Sciences*. 4. 10.3844/ajessp.2008.84.88.
- [2] Athanassiadou, M., Francis, P. N., Saunders, R. W., Atkinson, N. C., Hort, M. C., Havemann, S., Thelen, J., & Bush, M. (2016). A case study of sulfur dioxide identification in three different volcanic eruptions, using Infrared satellite observations (IASI). *Meteorological Applications*, 23(3), 477–490.
- [3] Dale, Virginia & Delgado-Acevedo, Johanna & MacMahon, J.. (2005). Effects of modern volcanic eruptions on vegetation. 10.1017/CBO9780511614767.009.
- [4] Jenkins, Susanna & Wilson, Tom & Magill, Christina & Miller, Victoria & Stewart, Carol & Blong, Russell & Marzocchi, Warner & Boulton, Mike & Bonadonna, Costanza. (2015). Volcanic ashfall hazard and risk. 10.1017/CBO9781316276273.
- [5] J Phillips, (2019) Dynamic and Extensive Risk Arising from Volcanic Ash Impacts on Agriculture, School of Earth Sciences, University of Bristol, UK retrieved from https://www.unisdr.org/files/66547_f419finaljeremyphillipsdynamicandext.pdf
- [6] Rix, Meike & Valks, Pieter & Hao, Nan & van Geffen, Jos & Clerbaux, Catherine & Clarisse, Lieven & Coheur, P.-F & R, D.G. & Erbetseder, Thilo & Zimmer, Walt & Emmadi, Sunil. (2009). Satellite Monitoring of Volcanic Sulfur Dioxide Emissions for Early Warning of Volcanic Hazards. *Selected Topics in Applied Earth Observations and Remote Sensing, IEEE Journal of.* 2. 196 - 206. 10.1109/JSTARS.2009.2031120.
- [7] Schutter, Ann & Kervyn, Matthieu & Canters, Frank & Stadlin (Bosshard), Sonja & Songo, Majura & Mattsson, Hannes. (2015). Ashfall impact on vegetation: A remote sensing approach of the Oldoinyo Lengai 2007-08 eruption. *Journal of Applied Volcanology*. 4. 10.1186/s13617-015-0032-z.
- [8] Scitech(14 January 2020), Sulfur dioxide monitored in Taal, PHIVOLCS, retrieve from <https://www.gmanetwork.com/news/scitech/scitech/722104/sulfur-dioxide-monitored-in-taal-phivolcs-solidum-says/story/>
- [9] Stewart C. et al. (2016) Communication Demands of Volcanic Ashfall Events. In: Fearnley C.J., Bird D.K., Haynes K., McGuire W.J., Jolly G. (eds) *Observing the Volcano World. Advances in Volcanology (An Official Book Series of the International Association of Volcanology and Chemistry of the Earth's Interior – IAVCEI, Barcelona, Spain)*. Springer, Cham
- [10]Turnbull, Kate & Johnson, Ben & Marengo, Franco & Haywood, J. & Minikin, Andreas & Weinzierl, Bernadett & Schlager, Hans & Schumann, Ulrich & Leadbetter, Susan & Woolley, Alan. (2012). A case study of observations of volcanic ash from the Eyjafjallajökull eruption: 1. In situ airborne observations. *Journal of Geophysical Research (Atmospheres)*. 117. 10.1029/2011JD016688.

- [11] Jerry L. Hatfield, J. H. (2016). Weather and Climate Extremes. *Temperature extremes: Effect on plant growth and development*, 4-10.
- [12] Lawrence, G. H. (2005). Taxonomy of Angiosperms. In A. V. Sambamurty, *Herbaria, Botanical Gardens, Plant Identification and Literature of Taxonomy* (p. 202). New Delhi: I.K. International Pvt. Ltd.
- [13] Neild J, O. P. (2004). Impact of a volcanic eruption on agriculture and forestry in New Zealand. 99-101.
- [14] Pratikshya Bohra-Mishra, M. O. (2017). Climate variability and migration in the Philippines. *Popul Environ*, 286-302. Retrieved from Climate in Manila (Luzon), Philippines.
- [15] Shuttleworth, M. (2008, February 9). *True Experimental Design*. Retrieved from Explorable: <https://explorable.com/true-experimental-design>
- [16] William Mueller, H. C. (2020). GeoHealth. *Health Impact Assessment of Volcanic Ash Inhalation: A Comparison With Outdoor Air Pollution Methods*, 2-3.

Hypolipidemic Effect of Guava (*Psidium guajava* L.) and Strawberry Guava (*Psidium cattleianum*) Leaves Extract in White Rats (*Rattus norvegicus*)

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Abstract: The number of people with Diabetes Mellitus, high Uric acid levels, and high Cholesterol level, which causes deadly complications, is increasing significantly. Traditional medicines are preferable in preventing and curing these diseases. This study aims to determine the effects of Guava (*Psidium guajava* L.) and Strawberry guava (*Psidium cattleianum*) leaf extracts on, specifically, cholesterol levels in white rats (*Rattus norvegicus*). The design of this study is a pretest-posttest control group design. White rats were made to acute pancreatitis by inducing 0.25mL of alloxan solution intraperitoneally. Twenty-eight white rats were used and divided into several groups. Group 1 (negative, control group), group 2 (positive, control group), groups 3-5 (experimental guava leaves extract groups), and groups 6-7 (experimental strawberry guava leaves extract groups). Extract dosages used were 30, 60, and 90 mg. Univariate statistical analysis and Duncan's Multiple Range Test were used to determine the significance and the variables that contributed to the significance of the result. The results show that there is a significant difference in the type of plants and dosages of extract used where $p = 0.000 < \alpha = 0.05$. In analyzing the time of treatment exposure, it shows a significant difference with $p = 0.000 < \alpha = 0.05$ and the Duncan Multiple Range Test shows that the variable of day 14 (T_4) of blood glucose level gives the highest contribution to the significance of the statistical analysis (mean value of 101.179). The interaction of groups (plant types and dosages) and time of extract exposure, show that there is a significant difference of $p = 0.001 < \alpha = 0.05$. Thus, this study concluded that Guava (*Psidium guajava* L.) and Strawberry guava (*Psidium cattleianum*) leaves extract showed significant differences in the plant types and dosages of the extract and the time of extract exposure on the cholesterol levels of the rats.

Keywords: guava (*psidium guajava* L.), and strawberry guava (*psidium cattleianum*), cholesterol levels, alloxan, white rats (*rattus norvegicus*)

Introduction

Hyperlipidemia is an associated complication of diabetes mellitus. Many spices and herbs are known to be hypoglycemic (Dhandapani, et.al., 2002). Triglyceride levels can be elevated in the setting of acute pancreatitis as injury to the pancreas causes inadequate lipid metabolism leading to triglyceride elevation (Lu and Agito, 2016). Rats' hypercholesterolemia of a comparable degree was induced by the feeding procedure. The level of Cholesterol is one of the symptoms that occurs when the pancreas is no longer able to work to produce insulin. alloxan-induced diabetes causes hyperglycemia and dyslipidemia in white rats (Ojiako, et.al., 2016)

The hypoglycemic and hypolipidemic effect of aqueous extract of *Arachis hypogaea* was investigated in normal and alloxan-induced diabetic rats (Bilbis, et.al., 2002). People still think that the use of traditional medicines derived from nature is safer and more efficacious than using chemical drugs, so many people nowadays prefer to use traditional medicine to treat diseases and the price is also more affordable. However, there are still many traditional plants that have toxic effects on the body if their use is not appropriate. Red guava intake in the hypocholesterolemic rats significantly reduced the contents of total cholesterol, LDL, and triglyceride (Maryanto and Marsono, 2019)

Some traditional plants that have been known to treat diabetes, Cholesterol, and Uric Acids such as guava (*Psidium guajava* L.) and Strawberry Guava (*Psidium cattleianum*) (Sukmawati et al., 2018). Guava Leaves (*Psidium guajava* L.) contain saponin compounds, tannins, steroids, flavonoids,

alkaloids, quinine, triterpenoids, and carbohydrates. Some of these compounds have antioxidant activity and one of them is flavonoid group compounds that can reduce free radicals and potentially as antioxidants that can lower blood glucose, cholesterol, and uric acid levels (Vikrant et al., 2012). Many use the leaves boiled in water and make it as tea

The pharmacological effect of guava leaves as an anti-inflammatory, anti-diarrhea, analgesic, antibacterial, antioxidant, and antihypertensive, may reduce fever, and a platelet enhancer. Guava leaves can also be used for burns and blisters, and to cope with ulcers. Society in general used traditional medicine in tackling the symptoms of colds and frequent excessive urination, young leaf juice plus bark, root fingers, and flower buds, can be used as a dysentery medicine (Ariani et al., 2008).

Strawberry Guava Leaves (*Psidium cattleianum*) contain fiber and phenolic compounds such as catechins, lignin, and quercetin that serve as antioxidants, antidiabetic, anti-inflammatory, inhibit cell proliferation activity and prevent oxidation to prevent cancer (Vernin et al., 2011). Moderate amounts of guava fruit in the usual diet and changes in dietary fatty acids and carbohydrates may occur, providing significant amounts of soluble dietary fiber and antioxidant vitamins and minerals without any adverse effects. There is a greater decrease in lipoprotein metabolism and blood pressure (Singh et.al., 1992)

Some of the compounds contained have antioxidant activity and one of them is flavonoid group compounds that can reduce free radicals and potentially as antioxidants that can lower blood glucose and cholesterol levels. Based on the compounds contained Strawberry guava (*Psidium cattleianum*) can be used as a deterrent to the growth of cancer cells derived from free radicals through pollution, cigarette smoke, food, and even from the body that also produces free radicals (Zandona, 2018).

In this study, to obtain Guava (*Psidium guajava* L.) and Strawberry Guava (*Psidium cattleianum*) leaves extract researchers used the maceration method with ethanol as solvent. Ethanol is the universal solvent, as it can be used to attract substances whose polarity is relatively high to low. Since most antioxidant compounds are polar, ethanol is a widely used solvent (Verdiana et al., 2018).

Research Methods

Tools and Materials

The apparatus used in this study are blender, digital scale, plastic, sieve, label paper, Erlenmeyer flask, rotator shaker, measuring cup, measuring pipette, spatula, sieve, filter paper, aluminum foil, vacuum rotary evaporator, vial bottle, scalpel, gavage, syringe, "Auto-check" (tool to measure Blood Glucose, Cholesterol, and Uric Acid levels). The ingredients used in conducting this study are Guava (*Psidium guajava* L.) and Strawberry guava (*Psidium cattleianum*) leaves extract, ethanol solvent, distilled water, NaCl, Fatty rats' food, sodium CMC, and alloxan.

Research Procedures

This research is an experimental laboratory study with a pretest-posttest control group design approach. The samples in this study were obtained from the Pharmacology laboratory of Hasan Sadikin General Hospital, which has normal activity, aged about 2-3 months with a body weight of \pm 200 g. As many as 28 rats were used and they were divided into 8 randomly selected groups.

The Making of Extract

Raw materials, the leaves, as much as 1 kg each were obtained from the yard of UNAI's lecturers; The leaves that have been picked are then washed with running water to separate dirt such as sand and so on and then they were dried using a light bulb for 3 days. The dry material is then mashed using a blender until it becomes powder and sifted using a 50-mesh sieve. 160 g of *Simplicia* were poured into

an Erlenmeyer flask then soaked with ethanol as much as 800 mL then shaken using a rotator shaker for 24 hours; The solution is then kept still for \pm 24 hours, before being filtered. Extracts obtained from the solution were filtered with filter paper are then stored in a closed container protected from sunlight, this extraction process is carried out three times. The extract obtained as much as 2000 mL is then thickened by evaporation using a rotary vacuum evaporator at a temperature of 50° C, and thickened extracts were put in vials and stored in a sun-protected place.

Treatment

In this study, the researcher used three different dosages of treatments: 30 mg/200g BW, 60 mg/200g BW (as standard according to Guspratiwi et al., 2019), and 90 mg/200g BW (modified by the researcher).

Group 1 as a negative control of rats, not induced alloxan and no treatment;

Group 2 as a positive control of rats, induced alloxan 0.25 mL but no treatment;

Group 3 rats were induced with alloxan 0.25 mL + guava leaves extract with a dose of 30 mg as much as 2 mL as the treatment;

Group 4 rats were induced with alloxan 0.25 mL + guava leaves extract with a dose of 60 mg as much as 2 mL as the treatment;

Group 5 rats were induced with alloxan 0.25 mL + guava leaves extract with a dose of 90 mg as much as 2 mL as the treatment;

Group 6 rats were induced with alloxan 0.25 mL + Strawberry Guava leaves extract with a dose of 30 mg as much as 2 mL as the treatment;

Group 7 rats were induced with alloxan 0.25 mL + Strawberry Guava leaves extract with a dose of 60 mg as much as 2 mL as the treatment; and

Group 8 rats were induced with alloxan 0.25 mL + Strawberry Guava leaves extract with a dose of 90 mg as much as 2 mL as the treatment.

Cholesterol Level Measurement

Before being induced with alloxan, the rats were fasted for 18 hours with only given water to drink to reduce the influence of food consumed, then the blood of the rat was taken to check the initial cholesterol levels. Measurement of cholesterol levels is done by taking the blood of the rat through the tip of the tail that is rubbed with alcohol, for sterilization, and then slashing slightly the tip of the tail to get the blood out. Then the rat's blood was dripped into the strip kit to check the initial cholesterol levels using the "Auto-check" tool. All rats in groups 2-8 were induced with alloxan each as much as 0.25 mL

The dosage of alloxan used is 125 mg /kg BW, where 2 g of alloxan was dissolved into 20 mL NaCl 0.9%. After 72 hours with 18 hours of fasting cholesterol level examinations were done on all rats. Rats with Cholesterol levels \geq 200 mg/dL were declared to have high cholesterol. The rats were treated orally using a pet needle feeder feed injector syringe with guava (*Psidium guajava* L.) and strawberry guava (*Psidium cattleianum*) leaves extract with a predetermined dose based on the group. Furthermore, Cholesterol levels were measured on days 5, 10, and 14 after the administration of the extract.

Results and Discussion

Secondary Metabolite Compound Group Test Results

In this study, a test of secondary metabolite compounds contained in guava and strawberry guava leaves *Simplicia* was done. The stages are carried out following the Farnsworth (1996) method. The results are shown in the table below.

Table 1. *Secondary Metabolite Compound Group Test Results*

No.	Compound Group	Guava Leaves	Strawberry Guava Leaves
1	Alkaloids	√	-
2	Flavonoids	√	√
3	Quinone	√	-
4	Steroids	√	√
5	Triterpenoids	√	√
6	Tannins	√	√
7	Saponins	√	√

Description :(-) undetectable ;(√) detected

Based on the table above it can be known that the presence of alkaloid compounds, flavonoids, quinone, steroids, triterpenoids, tannins, and saponins was found in the *Simplicia* of guava leaves. Flavonoid compounds, steroids, triterpenoids, tannins, and saponins in the Strawberry guava leaves. Both *Simplicia* has almost the same secondary metabolite compounds, except the strawberry guava leaves do not have alkaloid and quinone compounds.

Table 2. *Descriptive Data on Cholesterol Levels*

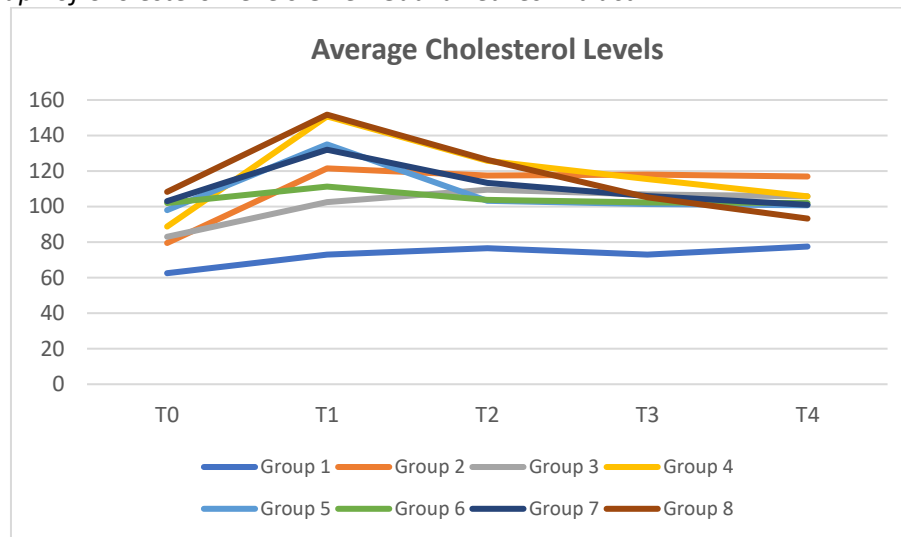
Groups	Dosages	Cholesterol Levels					Average
		T ₀	T ₁	T ₂	T ₃	T ₄	
Guava	30 mg	83	102.5	109.5	106.75	105.75	101.5
	60 mg	88.75	150.75	125.75	115.5	105.75	117.3
	90 mg	98	135	103.25	101.5	100.75	107.7
Average		89.92	129.42	112.83	107.92	104.08	108.83
Strawberry Guava	30 mg	102	111.25	103.75	102.25	101.5	104.15
	60 mg	103	130	113.25	106	101	110.65
	90 mg	108.25	151.75	126.5	105.25	96.25	117.6
Average		104.42	131	114.5	104.5	99.58	110.8
Total	30 mg	185	213.75	213.25	209	207.25	205.65
	60 mg	191.75	280.75	239	221.5	206.75	227.95
	90 mg	206.25	286.75	229.75	206.75	197	225.3
Average		194.33	260.42	227.33	212.42	203.67	219.63

Table 2. shows early fasting (18 hours) cholesterol levels after the acclimatization process as normal T₀ at the time of examination and before the induction of alloxan and the administration of extractant. T₁ as cholesterol levels after induction of alloxan for 72 hours and with 18 hours of fasting indicates high cholesterol levels. T₂ is a data of cholesterol levels on the 5th day after the administration of extract treatment, T₃ as a result of cholesterol level examination on the 10th day after the extract

treatment, and T₄ as a result of cholesterol level examination on the 14th day after the extract treatment experienced changes in Cholesterol levels. Cholesterol level measurement is fasting cholesterol levels.

Fig. 1 below shows results in the treatment groups of Guava and Strawberry guava leaf extract that there is an increase in cholesterol levels at T₁ after the induction of alloxan.

Figure 1. Graph of Cholesterol Levels Given Guava Leaves Extract



Legend:

T₀: Initial Cholesterol levels before induction of alloxan & extract treatment.

T₁: Cholesterol levels after induction of alloxan & treatment.

T₂: Cholesterol levels after extract treatment on day 5.

T₃: Cholesterol levels after extract treatment on day 10.

T₄: Cholesterol levels after extract treatment on day 14.

From the graph above it can be seen that the highest cholesterol level occurs in T₁ (72 hours after induction of alloxan). Cholesterol levels were decreasing at T₂ (5 days after extract administration), at T₃ (10 days after extract administration), and at T₄ (14 days after extract administration).

Results

Table 3. Univariate Analysis of Group, Time, and Interaction of Group and Time

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
Intercept	Hypothesis	1418264.820	1	1418264.820	414.028	.000
	Error	13702.130	4	3425.533 ^a		
Group	Hypothesis	17445.671	7	2492.239	6.459	.000
	Error	10803.114	28	385.826 ^b		
Time	Hypothesis	13702.130	4	3425.533	9.284	.000
	Error	11100.905	30.087	368.961 ^c		
Group * Time	Hypothesis	10803.114	28	385.826	2.288	.001
	Error	16863.000	100	168.630 ^d		

a. MS (Time)

b. MS (Group*Time)

c. Test Between-Subjects Effects

d. Dependent Variable: Cholesterol Levels

Analysis of Results by Types of Plant Extract

The data obtained in this study were analyzed using a univariate analysis to see the influence of Guava (*Psidium guajava* L.) and Strawberry Guava (*Psidium cattleianum*) leaves extract on cholesterol levels in white rats (*Rattus norvegicus*) induced with alloxan. The independent variables are Guava (*Psidium guajava* L.) leaves extract and Strawberry Guava (*Psidium cattleianum*) leaves extract, the dependent variable is the cholesterol levels, and the intervening variable is the induction of alloxan.

The results are shown in Table 3 above where the obtained statistical analysis value was a value of $p = 0.000$ lesser than the α value ($\alpha = 0.05$). Thus, this result states that the administration of Guava (*Psidium guajava* L.) and Strawberry Guava (*Psidium cattleianum*) leaves extract against cholesterol levels in white rats (*Rattus norvegicus*) induced by alloxan, differ significantly. Descriptively (table 2) showed that Strawberry guava leaves extract was better in influencing rat cholesterol levels (99.58 mg/dL) compared to the Guava leaves extract (104.8 mg/dL) in T₄ data (14 days after treatment).

Results of Analysis Based on Dosage of Extract

Table 3 shows the results of the cholesterol test to see the influence of differences in the dosage of Guava (*Psidium guajava* L.) and Strawberry Guava (*Psidium cattleianum*) leaves extract on cholesterol levels in white rats (*Rattus norvegicus*) induced with alloxan.

Cholesterol test results shown in table 3 show a significant statistical analysis value with $p = 0.000$ lesser than the α value ($\alpha = 0.05$). These results stated that the difference in dosage levels of Guava (*Psidium guajava* L.) and Strawberry Guava (*Psidium cattleianum*) leaves extract against cholesterol levels in white rats (*Rattus norvegicus*) induced with alloxan, differ significantly. Descriptively (table 2) shows that dosage of 30 mg was better in affecting rat cholesterol levels (205.65 mg/dL) compared to 60 mg (227.95 mg/dL) and 90 mg (225.3 mg/dL) dosages.

Analysis of Results Based on The Time of Data Collection

Table 3 shows the results of the Univariate test to see the effect of the time of treatment of Guava (*Psidium guajava* L.) and Strawberry Guava (*Psidium cattleianum*) leaves extract on the cholesterol levels in white rats (*Rattus norvegicus*) induced with alloxan.

The cholesterol test result shown in table 3 shows a significant statistical value of $p = 0.000$ less than the α value ($\alpha = 0.05$). This result states that there is a significant influence on the treatment time of Guava (*Psidium guajava* L.) and Strawberry guava (*Psidium cattleianum*) leaves extract on cholesterol levels in white rats (*Rattus norvegicus*) induced with alloxan. This result shows that the length of time the extract was administered had a difference in the influence on the cholesterol levels of the rats. Where at T₄ cholesterol levels are lower than cholesterol levels at T₃, and are lower than at T₂, and lower cholesterol levels at T₁ (shows the highest cholesterol levels).

Analysis of Results Based on The Interaction of Dosage and Time of Data Collection

Table 3 shows the results of the Univariate test to see the effect of the interaction between the dosages given and the time of exposure to the treatment of Guava (*Psidium guajava* L.) and Strawberry Guava (*Psidium cattleianum*) leaves extract on Cholesterol levels in white rats (*Rattus norvegicus*) induced with alloxan.

The cholesterol test results shown in table 3 shows a significant statistical value of $p = 0.001$ less than the α value ($\alpha = 0.05$). This result states that there is a significant effect of the interaction between the extract dosage given and the time of treatment exposure time of guava (*Psidium guajava* L.) and strawberry guava (*Psidium cattleianum*) leaves extract on the cholesterol levels in white rats (*Rattus norvegicus*) induced with alloxan.

Duncan Multiple Range Tests on Time Treatment Exposures

Because the results of the analysis of the data processing showed a significant value at the time of the treatment of extracts, the Duncan multiple range tests were conducted to find out which variables contributed the most to the significance of the statistical analysis.

Table 6. Duncan Multiple Range Tests Analysis Based on the Time Treatment of Plant *Simplicia* Extract

time	N	Subset = 0.05				category
		1	2	3	4	
T ₀	28	93.429				a
T ₄	28		101.179			b
T ₃	28		104.679	104.679		b, c
T ₂	28			111.286		c
T ₁	28				125.500	d
Sig.		1.000	.316	.060	1.000	

Based on the Duncan multiple range tests above, it can be seen that at the time of induction of alloxan T₁ there is a higher increase in the cholesterol levels (125.5 mg/dL) than before the induction of extract (T₀). The treatment of the extract on the 5th day (T₂), on the 10th day (T₃), and on the 14th day (T₄) showed an influence by the decrease in the Cholesterol levels of the rats.

And it was also found that the time of T₀ data is the highest variable in contributing to the significance of statistical analysis results in this study. Followed by variables T₄ and T₃, variables T₃ and T₂, and variable T₁

Conclusion

In this study, extraction procedures have been conducted by maceration using ethanol solvents, with the design set out in the methodology, and the results of analysis processed by a Univariate statistical test. From the analysis, conclusions are drawn that answer the established hypothesis, as follows:

That guava leaves extract (*Psidium guajava* L.) and strawberry guava leaves extract (*Psidium cattleianum*) has a significant difference of influence from statistical tests on the cholesterol levels in white rats (*Rattus norvegicus*) induced with alloxan, with a value of $p = 0.000$ which is lesser than the value of $\alpha = 0.05$. Descriptively this study shows that strawberry guava leaf extract was better in influencing cholesterol levels of the rats (99.58 mg/dL) compared to guava leaves extract (104.08 mg/dL) in T₄ data (14 days of treatment exposure).

That the difference in the dosage level of guava leaves extract (*Psidium guajava* L.) and Strawberry Guava leaves extract (*Psidium cattleianum*) has a significant difference in the effect of statistical tests on the cholesterol levels in white rats (*Rattus norvegicus*) induced alloxan, with a value of $p = 0.000$ which is lesser than the value of $\alpha = 0.05$. Where there is a significant difference between the administration of doses of 30 mg, 60 mg, and 90 mg against the cholesterol levels of white rats (*Rattus norvegicus*) induced alloxan. Descriptively, the dosage of 30 mg was better at affecting the rats cholesterol levels (205.65 mg/dL) compared to 90 mg (225.3 mg/dL) and 60 mg (227.95 mg/dL).

That the interaction of the dosage of guava (*Psidium guajava* L.) and Strawberry guava (*Psidium cattleianum*) leaves extract and the time of treatment exposure has a significant difference in the cholesterol levels in alloxan-induced rats (*Rattus norvegicus*), with a p -value = 0.001 which is lesser the value of $\alpha = 0.05$.

Recommendation

Based on the results of this study and the conclusions obtained, researchers provide suggestions that can be a reference in conducting further research.

Further research is needed for a longer time to be better able to observe changes in cholesterol levels of rats after induced alloxan or during the treatment time.

More research needs to be done on the dosage level of guava and Strawberry Guava leaves extract that is more optimal for cholesterol levels of alloxan-induced white rats.

More research needs to be done on the mechanism of extracts in affecting cholesterol levels in analyzing alloxan-induced white rats.

References

- [1] Ariani, S. R., Susilowati, E., VH, E. S., & Setiyani. 2008. Test Activity of Methanol Extract Guava Leaves (*Psidium guajava* L.) as Contraceptive Antifertility in White Rats (*Rattus norvegicus*). Indonesia Journal Chemical, Vol.8 No.2 (2008) 264 – 267.
<https://journal.ugm.ac.id/ijc/article/download/21632/14337&sa=U&ved=2ahUKEwiQzpb3rKrsAhWi9nMBHUMfDRIQFjAAegQIABAB&usg=AO>
- [2] Bilbis, L. S., R. A. Shehu, and M. G. Abubakar. 2002. Hypoglycemic and hypolipidemic effects of aqueous extract of *Arachis hypogaea* in normal and alloxan-induced diabetic rats. Phytomedicine: International Journal of Phytotherapy and Phytopharmacology. Sept. 2002; 9(6):553-5. DOI: 10.1078/09447110260573191.
<https://pubmed.ncbi.nlm.nih.gov/12403165/>
- [3] Dhandapani Surya, Vijayakumar Ramasamy Subramanian, Senthilkumar Rajagopal, and Nalini Namasivayam. 2002. Hypolipidemic Effect of *Cuminum cyminum* L. on Alloxan-Induced Diabetic Rats. *Pharmacological Research*. Sep. 2002; 46(3):251-5. DOI: 10.1016/s1043-6618(02)00131-7. <https://pubmed.ncbi.nlm.nih.gov/12220968/>
- [4] Guspratiwi, R., Eliya Mursyida & Yulinar. 2019. Effect of Ethanol Extract 96% Guava Leaves (*Psidium guajava* L.) on Blood Glucose Levels of Male Wistar Rats (*Rattus norvegicus*) Induced Alloxan. Collaborative Medical Journal (CMJ), Vol 2. 112-114.
- [5] Lu, Marvin Louis Roy Yap and Markus D. Agito. 2016. Triglyceride-Induced Pancreatitis: Diagnostic and Therapeutic Approach. January 2016. Gastroenterology, Hepatology, and Endoscopy. https://www.researchgate.net/publication/305887892_Triglyceride-induced_Pancreatitis_Diagnostic_and_Therapeutic_Approach
- [6] Maryanto, Sugeng, and Yustinus Marsono. 2019. The Effect of Guava on the Improvement of Lipid Profile in Hypercholesterolemic Rats. International Conference on Life Sciences and Technology IOP Conf. Series: Earth and Environmental Science 276 (2019) 012054 IOP Publishing doi:10.1088/1755-1315/276/1/012054.
<https://iopscience.iop.org/article/10.1088/1755-1315/276/1/012054/pdf>
- [7] Ojiako, Okey A, Paul C. Chikezei, and Agomuo C. Ogbuji. 2016. Blood Glucose Level and Lipid Profile of Alloxan-Induced Hyperglycemic Rats Treated with Single and Combinatorial Herbal Formulation. Journal of Traditional Complement Medicine, April 2016, 6(2): 184-192.
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4833464/>
- [8] Singh, R.B., S. S. Rastogi, R. Singh, S. Ghosh, and M.A. Niaz. 1992. Effects of Guava intake on Serum Total and High-Density Lipoprotein Cholesterol Level and Systemic Blood Pressure. American Journal of Cardiology. Nov.15 1992, 70(15): 1287-91. DOI: 10.1016/0002-9149(92)90763-o. <https://pubmed.ncbi.nlm.nih.gov/1332463/>

- [9] Sukmawati, Andi, E., & Yesi, R. A. 2018. Combination of Bay Leaf Ethanol Extract (*Syzygium polyanthum*) and Guava Leaf (*Psidium guajava* L.) as Oral Antidiabetic in White Rats (*Rattus norvegicus*). Pharmaceutical Journal of Indonesia, Vol.4, No.1 (2018) 18-20.
- [10] Verdiana, M., I Wayan, R. W., & I Dewe, M. P. 2018. Effect of Solvent Type on Extraction using Ultrasonic Waves on Antioxidant Activity of Lemon Peel Extract (*Citrus Limon* Linn). Journal of Food Science and Technology, Vol. 7 No.4 (2018) 213-215.
- [11] Vernin, G., Vernin, C., Pieribattesti, J.C., & Roque, C. 2011. Analysis of Sabine *Cattleianum Psidium* Fruit Volatile Compounds from Reunion Island. Taylor Francis Online, Vol.10, 2011,353-362. <https://www.tandfonline.com/doi/pdf/10.1080/10412905.1998.9700923?needAccess=true>
- [12] Vikrant, A., Narender, T., & Kashyap, C. P. 2012. Preliminary Phytochemical Analysis of the Extracts of *Psidium* Leaves. Journal of Pharmacognosy and Phytochemistry Vol.1 (1) 2012, 3-5 http://www.phytojournal.com/vol1Issue1/Issue_may_2012/1.1.pdf.
- [13] Zandona, G. P. 2018. Extraction and Characterization of Phytochemical Compounds from the Leaves of Aracazeiro (*Psidium cattleianum*): Suspected Antioxidant and Antimicrobial Properties. Science Direct, Vol. 4 No. 3 (2018) 21-23. <https://www.sciencedirect.com/science/article/abs/pii/S0963996920305986?via%3Hub>.

Mediating Role of Coping Strategies on the Symptoms of Complicated Grief and Psychological Well-Being during COVID-19 Pandemic

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Abstract: The COVID-19 pandemic altered the way that people live. For safety reasons, the government of the Philippines imposed health guidelines that affected the grieving process of Filipinos, resulting in complicated bereavement. Yet, there is but little research examining potential protective factors for grieving Filipinos. This study investigated the mediating role of coping strategies between complicated grief and psychological wellbeing among 200 bereaved Filipinos aged 18 to 67. The researchers employed random sampling to administer modified versions of the Inventory of Complicated Grief, Coping Strategies Scale, and Ryff's Psychological Well-being questionnaires. It was determined that the degree of complicated grief was low, the level of coping strategies was high, and coping mechanisms were frequently employed. The findings indicated that coping strategies fully mediated the relationship between symptoms of complicated grief and psychological well-being ($\beta = -0.493$, $t = 2.16$, $p = 0.03$). Implications and recommendations were discussed.

Keywords: *grief, well-being, coping*

Introduction

The World Health Organization (WHO) declared in March 2020 that the novel coronavirus or COVID-19 outbreak in China characterized a global pandemic (Cucinotta & Vanelli, 2020). COVID-19 is a contagious viral respiratory disease that led many countries, including the Philippines, to impose health protocols to contain the virus (i.e., wearing a mask, physical distancing, and a limited number of people in any social gathering). According to the Center for Strategic and International Studies, the Philippines has the 2nd highest COVID-19 death rate among Southeast Asian countries, with 34,672 deaths as of September 9, 2021. However, due to the existing health protocols, the mourning rituals cannot be performed, making the grieving process more difficult for bereaved families. For instance, the days of the funeral services for non-COVID related deaths are shortened to 3-5 days with only a maximum number of 30 people. Meanwhile, COVID-19 related deaths usually end up cremated with little to no chance to hold funeral services. In addition, families and friends living far from the burial place have a little chance to attend the service because of the travel restrictions of community quarantines.

Few studies suggest that normal grief might develop into complicated grief (CG) during the COVID-19 pandemic (Eisma & Tamminga, 2020; Goveas & Shear, 2020; Eisma et al., 2021; Tang & Chen, 2021). It is difficult to pinpoint a specific time when "normal" grieving becomes CG as each person's experience is different. The main distinction is that feelings of sadness or anger fade over time with normal grief, and people resume their daily habits. A person with CG may feel trapped, unable to recuperate or return to their previous life indefinitely. Grief is the typical response to the loss of something meaningful, like a job or a relationship, whereas CG is usually the result of someone's death (Shear et al., 2011).

People who lose someone during the COVID-19 pandemic experience higher grief levels and prolonged grief than those who lose someone before the COVID-19 pandemic (Eisma & Tamminga, 2020). In addition, bereaved individuals become "more insecure and more preoccupied" if they lose someone due to COVID-19 (Han et al., 2021). According to Vahdani et al. (2020), grieving can be prolonged,

difficult, and even traumatic if the mourning rituals are not performed, resulting in complicated grief characterized by maladaptive thoughts, sentiments, emotions, and behaviors that exacerbate grief. Furthermore, Zhai and Du (2020) found that neglecting the needs of grieving individuals may result in poor mental health and physical health.

Most of these studies emphasize how normal grief due to COVID-19 related death might become complicated. However, there is limited research discussing possible protective factors from pathological grief. Moreover, there are no studies conducted in the Philippines about understanding the grieving process of Filipinos and how they cope with grief, given that there are no existing intervention programs in the Philippines yet. Therefore, this study aimed to examine the potential mediating effects of Filipino coping strategies on the symptoms of complicated grief and psychological well-being. In addition, this study aimed to identify what coping strategies work best for bereaved Filipinos regarding COVID- and non-COVID-related death. This will answer the following research questions:

Research Question

Is there a significant relationship between the following?

Symptoms of Complicated Grief and Coping Strategies

Symptoms of Complicated Grief and Psychological Well-being

Coping Strategies and Psychological Well-being

Do coping strategies mediate the relationship between symptoms of complicated grief and psychological well-being among bereaved Filipinos?

Methodology

Research Design

This study utilized a descriptive-correlational research design to look for relationships between variables without using a control variable. Through descriptive statistics, identifying coping styles as helpful or not was made possible. The ultimate goal of descriptive statistics was to find new meaning, explain what already exists, identify the frequency with which something happens, and categorize data. (Walker, 2005). In addition, this study includes the structural equation modelling (SEM) approach. It is a sophisticated statistical technique used in behavioral science that combines a measurement model and a structural model into a single statistical test (Hoe, 2008; Hox & Bechger, 1998). In SEM statistical models, paths represent the causal relationships—proposed relationships between variables representing the causal and consequential constructs of a theoretical proposition (Lowry & Gaskin, 2014). The advantage of SEM allowed researchers to specify and estimate more complex path models, including intervening variables between the independent and dependent variables and latent factors (Hox & Bechger, 1998). The researchers used descriptive-correlational with SEM approach as it intentionally aimed to prospect the relationship between the coping strategies, symptoms of complicated grief, and psychological well-being variables.

Population and Sampling Techniques

The population for this research study were 200 Filipinos that are 18-67 years old who experienced the death of loved ones during the Covid-19 pandemic to gather the required information needed to answer the research questions. Contacting the was via social media. The selection of participants was through a purposive sampling procedure, also known as judgmental, selective, or subjective sampling. It is a non-probability sampling technique that relies on the researchers' judgment to select the participants based on the characteristics of a population and the objective of the study. This type of sampling can be useful when researchers need to reach a targeted sample quickly, and sampling for proportionality is not the primary concern (Crossman, 2019).

Further, snowball sampling was used in this study. According to Sharma (2017), snowball sampling is a non-probability sampling technique in which the study participants recruit people they know to participate in the study. Thus, the number of participants seems to enlarge like a rolling snowball. This sampling technique is commonly used when the target population is difficult to approach.

Instrumentation

The researchers employed structured questionnaires as their instruments to collect data and help ensure the validity and reliability of the research study. The researchers utilized three (3) questionnaires in this study: Inventory of Complicated Grief (ICG), Coping Strategies Scale, and Psychological Well-being Scale (PWB).

Inventory of Complicated Grief (ICG)

It aims to examine pathological grieving indicators such as anger, disbelief, and hallucinations. The test consists of 19 first-person statements that describe the client's immediate bereavement-related thoughts and behaviors. Internal consistency was excellent, with an alpha coefficient of 0.94. In the same study, the test-retest reliability was 0.80. This scale also has a clinical cut point that has been well-validated. Clients with a score of more than 25 are at high risk of requiring clinical care.

The scale and verbal interpretation of the Symptoms of Complicated Grief has a 5-point Likert scale with responses ranging from (1) Never to (4) Always and verbal interpretations.

Coping Strategies Scale

It examines Filipinos' stress coping strategies and provides a coping dispositional profile that aids in coping behavior assessment. The measured variables are cognitive reappraisal, social support, religiosity, recreation, problem-solving, tolerance, emotional release, overactivity, and substance use. This scale's inter-item consistency adds to its reliability, and the SPSS reliability analysis confirmed it. The degree of interrelatedness or homogeneity of items on a scale is inter-item consistency. The items in each domain represent the same coping strategy construct. High inter-item consistency implies high reliability. Construct validity uses confirmatory factor analysis. The Ways of Coping Questionnaire and COPE Inventory items in each Filipino Coping Strategies Scale domain was associated with the corresponding items in related areas of the scale. The correlations between the domains determine convergent validity. Pearson correlation demonstrated statistically significant correlations between the domains of the three coping measures. Positive correlations ranging from low to high confirm the domain constructs' validity. The Filipino Coping Strategies Scale's overall coefficient alpha is 0.716.

The scale and verbal interpretation of Coping Strategies has a 4-point Likert scale with responses ranging from (1) Never to (4) Always, and verbal interpretations ranging from Not Utilized to Highly Utilized.

Psychological Well-Being Scale (PWB)

It is a theoretically based tool that measures many aspects of psychological well-being. It measures six aspects of well-being and happiness but only 3 were used, namely, autonomy, personal growth, and self-acceptance. Researchers then reverse-code 21 elements so that higher scores imply greater happiness, and then compute different subscale scores by adding all items in each subscale together. The test-retest reliability coefficients for a subsample of the individuals across six weeks were also high (0.81–0.88). The factor correlations in the pure six-factor model (in absolute value) ranged from moderate to substantial, 0.03 to 0.67. The "shorter scales with 20-item parent scales have between 0.70 and 0.89 reliability. It includes positive and negative items on each scale" (Ryff and Keyes, 1995 as cited in Springer et al., 2006, p. 720). The questionnaire was shortened to 7 questions from an 18-item questionnaire and underwent a reliability study.

The scale and verbal interpretation for psychological well-being has a 7-point Likert scale with responses ranging from (1) Strongly Agree to (7) Strongly Disagree, and verbal interpretations ranging from Very Adequate to Very Poor.

Ethical Considerations

The Ethical Review Board of the Adventist University of the Philippines approved this study. The researchers guarantee anonymity and confidentiality to all participants. They informed the participants about the study's benefits, effects, and purpose. Participants' safety was valued, and no harm was done to them, whether psychological, physical, emotional, or mental. The informed consent form also included information on the population criteria. In the event of any unforeseen events, the researchers' phone numbers and emails were provided so that they could assist the respondents at any moment. The participants have the right to withdraw, and no information will be used against them.

Statistical Treatment of Data

To answer the main problem of this study, the researchers utilized mean, standard deviation, frequency table, Pearson correlation analysis, linear regression for descriptive analysis, and SmartPLS to analyze the data collected.

Results and Discussions

Symptoms of Complicated Grief and Coping Strategies

Table 17 presents the correlation analysis to answer the research question, *"Is there a significant relationship between the symptoms of complicated grief and coping strategies, symptoms of complicated grief and psychological well-being, psychological well-being and coping strategies."*

Table 1. *Correlation between Symptoms of Complicated Grief and Coping Strategies*

	Correlation with Complicated Grief	
	r	P
Cognitive Reappraisal	-.187**	.008
Social Support	-.014	.843
Problem Solving	-.191**	.007
Religiosity	-.085	.230
Tolerance	.022	.761
Emotional Release	.215**	.002
Overactivity	.184**	.009
Recreation	-.123	.082
Substance Use	.236**	.001

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

Table 1 indicates that when the bereaved Filipinos use coping strategies, specifically cognitive reappraisal and problem-solving, they are less likely to experience CG. It also implies that when the bereaved Filipinos use coping strategies, specifically emotional release, overactivity, and substance use, they are more likely to experience CG.

In general, surveys support positive associations between putative maladaptive emotion regulation strategies (e.g., emotional avoidance) and complicated grief and negative associations between putative adaptive emotion regulation strategies (cognitive reappraisal, acceptance, and problem-solving) and complicated grief (Eisma & Stroebe, 2021).

Based on a qualitative study conducted by Chuqian and Suqin (2021), another participant was overworked and abusing alcohol to avoid remembering his loss. Psychological characteristics linked to the deceased and contextual factors appeared to be risk factors. Moreover, CG has sensible emotional releases of an individual such as anger and loneliness (Stroebe et al., 2007 as cited in Titlestas et al., 2021). Furthermore, individuals who used substances were more likely to suffer complicated grieving later in life, especially if their substance intake escalated prior to the loss (Parisi et al., 2019).

Symptoms of Complicated Grief and Psychological Well-Being

Table 18 presents the correlation analysis to answer the research question, *“Is there a significant relationship between the symptoms of complicated grief and coping strategies, symptoms of complicated grief and psychological well-being, psychological well-being and coping strategies.”*

Table 2. *Correlation between Symptoms of Complicated Grief & Psychological Well-Being*

	Correlation with Complicated Grief	
	R	P
Autonomy	-.087	.219
Personal Growth	-.186**	.009
Self-Acceptance	-.171*	.015

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

Table 2 implies that when bereaved Filipinos have personal growth and self-acceptance, they are less likely to experience CG.

The Grieving led some studies to Personal Growth Theory, where personal growth refers to the process of being constructively transformed by a traumatic incident, as opposed to a sense of accomplishment or contentment with returning to normalcy (Hogan et al., 2001, as cited in Rogalla, 2015). Further, individuals who have reached acceptance as the final stage of grieving can live in peace with their loss (Ristriyani et al., 2018).

Coping Strategies and Psychological Well-Being

Table 3 presents the correlation analysis to answer the research question, *“Is there a significant relationship between the symptoms of complicated grief and coping strategies, symptoms of complicated grief and psychological well-being, coping strategies and psychological well-being.”*

Table 19 below shows that among the coping strategies subscale, seven have a significant correlation with the psychological well-being of the bereaved Filipinos. However, the correlation differs in each aspect of psychological well-being, namely, autonomy, personal growth, and self-acceptance.

Table 3. *Correlation between Coping Strategies and Psychological Well-Being*

	Correlation with Psychological Well-Being					
	Autonomy		Personal Growth		Self-Acceptance	
	<i>r</i>	<i>p</i>	<i>R</i>	<i>p</i>	<i>r</i>	<i>P</i>
Cognitive Reappraisal	.307**	.000	.347**	.000	.475**	.000
Social Support	.158*	.026	.343**	.000	.391**	.000
Problem Solving	.319**	.000	.390**	.000	.425**	.000
Religiosity	.138	.051	.368**	.000	.488**	.000
Tolerance	.136	.056	.289**	.000	.140*	.048
Emotional Release	.057	.422	-.009	.898	-.002	.982
Overactivity	-.042	.557	-.154*	.029	-.184**	.009
Recreation	.280**	.000	.453**	.000	.459**	.000
Substance Use	.061	.389	-.020	.776	-.001	.994

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

The results indicated in table 3 that when bereaved Filipinos used coping strategies, specifically cognitive reappraisal, problem-solving, social support, and recreation, they are more likely to have autonomy, personal growth, and self-acceptance. It also implies that when bereaved Filipinos used religiosity and tolerance as their coping strategies, they are more likely to have personal growth and self-acceptance, while the use of overactivity implies that they are less likely to have personal growth and self-acceptance.

Concerning the impact of coping strategies on psychological well-being, Halstead et al. (2017) asserted that individuals who use problem-solving and social support coping strategies in dealing with stressors may incur fewer psychological costs. It may reflect good faith and religiosity that are highly prevalent in our community. Additionally, participants who displayed high levels of reappraisal were found to have reported less anger than those who did not (Juang et al., 2016). In the study of Iwasaki (2002, as cited in Alford et al., 2021), recreation and leisure activities reduce self-reported levels of stress and contribute to both physical and mental health in various contexts and among individuals. Some studies indicate the ability to accept uncertainty, which could be due to an increased tolerance of uncertainty when living with a long-term health problem (Kurita, Garon, Stanton, & Meyerow-itz, 2013, as cited in Rettie & Daniels, 2021).

However, individuals who habitually do overactivities may contribute to their psychological rigour and unwillingness to rely on others for support (Andrews et al., 2015b), and poorer psychological health (Callaghan & Morrissey, 1993; Kashdan & Rottenberg, 2010, as cited in Andrew et al., 2021).

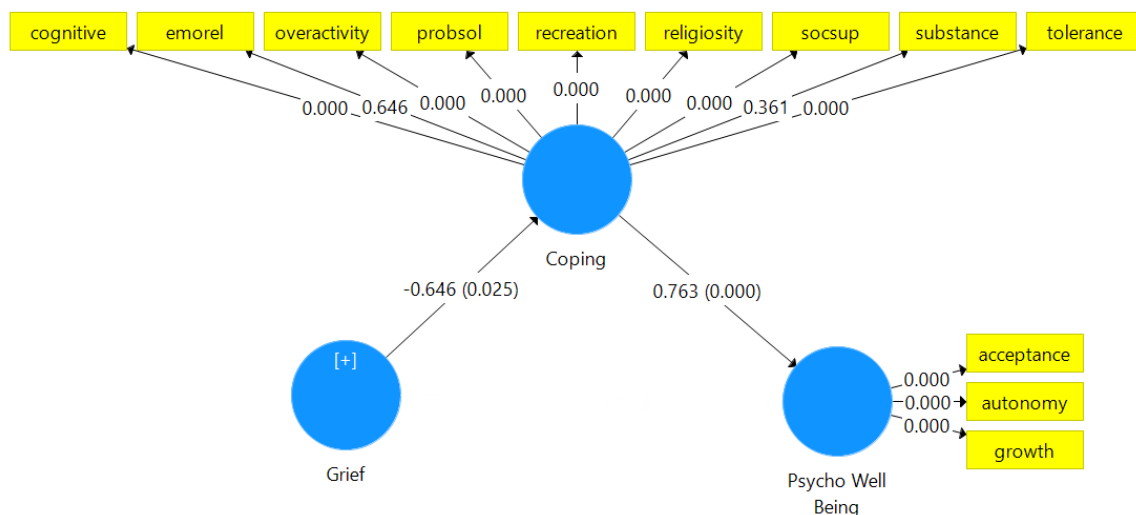


Table 4. Mediation Effects of Coping Strategies on the Effect of Grief on Psychological Well-Being

	Coefficients	T	P	Interpretation
Direct Effects				
CG -> PWB	-0.164	1.108	0.268	Not Significant
CG -> CS	-0.646	2.240	0.025	Significant
CS -> PWB	0.763	6.273	0.000	Significant
Total Effect				
CG -> PWB	-0.657	2.283	0.023	Significant
Indirect Effect				
CG -> CS -> PWB	-0.493	2.159	0.031	Significant; Full Mediation

Legend: CG – Complicated Grief, CS – Coping Strategies, PWB – Psychological Well-Being

The results in table 4 indicated the significant direct effect of Grief on Coping Strategies and Coping Strategies on Psychological Well Being. It demonstrated that the more symptoms of complicated grief one experiences, the less effective coping strategies one would use. However, less effective coping strategies would lead to lower psychological well-being. It is consistent with previous studies suggesting that coping strategies could lead to lower psychological well-being (Peña & Ritzer, 2017; Shamblaw et al., 2021).

Further, the total effect of Complicated Grief on Psychological Well was significant. However, excluding the mediating variable, the (direct) effect of Complicated Grief on Psychological Well Being was not significant. Finally, the indirect effect of Complicated Grief on Psychological Well Being through Coping Strategies was significant. It shows that Coping Strategies fully mediate the relationship between Complicated Grief and Psychological Well Being.

The overall results indicate that complicated grief does not directly affect psychological well-being. Instead, the higher level of complicated grief could lead to less effective coping strategies, which would, in turn, result in a lower level of psychological well-being. It further suggests that more effective coping strategies do not lead to higher psychological well-being alone. Instead, it is necessary to have lower levels of complicated grief to utilize good coping strategies that would lead to higher levels of psychological well-being.

This study provides new empirical evidence that CG symptomology could make a bereaved person use unhealthy coping strategies. In contrast, a cross-sectional study suggests that specific coping strategies caused by closeness to the deceased lead to complicated grief. Approach coping was associated with symptoms of complicated grief (Buqo et al., 2020). In addition, Schnider et al. (2007) also suggest that avoidant emotional coping predicted symptomology of complicated grief.

Overall, the statistical analysis performed in this chapter suggests that hypotheses were rejected except for the second hypothesis. The findings emphasized a relationship between coping strategies, symptoms of complicated grief, and psychological well-being with significant differences in terms of relationship and age of the deceased loved one and age and sex of the bereaved but not the type of death. Additionally, only the coping strategies were found to predict psychological well-being. Finally, the study found that coping strategies fully mediated the relationship between symptoms of complicated grief and psychological well-being.

Conclusion

The COVID-19 pandemic disrupted the living patterns, including the grieving process, leading to complicated grief. Despite that, this study found that bereaved Filipinos have lower levels of complicated grief symptomology and higher levels of psychological well-being. In addition, this study confirms that Filipinos commonly use adaptive coping strategies in times of grieving. Further, the results support the notion that the higher the psychological well-being, the lower level of complicated grief symptomology. Results also show that coping strategies are associated with higher levels of either psychological well-being or complicated grief symptomatology.

Coping strategies vary in terms of gender, age, and relationship. Interestingly, the immediate family of the deceased use more efficient coping strategies than friends and other family members despite higher complicated grief symptomology. In comparison with Bowlby's attachment style theory, the immediate family could still utilize adaptive coping strategies regardless of attachment styles. Surprisingly, there was no difference between COVID and non-COVID-related death. Contrary to our assumption, COVID-related deaths are inclined to higher levels of complicated grief symptomology.

Moreover, the results demonstrate that coping strategies predict psychological well-being. That is, bereaved Filipinos who use healthy coping strategies will also be high in psychological well-being. Finally, as the results show full mediation of coping strategies, it is appropriate to conclude that coping strategies promote higher psychological well-being. It implies that grief intervention programs should assist the bereaved in using healthy coping strategies. For instance, mental health professionals could help alleviate the symptoms of prolonged grief disorder by improving their problem-solving skills, improving their ability to accept their emotions and the situation, and using therapies that aim to reconstruct their thought patterns.

Nonetheless, the generalizability of this study might be questionable due to the nature of the non-probability sampling methods used, which may result in an under-representation of some coping strategies. In addition, the participants are primarily female and young adults, which could have affected the results. Despite its limitations, this study still contributes to the existing knowledge that bereaved Filipinos during the COVID-19 pandemic have high psychological well-being due to the coping strategies they use and not because of the little to no symptoms of complicated grief they experience. Thus, this study highlights the importance of coping strategies as a complete intervention for the bereaved Filipinos to enhance their psychological well-being during their grieving period. Future researchers are encouraged to increase the sample size or replicate different respondents and additional variables in different locations or environments. To increase quality and reliability, they can employ a mixed-methods strategy. In addition, an interview approach should be included in the instrument.

References

- [1] Andrews, N. E., Strong, J., Meredith, P. J., Gordon, K., & Bagraith, K. S. (2015b). "It's very hard to change yourself": an exploration of overactivity in people with chronic pain using interpretative phenomenological analysis. *Pain*, 156(7), 1215-1231. DOI: 10.1097/j.pain.000000000000161.
- [2] Andrews, N. E., Chien, C. W., Ireland, D., & Varnfield, M. (2021). Overactivity assessment in chronic pain: The development and psychometric evaluation of a multifaceted self-report assessment. *European Journal of Pain*, 25(1), 225-242. doi: 10.1002/ejp.1664.
- [3] Buqo, T., Ward-Ciesielski, E. F., & Krychiw, J. K. (2020). Do Coping Strategies Differentially Mediate the Relationship Between Emotional Closeness and Complicated Grief and Depression? *OMEGA - Journal of Death and Dying*, 84(4):985-997. doi: 10.1177/0030222820923454.
- [4] Chuqian C., & Suqin, T. (2021). Profiles of grief, post-traumatic stress, and post-traumatic growth among people bereaved due to COVID-19. *European Journal of Psychotraumatology* 12:1. DOI: 10.1080/20008198.2021.1947563.
- [5] Cucinotta, D., & Vanelli, M. (2020). WHO Declares COVID-19 a Pandemic? *Acta bio-medical: Atenei Parmensis*, 91(1), 157–160. DOI: 10.23750/abm.v91i1.9397.
- [6] Eisma, M. C., & Stroebe, M.S. (2021). Emotion Regulatory Strategies in Complicated Grief: A Systematic Review. *Behavior Therapy*, 52(1):234-249. DOI: 10.1016/j.beth.2020.04.004.
- [7] Eisma, M.C., & Tamminga A. (2020). Grief Before and During the COVID-19 Pandemic: Multiple Group Comparisons. *Journal of Pain and Symptom Management*, 60(6). DOI: 10.1016/j.jpainsymman.2020.10.004.
- [8] Eisma, M. C., Tamminga, A., Smid, G. E., & Boelen, P. A. (2021). Acute grief after deaths due to COVID-19, natural causes and unnatural causes: An empirical comparison. *Journal of affective disorders*, 278, 54–56. DOI: 10.1016/j.jad.2020.09.049.
- [9] Goveas, J. S., & Shear, M. K. (2020). Grief and the COVID-19 pandemic in older adults. *American of Journal Geriatric Psychiatry*, 28, 1119–1125. DOI: 10.1016/j.jagp.2020.06.021.

- [10]Halstead, E., Griffith, G. &Hastings, R., (2017). Social Support, Coping and Positive Perceptions as Potential Protective Factors for the Wellbeing of Mothers of Children with Intellectual and Developmental Disabilities. *International Journal of Developmental Disabilities*, 221-228. DOI: 10.1080/20473869.2017.1329192.
- [11]Han, N., Chen, G., Li, S., Huang, F., Wang, X., Ren, X., & Zhu, T. (2021). Impacts of the COVID-19 Pandemic on the Bereaved: A Study of Bereaved Weibo Users. *Healthcare (Basel, Switzerland)*, 9(6), 724. DOI: 10.3390/healthcare9060724.
- [12]Hogan, N. S. and Schmidt, L. A. (2010). Testing the Grief to Personal Growth Model using Structural Equation Modeling. Pages 615-634. doi: 10.1080/07481180290088338.
- [13]Hoe, S. L. (2008). Issues and procedures in adopting structural equation modeling technique. *Journal of Quantitative Methods*, 3(1), 76-83. <http://jaqm.ro/issues/volume-3,issue-1/pdfs/hoe.pdf>.
- [14]Hox, J.J., & Bechger, T. (1998). An introduction to structural equation modeling. *Family Science Review*, 11, 354-373. <http://joophox.net/publist/semfamre.pdf>.
- [15]Juang, L. P., Moffitt, U., Kim, S. Y., Lee, R. M., Soto, J. A., Hurley, E., ... & Whitbourne, S. K. (2016). Cognitive reappraisal and expressive suppression: Links to racial-ethnic discrimination and adjustment among Latino/a and Asian-heritage college students. *Journal of Adolescence*, 53, 21-33. DOI: 10.1016/j.adolescence.2016.08.012.
- [16]Parisi, A., Sharma, A., Howard, M. O., & Wilson, A. B. (2019). The relationship between substance misuse and complicated grief: A systematic review. *Journal of substance abuse treatment*, 103, 43-57. DOI: 10.1016/j.jsat.2019.05.012.
- [17]Peña, L., & Ritzer, D. (2017). Mindfulness, Coping, and Psychological Well-being Among Diverse Populations. *The Winthrop McNair Research Bulletin*. 3(1), 8. <https://digitalcommons.winthrop.edu/cgi/viewcontent.cgi?article=1039&context=wmrbr>.
- [18]Rettie, H., & Daniels, J. (2021). Coping and tolerance of uncertainty: Predictors and mediators of mental health during the COVID-19 pandemic. *American Psychologist*, 76(3), 427. DOI: 10.1037/amp0000710.
- [19]Ryff, C. D. & Keyes, C. L. (1995). The Structure of Psychological Well-Being. *Journal of Personality and Social Psychology*, 69(4):719-27. DOI: 10.1037//0022-3514.69.4.719.
- [20]Rilveria, J. R. C. (2018). The Development of the Filipino Coping Strategies Scale. *Asia-Pacific Social Science Review*, 18(1), 111-126. <https://apsr.com/wp-content/uploads/2018/06/RA-8.pdf>.
- [21]Ristriyani, R., Rachmawati, I. N., & Afiyanti, Y. (2018). Children's HIV Status and the Acceptance Stage of Grief amongst HIV-Positive Women. *Makara Journal of Health Research*, 22(2), 3. DOI:10.7454/msk.v22i2.8545.
- [22]Schnider, K.R., Elhai, J.D., & Gray, M.J. (2007). Coping Style Use Predicts Post-Traumatic Stress and Complicated Grief Symptom Severity Among College Students Reporting a Traumatic Loss. *Journal of Counseling Psychology*. 54(3) 344-350. DOI: 10.1037/0022-0167.54.3.344.
- [23]Shear, M. K., et. al. (2011). Complicated grief and related bereavement issues for DSM-5. *Depression and Anxiety*. Volume 28, Issue 2 p. 103-117. DOI: 10.1002/da.20780.
- [24]Walker, W. (2005). The strengths and weaknesses of research designs involving quantitative measures. *Journal of Research in Nursing*, 10(5), 571-582. DOI: 10.1177/136140960501000505.

The Correlation between Perceptions of Gender-Based Violence and Gender: A Cross-Sectional Study among University Students at Asia-Pacific International University, Thailand

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Abstract: Gender-based violence (GBV), which primarily affects women's health, is predicted by attitudes conducive to the acceptance of GBV. While there are extensive studies on the perception of GBV and its correlation with gender, only a few studies have analyzed the attitudes toward GBV in a predominantly Christian, Asian university and additionally, how religion correlates with GBV. This cross-sectional study empirically compared the difference in perception of GBV between genders, using survey data collected from 182 students in Asia-Pacific International University, Thailand, with 54.1% female respondents and 43.6% male respondents. The predictive factors of acceptance of GBV were assessed through an online questionnaire which included demographic data, attitudes toward gender norms, and justification of GBV. With SPSS, Pearson's Coefficient was used to determine the correlation between gender and perceptions of GBV, as well as one-way Analysis of variance to determine whether there are any statistically significant differences between the perceptions of GBV and the religion of the respondents. The study results show that gender and gender role beliefs have a significant positive correlation [$r(168) = .155, p = .046$] as shown by Pearson's correlation. Religion has a significant effect on justification of GBV as shown by one-way ANOVA [$F(1,168) = 3.915, p = .046$]. This study shows that gender and religion, namely, gender role beliefs and justification of GBV did have a significant effect on the attitudes toward acceptance of GBV.

Keywords: *gender-based violence, university students, perceptions of gender-based violence*

Introduction

The definition of Gender-based Violence according to the United Nations High Commissioner for Refugees - UNHCR (n.d.) is harmful acts directed at an individual based on their gender. The majority of the burden of Gender-based Violence (GBV) falls on women. It is estimated that one in three women will experience GBV in their lifetime. GBV includes but is not limited to sexual, physical, mental, and economic harm. GBV can be inflicted by strangers, family, institutions, and intimate partners. Physical violence involves using physical force, strength, or a weapon to harm or injure the woman. Sexual violence includes abusive sexual contact, making a woman engage in a sexual act without her consent, and attempted or completed sex acts with a woman who is ill, under pressure, or under the influence of alcohol or other drugs (WHO, 2009). Addressing GBV as a pressing public health issue will also contribute to the United Nations Sustainable Development Goals in achieving gender equality, therefore it is a very important issue to be considered (UN, 2015).

Literature Review

Gender-based violence, a prevalent problem that affects the health of women, is mainly predicted by attitudes conducive toward the acceptance of GBV. These attitudes differ across gender, beliefs in gender roles, and religion.

Prevalence and Effects

Gender-based violence does not only affect adult women, but also young girls. An estimated 83 to 102 million women in 28 EU member states have experienced at least one form of sexual harassment since the age of 15 (Latcheya, 2015). Gender-based violence can be inflicted by both intimate partners and

non-intimate partners. Globally, 27% of women ages fifteen to forty-nine have been subjected to intimate partner violence (Kalra, 2021). Gross (2006) found that 27% of college women had experienced unwanted sexual contact. Cultures that tolerate violence against women and actively victim-blame also exhibit low violence reporting rates (Kalra, 2021).

Gender-based violence affects the physical, mental, and emotional health of women. Physical and sexual violence can lead to issues such as bruises, bone fractures, hemorrhaging, pelvic pain, sexually transmitted infections such as HIV, unwanted pregnancies, unsafe abortions, gynecological disorders, chronic diseases, and even death (Kalra, 2021). Ninety-one percent of pregnant women reported experiencing gender-based violence, of which 41.8% was sexual (Gurung, 2016). Beyond the victim herself, the violence frequently extends to cause broken bones and deformities in the fetus, and even miscarriage. Additionally, GBV affects the psychological health of women leading to an assortment of issues such as substance abuse, depression, post-traumatic stress disorder, and anxiety disorders (Kalra, 2021). Women who experienced abuse had a significantly higher rate of post-traumatic stress disorder related symptoms than women who were not abused (Pico-Alfonso, 2005).

Attitudes

One of the defining factors that exacerbate GBV are the societal attitudes associated with it. The perceptions around GBV seem to be sympathetic towards the abuser. Men rationalize perpetrating or allowing GBV because some of them believe in strict gender roles such as it is acceptable for men to discipline their wives, they own their partners, it is a way to emphasize authority and control women, or even understanding violence to be an important factor of manhood (Darj, 2017; Sikweyiya, 2020). These perceptions are not limited to males, sadly, the women who justify physical and sexual violence are the women who are most likely to experience either physical or sexual violence (Hayati, 2011). The justification of GBV is common and like-minded perceptions are found in all genders, stemming from the beliefs that women are somehow inferior and not equal to men.

Keller et al. (2017) shows that more positive attitudes toward women influence school-going boys to intervene when witnessing GBV. Moreover, male adolescents who had more equitable gender attitudes had less self-reported violence perpetration, including dating abuse and sexual harassment (Miller, 2020).

Attitudes regarding GBV include, but are not limited to, the acceptability of violence against women, community responses to women experiencing violence, and the acceptability of women refusing sex or sexual activity (Abramsky et al., 2012). Attitudes affect the tolerance of women in dealing with situations of GBV. Li (2020) found that in college students, the tolerance for intimate partner violence was affected primarily by the students' attitudes towards GBV. The intention to commit violent behaviours against women was predicted significantly by the attitude of Taiwanese university students (Lin, 2021). In a study done on medical and nursing students by Majumdar (2004), it was evident that attitudes towards GBV can affect healthcare staff assisting the victims since the students could believe that the abuse was justified. Noticeably, attitudes in which GBV was justified led to worse outcomes for women, ranging from community and medical support, to enduring and performing violence. The perceptions about GBV, therefore, affect the pervasive spread of certain behaviours such as decreased support seeking, decreased help assisting, and increased assaultive behaviours. As behaviour is determined by attitudes, it is necessary to assess, analyze, and attempt to change attitudes as a catalyst for creating a safer, healthier society for women.

The continuation of a community intervention to prevent violence against women by Abramsky et al. (2014), discovered that the intervention was associated with a lower social acceptance of IPV among women and men, a significantly greater acceptance that women can refuse sex, a more supportive community response, and lower levels of both physical and sexual IPV directed towards women. There

is a clear correlation between attitudes and behaviours, with attitudes affecting the behaviours of perpetrators, victims, and social workers or healthcare providers. This brings our attention to the fact that attitudes can change with intervention, and accordingly, so can behaviours, which demonstrates why analyzing attitudes are important in addressing issues regarding women's rights and their health. Attitudes differ over demographics and cultures and some of the predictive factors of attitude include gender, beliefs in strict gender roles, justification of GBV, and religion which will be discussed below.

Gender

Certain predictive factors of attitudes seem to be more prevalent than others. Gender is a statistically significant predictive factor of attitudes towards gender-based violence (Yilmaz, 2020). Attitudes that condone GBV are more identified in males than females. The attitudes of undergraduate male students were more accepting of rape than females (Talbot, 2010). As seen in multiple studies, men have higher levels of victim-blaming, are more tolerant of GBV, and are more accepting of rape myths than women (Johnson, 1997; Caron, 1997; Kamal, 2013).

Female medical students had stronger beliefs against GBV than their male counterparts (Majumdar, 2004). According to a study done by De Vries (2014), even adolescent boys had a more positive view of forced sex than girls, associating it with signs of love and even acceptable punishments for the girl. Even among the youth of indigenous tribes, victim-blaming attitudes were rampant among men (War, 2013). Acceptive attitudes toward GBV in men are seemingly unchanging across cultures, ages, and continents.

Gender Role Beliefs and Justification of GBV

The different beliefs concerning gender roles also play a role in GBV. Individuals who had more traditional and conservative beliefs about gender roles had more rape-accepting attitudes than individuals who believed in more egalitarian and equalitarian gender roles (Talbot, 2010). The same was explored in a study that confirmed that those with conservative gender roles believe in rape myths to a greater extent than those with liberal gender roles and another study that stated that traditional and rigid gender roles were associated with tolerant domestic violence attitudes (Terraza-Carillo, 1990; Johnson, 1997). The presence of strict gender roles oftentimes leads to gender-based power imbalances which increase the risk of women experiencing IPV due to beliefs in male superiority and dominance (Chilanga, 2020). The existence of traditional gender roles in itself is not unsuitable, it is because most of these traditional gender roles are based in cultures with higher levels of sexism which indicate a more accepting stance toward sexual violence (Del Valle, 2020). Conservative gender roles expect women to be submissive, controllable, and voiceless about their experiences and wishes even when it infringes on their rights as a human.

Religion

Religious fundamentalism is the approach of religious groups that believe in the superiority of their religious teachings and believe that they must be applied to all social, economic, and political aspects (Kossowska, 2018; Razaghi et al., 2021). A well-known Christian fundamentalist group is the Seventh Day Adventists, which consist of a majority population within Asia Pacific International University, the location of my proposed research.

A study done in a religiously affiliated university found that religious fundamentalism had a positive association with rape myth acceptance, signifying that rape myth acceptance increases as religious fundamentalism increases (Ensz, 2020). An extreme internalization of religious fundamental values, such as preserving a stereotypical patriarchal society, can set the stage for gender-based violence by heterosexual men towards women, especially lesbians and queer women, and increase the risk of violence towards these already marginalized, vulnerable groups. (Vincent et al., 2011).

On Christian campuses, research indicates that fewer acts of sexual violence are committed, while people are more willing to intervene in sexual violence prevention than on secular campuses (Foubert

et al. 2021). On the contrary, in another study done by Vanderwoerd and Lankhof (2020), it was found that 23% of women in Christian colleges reported experiencing stalking behaviours, which is a form of GBV, more than five times since they turned eighteen years of age. This study affirmed that women are at greater risk for sexual violence than men and that Christian colleges are not immune to sexual violence.

While most of the predictive factors of attitudes toward GBV were analyzed in separate studies, my research will fill in the gap and analyze the perceptions of GBV by exploring the predictive factors primarily gender, as well as religion, justification of GBV, and gender roles together.

Research Objectives

Gender-based violence is a highly prevalent problem which affects the health of women and is mainly predicted by attitudes conducive towards acceptance of GBV, with these attitudes differing over gender, religion, and beliefs in gender roles. This study will contribute to the body of knowledge about GBV and inspect the perceptions on college campuses that could either be a contributing or suppressing factor to acceptance of GBV.

Objectives

Q: Are there any significant correlations regarding the perceptions of GBV and gender among students at APIU?

H: There is no significant correlation between the gender of students and their perceptions of GBV.

Q: Are there any significant differences in perceptions towards GBV between APIU students of different religious beliefs, i.e. Christian Seventh Day Adventists, and other religions?

H: There are no significant differences in perceptions of GBV between different religions

Methods

Study Design

The research is a quantitative, observational cross-sectional study in the form of an online questionnaire about the perceptions of GBV in APIU Students. The study variables consist of:

Dependent: Perceptions regarding GBV

Independent: Gender, Religion

Population and Sample

The population studied were students enrolled at Asia-Pacific International University, during the academic year of 2021-2022. Participants were reached through Teams and Messenger and self-selected to be a part of the study. Using a confidence level of 95% and a margin of error of 5% for 900 students, the sample size was determined at 270 participants.

Instrumentation

The 20 questions that were included in the study were adapted from two sources:

The Social Norms and Beliefs about Gender-Based Violence Scale which is found in the public domain (Perrin, Marsh et al., 2019). A questionnaire on GBV in Myanmar conducted by UKAID, which is found in the public domain (UKAID, 2016). The structure of the survey addresses perceptions on: gender roles, the justification and tolerance, and the acceptability of GBV. The scale used was the Likert Scale. Within the sections of the survey, average scores were taken. Lower scores in the sections of Gender roles and Justification of GBV would specify more conducive views toward GBV.

Data collection began after the IRB approval, and online survey questionnaires were distributed through Teams and Facebook Messenger to AIU students in the form of a Google Forms link.

Data Analysis

The data analysis was performed using the statistical software IBM SPSS Statistics for Windows OS, version 28. A 95% confidence interval, and $\alpha < .05$ was used. The study sample was described using descriptive statistics. The statistical models used were Pearson's Coefficient and One-way Analysis of variance ANOV. A bivariate correlation of Pearson's Coefficient was used to assess the relationship between gender and perceptions. A one-way analysis of variance was used to determine if there were any statistically significant differences between the scores of perceptions and religion of the respondents.

Ethical Considerations

IRB approval was sought. The voluntary participants received all information, procedures, benefits, confidentiality, and risks of the study explained to them in a consent form before they consented to participate in the study. All participants retained the right to refuse or withdraw participation at any time before submitting the form. All the participants' responses were anonymous and no identifying information was in the data.

Results

Voluntarily, 182 participants attempted the online questionnaire. Of the surveys distributed, 172 (94.5%) questionnaires were valid after removing incomplete questionnaires. The ages of the participants ranged from 16 to 25 or over. Further, 93 (54.1%) participants were female and 75 (43.6%) were male. The respondents were mostly (81.3%) from the international program, while 16.4% were from the Thai program. Of the students, 76% of them were Seventh-Day Adventist Christian, 14% Buddhist, 4.1% Atheist/Agnostic, and 5.2% Christians. With regards to the year of study, 63 (36.6%) of the participants were senior students, 38 (22.1%) were juniors, 39 (22.7%) were sophomores, and 32 (18.6%) were freshmen.

Table 1.

Pearson's Correlation between gender and perceptions of gender roles

		Gender	Mean Score of Gender Roles
Gender	Pearson Correlation	1	.155 [*]
	Sig. (2-tailed)		.046
	N	168	168
Mean Score of Gender Roles	Pearson Correlation	.155 [*]	1
	Sig. (2-tailed)	.046	
	N	168	172

*. Correlation is significant at the 0.05 level (2-tailed).

A Pearson correlation coefficient was computed to assess the relationship between the perceptions of GBV and respondent gender. As seen in Table 1 there was a weak, positive correlation between the gender and gender role beliefs, $r(168) = .155$ and the relationship was statistically significant ($p = .046$), two-tailed.

Table 2.*Correlation between gender and justification of GBV*

		Gender	Mean Score of Justification
Gender	Pearson Correlation	1	.024
	Sig. (2-tailed)		.761
	N	168	168
Mean Score of Justification	Pearson Correlation	.024	1
	Sig. (2-tailed)	.761	
	N	168	172

Pearson's correlation coefficient was also used to assess the relationship between the justification of GBV and the respondent's gender. As seen in Table 2, there was a very weak, positive correlation, $r(168) = .024$. However, the relationship was not significant ($p = .761$), so gender was not associated with the justification of GBV.

Table 3.*Mean Score of Gender Roles*

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Male	75	4.000	.8161	.0942	3.812	4.188	1.4	5.5
Female	93	4.255	.8141	.0844	4.087	4.422	2.3	5.5
Total	168	4.141	.8224	.0634	4.016	4.266	1.4	5.5

Table 4.

ANOVA

Mean Score of Gender Roles

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	2.696	1	2.696	4.060	.046
Within Groups	110.250	166	.664		
Total	112.947	167			

A one-way ANOVA to assess the effect of gender, on gender role beliefs in AIU students showed that the effect of gender was significant, $[F(1,166) = 4.06, p = .046]$. Table 3 indicates the average score of gender role beliefs for males ($M = 4.0, SD = 0.8$) was significantly lower than the scores for females ($M = 4.2, SD = 0.81$), $p = .046$.

Table 5.

Descriptives

Mean Score of Justification

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Male	75	4.285	.7674	.0886	4.108	4.462	1.1	5.0
Female	93	4.323	.8152	.0845	4.155	4.490	1.4	5.0
Total	168	4.306	.7921	.0611	4.185	4.426	1.1	5.0

Table 6.
ANOVA

Mean Score of Justification

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.059	1	.059	.093	.761
Within Groups	104.715	166	.631		
Total	104.774	167			

Table 5 reveals that the male participants (N=75) had an average score of 4.28 ($SD = 0.76$), while the female participants (N=93) had an average score of 4.32 ($SD = 0.81$). Table 6 shows that there is no statistically significant difference in the mean score of justification of GBV between males and females analyzed as demonstrated by one-way ANOVA [$F(1,166) = 0.093, p=.76$].

Table 7.
Descriptives

Mean Score of Gender Roles

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
SDA	130	4.194	.7921	.0695	4.056	4.331	1.4	5.5
Other	40	4.088	.9630	.1523	3.780	4.395	2.2	5.5
Total	170	4.169	.8336	.0639	4.043	4.295	1.4	5.5

Table 8.
ANOVA

Mean Score of Gender Roles

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.346	1	.346	.496	.482
Within Groups	117.099	168	.697		
Total	117.445	169			

Table 7 reveals that the respondents who self-identified as SDA Christians (N=130) had an average gender role belief score of 4.19 ($SD = 0.79$), while the other respondents (N=40) had an average score of 4.08 ($SD = 0.96$). Table 8 indicates that there is no statistically significant difference in the mean score of gender role beliefs between SDA and other religions analyzed as demonstrated by one-way ANOVA [$F(1,166) = .496, p=.482$].

Table 9.
Descriptives

Mean Score of Justification

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
SDA	130	4.381	.7083	.0621	4.258	4.504	1.1	5.0
Other	40	4.100	.9969	.1576	3.781	4.419	1.4	5.0
Total	170	4.315	.7915	.0607	4.195	4.435	1.1	5.0

Table 10.**ANOVA****Mean Score of Justification**

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	2.411	1	2.411	3.915	.049
Within Groups	103.471	168	.616		
Total	105.882	169			

Table 9 reveals that the respondents who self-identified as SDA Christians (N=130) had an average justification of GBV score of 4.38 ($SD = 0.70$), while the other respondents (N=40) had an average score of 4.10 ($SD = 0.99$). Table 10 shows ($p=.049$) that there is a statistically significant difference in the mean score of justification of GBV between SDA and other religions analyzed as demonstrated by one-way ANOVA [$F(1,168) = 3.915, p=.049$].

Table 11.**Correlations between Religion, score of gender roles, and score of justification**

		Religion	Mean Score of Gender Roles	Mean Score of Justification
Religion	Pearson Correlation		-.054	-.151 ^{**}
	Sig. (2-tailed)		.482	.049
	N		170	170
Mean Score of Gender Roles	Pearson Correlation	-.054		
	Sig. (2-tailed)	.482		
	N	170		
Mean Score of Justification	Pearson Correlation	-.151 ^{**}		
	Sig. (2-tailed)	.049		
	N	170		

*. Correlation is significant at the 0.05 level (2-tailed).

Table 11 reaffirms the significance shown in ANOVA by revealing a weak negative correlation between both beliefs in gender roles, [$r(170) = -.054, p=.482$] and justification, [$r(170) = -.151, p = 0.49$], with religion. From these two correlations, only justification is statistically significant.

Table 12.

		Mean Score of Gender Roles	Mean Score of Justification
Mean Score of Gender Roles	Pearson Correlation	1	.706 ^{***}
	Sig. (2-tailed)		<.001
	N	172	172
Mean Score of Justification	Pearson Correlation	.706 ^{***}	1
	Sig. (2-tailed)	<.001	
	N	172	172

***. Correlation is significant at the 0.01 level (2-tailed).

Lastly, Table 12 shows us the bivariate correlation between scores of gender roles and justification. The data indicates a very strong positive correlation $r(172) = .706$, which is statistically significant at the $p < .001$ level.

Discussion

This study explored how university students perceive GBV, and the predictive factors of GBV such as gender roles.

The results signify a very strong, significant, positive correlation between the predictive factors of acceptance of GBV. Lower mean scores stipulate conducive views toward GBV acceptance, the correlation matrix shows that when the score of beliefs in gender roles decreases, i.e., becomes stricter and more conservative, the score beliefs in justification decreases as well, i.e., become more disregarding toward GBV victims.

The bivariate correlation coefficients of gender and gender roles establish that the relationship has a significant, positive correlation. Based on the data analysis, we can conclude that there is evidence that gender is related to perceptions of GBV, namely that male students have a greater acceptance of GBV, as was hypothesized ($r=.155$, $p<.05$). This finding is consistent with the literature. However, for the justification of GBV, the correlation with gender was not significant indicating that both males and females had similar views toward the justification of GBV.

ANOVA found that religion does not have a significant effect on gender role beliefs. This result was surprising because according to the literature it was expected that fundamentalist religions would influence beliefs about gender roles. However, the data analysis discovered that religion significantly affects the justification of GBV.

A Pearson's correlation was carried out for religion to verify the ANOVA results and it was found that religion had an overall negative correlation with perceptions of GBV. SDA Christians have a significant negative correlation with justifying GBV, inferring that SDA Christians have fewer beliefs that GBV can be justified compared to the other religions in the study.

Limitations

While interpreting the findings of the study, there are some limitations that need to be considered. The highest percentage of the study respondents were senior students ($N=63$, 36.6%), which means that most of the respondents were more educated compared to the rest, and that could influence their perceptions. Also, there were more female participants ($N=93$, 54.1%) than males ($N=75$, 43.6%), which might skew the overall results. Since it is a Christian university, the overwhelming number of respondents were SDA Christian, leaving only a few other religions, which would affect the validity of the ANOVA analysis of religion. There were no considerations given toward culture in the demographic questions of the survey, which could be a limitation because there are differences in perceptions beyond gender or religion, accounted for by cultural norms. However, the target population at AIU is multicultural and the multiplicity of cultures neutralizes the overall effect of culture. Since this study was conducted in English and was not translated into Thai, the number of Thai respondents was less.

Conclusion

This study examined the correlation between gender and religion with the perceptions of GBV. Some predictive factors for GBV were analyzed, including gender roles and justification of GBV, and for all predictive factors, the positive correlation in males was stronger than in females. For all predictive factors, the significant effect of religion was positive, with the fundamentalist SDA Christian religion less acceding to acceptance of GBV, which contradicted the literature.

Overall, the results of my summary are important because they lend insights into the population of students at AIU and their beliefs. Although these results are strongly corroborated by previous findings which verify the disparity of acceptance between males and females, this study incorporated both gender and religion as predictive factors of GBV acceptance in a Christian university in an Asian country.

Future researchers could consider investigating the effect of culture or educational status on the acceptance of GBV within this multicultural, religious university.

References

- [1] Abramsky, T., Devries, K., Kiss, L., Francisco, L., Nakuti, J., Musuya, T., Kyegombe, N., Starmann, E., Kaye, D., Michau, L., & Watts, C. (2012). A community mobilization intervention to prevent violence against women and reduce HIV/AIDS risk in Kampala, Uganda (the SASA! Study): study protocol for a cluster randomised controlled trial. *Trials*, 13(96). <https://doi.org/10.1186/1745-6215-13-96>
- [2] Abramsky, T., Devries, K., Kiss, L., Nakuti, J., Kyegombe, N., Starmann, E., Cundill, B., Francisco, L., Kaye, D., Musuya, T., Michau, L., & Watts, C. (2014). Findings from the SASA! Study: a cluster randomized controlled trial to assess the impact of a community mobilization intervention to prevent violence against women and reduce HIV risk in Kampala, Uganda. *BMC medicine*, 12, 122. <https://doi.org/10.1186/s12916-014-0122-5>
- [3] Ali, T. S., Mogren, I., & Krantz, G. (2013). Intimate partner violence and mental health effects: a population-based study among married women in Karachi, Pakistan. *International journal of behavioral medicine*, 20(1), 131–139. <https://doi.org/10.1007/s12529-011-9201-6>
- [4] Alp Yilmaz, F., & Şener Taplak, A. (2020). Relationship between self-esteem, perception of gender and attitudes towards dating violence among university students. *Perspectives in psychiatric care*, 10.1111/ppc.12634. Advance online publication. <https://doi.org/10.1111/ppc.12634>
- [5] Arnold, D., Gelaye, B., Goshu, M., Berhane, Y., & Williams, M. A. (2008). Prevalence and risk factors of gender-based violence among female college students in Awassa, Ethiopia. *Violence and victims*, 23(6), 787–800. <https://doi.org/10.1891/0886-6708.23.6.787>
- [6] Baiocchi, M., Friedberg, R., Rosenman, E., Amuyunzu-Nyamongo, M., Oguda, G., Otieno, D., & Sarnquist, C. (2019). Prevalence and risk factors for sexual assault among class 6 female students in unplanned settlements of Nairobi, Kenya: Baseline analysis from the IMPower & Sources of Strength cluster randomized controlled trial. *PloS one*, 14(6), e0213359. <https://doi.org/10.1371/journal.pone.0213359>
- [7] Berbegal-Bolsas, M., Gasch-Gallén, Á., Oliván-Blázquez, B., Sánchez Calavera, M. A., García-Arcega, P., & Magallón-Botaya, R. (2020). Variables associated with a higher awareness of gender-based violence by students of the health sciences and social work. *Gaceta sanitaria*, S0213-9111(20)30210-7. Advance online publication. <https://doi.org/10.1016/j.gaceta.2020.09.005>
- [8] Bryant, R. A., Schafer, A., Dawson, K. S., Anjuri, D., Mulili, C., Ndogoni, L., Koyiet, P., Sijbrandij, M., Ulate, J., Harper Shehadeh, M., Hadzi-Pavlovic, D., & van Ommeren, M. (2017). Effectiveness of a brief behavioural intervention on psychological distress among women with a history of gender-based violence in urban Kenya: A randomised clinical trial. *PLoS medicine*, 14(8), e1002371. <https://doi.org/10.1371/journal.pmed.1002371>
- [9] Caron, S. L., & Carter, D. B. (1997). The relationships among sex role orientation, egalitarianism, attitudes toward sexuality, and attitudes toward violence against women. *The Journal of social psychology*, 137(5), 568–587. <https://doi.org/10.1080/00224549709595479>
- [10] Chilanga, E., Collin-Vezina, D., Khan, M. N., & Riley, L. (2020). Prevalence and determinants of intimate partner violence against mothers of children under-five years in Central Malawi. *BMC public health*, 20(1), 1848. <https://doi.org/10.1186/s12889-020-09910-z>
- [11] Darj, E., Wijewardena, K., Lindmark, G., & Axemo, P. (2017). 'Even though a man takes the major role, he has no right to abuse': future male leaders' views on gender-based violence in

- Sri Lanka. *Global health action*, 10(1), 1348692.
<https://doi.org/10.1080/16549716.2017.1348692>
- [12] De Vries, H., Eggers, S. M., Jinabhai, C., Meyer-Weitz, A., Sathiparsad, R., & Taylor, M. (2014). Adolescents' beliefs about forced sex in KwaZulu-Natal, South Africa. *Archives of sexual behavior*, 43(6), 1087–1095. <https://doi.org/10.1007/s10508-014-0280-8>
- [13] Ensz, S., & Jankowski, P. J. (2020). Religiousness and Rape Myth Acceptance: Risk and Protective Effects. *Journal of interpersonal violence*, 35(7-8), 1671–1693.
<https://doi.org/10.1177/0886260517698281>
- [14] Ferro, C., Cermele, J., & Saltzman, A. (2008). Current perceptions of marital rape: some good and not-so-good news. *Journal of interpersonal violence*, 23(6), 764–779.
<https://doi.org/10.1177/0886260507313947>
- [15] Foubert, J. D., Durham, A., Houston, M., & Vanderwoerd, J. (2021). Sexual Violence at Christian and Secular Universities: Does Institutional Type Matter? *Christian Higher Education*, 20(4), 257–270. <https://doi.org/10.1080/15363759.2020.1806143>
- [16] Gelaye, B., Arnold, D., Williams, M. A., Goshu, M., & Berhane, Y. (2009). Depressive symptoms among female college students experiencing gender-based violence in Awassa, Ethiopia. *Journal of interpersonal violence*, 24(3), 464–481.
<https://doi.org/10.1177/0886260508317173>
- [17] Gross, A. M., Winslett, A., Roberts, M., & Gohm, C. L. (2006). An examination of sexual violence against college women. *Violence against women*, 12(3), 288–300.
<https://doi.org/10.1177/1077801205277358>
- [18] Gurung, S., & Acharya, J. (2016). Gender-based Violence Among Pregnant Women of Syangja District, Nepal. *Osong public health and research perspectives*, 7(2), 101–107.
<https://doi.org/10.1016/j.phrp.2015.11.010>
- [19] Hayati, E. N., Högborg, U., Hakimi, M., Ellsberg, M. C., & Emmelin, M. (2011). Behind the silence of harmony: risk factors for physical and sexual violence among women in rural Indonesia. *BMC women's health*, 11, 52. <https://doi.org/10.1186/1472-6874-11-52>
- [20] Jewkes, R., Dunkle, K., Jama-Shai, N., & Gray, G. (2015). Impact of exposure to intimate partner violence on CD4+ and CD8+ T cell decay in HIV infected women: longitudinal study. *PloS one*, 10(3), e0122001. <https://doi.org/10.1371/journal.pone.0122001>
- [21] Johnson, B.E., Kuck, D.L. & Schander, P.R. Rape Myth Acceptance and Sociodemographic Characteristics: A Multidimensional Analysis. *Sex Roles* 36, 693–707 (1997).
<https://doi.org/10.1023/A:1025671021697>
- [22] Kamal, A., Shaikh, I. A., & Shaikh, M. A. (2010). Comparative analysis of attitudes and perceptions about rape among male and female university students. *Journal of Ayub Medical College, Abbottabad : JAMC*, 22(2), 108–110.
- [23] Kalra, N., Hooker, L., Reisenhofer, S., Di Tanna, G.L., Garcia-Moreno, C. (2021). Training healthcare providers to respond to intimate partner violence against women. *Cochrane Database of Systematic Reviews*, 5. DOI: 10.1002/14651858.CD012423.pub2
- [24] Keller, J., Mboya, B. O., Sinclair, J., Githua, O. W., Mulinge, M., Bergholz, L., Paiva, L., Golden, N. H., & Kapphahn, C. (2017). A 6-Week School Curriculum Improves Boys' Attitudes and Behaviors Related to Gender-Based Violence in Kenya. *Journal of interpersonal violence*, 32(4), 535–557. <https://doi.org/10.1177/0886260515586367>
- [25] Klement, K., & Sagarin, B. (2017). Nobody Wants to Date a Whore: Rape-Supportive Messages in Women-Directed Christian Dating Books. *Sexuality & Culture*, 21(1), 205–223.
<https://doi.org/10.1007/s12119-016-9390-x>
- [26] Kossowska, M., Szwed, P., Wyczesany, M., Czarnek, G., & Wronka, E. (2018). Religious Fundamentalism Modulates Neural Responses to Error-Related Words: The Role of Motivation Toward Closure. *Frontiers in Psychology*, 9.
<https://doi.org/10.3389/fpsyg.2018.00285>

- [27] Krishnan S. (2005). Gender, caste, and economic inequalities and marital violence in rural South India. *Health care for women international*, 26(1), 87–99. <https://doi.org/10.1080/07399330490493368>
- [28] Li, L., Sun, I. Y., & Button, D. M. (2020). Tolerance for Intimate Partner Violence: A Comparative Study of Chinese and American College Students. *Journal of interpersonal violence*, 35(21-22), 4533–4557. <https://doi.org/10.1177/0886260517716941>
- [29] Lin, C. Y., Tseng, Y. H., Lin, M. L., & Hou, W. L. (2021). Factors Related to Intentions to Commit Dating Violence among Taiwanese University Students: Application of the Extended Theory of Planned Behavior. *International journal of environmental research and public health*, 18(4), 1956. <https://doi.org/10.3390/ijerph18041956>
- [30] Majumdar B. (2004). Medical and nursing students' knowledge and attitudes toward violence against women in India. *Education for health (Abingdon, England)*, 17(3), 354–364. <https://doi.org/10.1080/13576280400002627>
- [31] Miller, E., Culyba, A. J., Paglisotti, T., Massof, M., Gao, Q., Ports, K. A., Kato-Wallace, J., Pulerwitz, J., Espelage, D. L., Abebe, K. Z., & Jones, K. A. (2020). Male Adolescents' Gender Attitudes and Violence: Implications for Youth Violence Prevention. *American journal of preventive medicine*, 58(3), 396–406. <https://doi.org/10.1016/j.amepre.2019.10.009>
- [32] Oshiname, F. O., Ogunwale, A. O., & Ajuwon, A. J. (2013). Knowledge and perceptions of date rape among female undergraduates of a Nigerian university. *African journal of reproductive health*, 17(3), 137–148. <https://www.jstor.org/stable/23485721>
- [33] Perrin, N., Marsh, M., Clough, A. et al. Social norms and beliefs about gender based violence scale: a measure for use with gender based violence prevention programs in low-resource and humanitarian settings. *Confl Health* 13, 6 (2019). <https://doi.org/10.1186/s13031-019-0189-x>
- [34] Pico-Alfonso M. A. (2005). Psychological intimate partner violence: the major predictor of posttraumatic stress disorder in abused women. *Neuroscience and biobehavioral reviews*, 29(1), 181–193. <https://doi.org/10.1016/j.neubiorev.2004.08.010>
- [35] Pontecorvo, C., Mejía, R., Aleman, M., Vidal, A., Majdalani, M. P., Fayanás, R., Fernández, A., & Pérez Stable, E. J. (2004). Violencia doméstica contra la mujer. Una encuesta en consultorios de atención primaria [Detection of domestic violence against women. Survey in a primary health care clinic]. *Medicina*, 64(6), 492–496.
- [36] Razaghi, M., Chavoshian, H., Chanzanagh, H. E., & Rabiei, K. (2020). Religious fundamentalism, individuality, and collective identity: A case study of two student organizations in Iran. *Critical Research on Religion*, 8(1), 3–24. <https://doi.org/10.1177/2050303219900226>
- [37] Shamu, S., Shamu, P., & Machisa, M. (2018). Factors associated with past year physical and sexual intimate partner violence against women in Zimbabwe: results from a national cluster-based cross-sectional survey. *Global health action*, 11(sup3), 1625594. <https://doi.org/10.1080/16549716.2019.1625594>
- [38] Sikweyiya, Y., & Jewkes, R. (2012). Perceptions and experiences of research participants on gender-based violence community based survey: implications for ethical guidelines. *PloS one*, 7(4), e35495. <https://doi.org/10.1371/journal.pone.0035495>
- [39] Sikweyiya, Y., Addo-Lartey, A. A., Alangea, D. O., Dako-Gyeke, P., Chirwa, E. D., Coker-Appiah, D., Adanu, R., & Jewkes, R. (2020). Patriarchy and gender-inequitable attitudes as drivers of intimate partner violence against women in the central region of Ghana. *BMC public health*, 20(1), 682. <https://doi.org/10.1186/s12889-020-08825-z>
- [40] Talbot, K. K., Neill, K. S., & Rankin, L. L. (2010). Rape-accepting attitudes of university undergraduate students. *Journal of forensic nursing*, 6(4), 170–179. <https://doi.org/10.1111/j.1939-3938.2010.01085.x>

- [41] UKAID. (2016). *Gender based violence among displaced communities in Sittwe Township, Rakhine State: A knowledge, attitudes and practices study*. ReliefWeb.
<https://reliefweb.int/sites/reliefweb.int/files/resources/IRC%20GBV%20KAP%202016.pdf>
- [42] United Nations. (2015). *Sustainable Development Goals*. United Nations. Retrieved from https://sdgs.un.org/#goal_section
- [43] United Nations High Commissioner for Refugees. (n.d.). *Gender-based violence*. UNHCR.
<https://www.unhcr.org/gender-based-violence.html#:~:text=Gender%2DBased%20violence%20refers%20to,of%20power%20and%20harmful%20norms.&text=It%20is%20estimated%20that%20one,physical%20violence%20in%20their%20lifetime.>
- [44] Vanderwoerd, J. R., & Lankhof, K. (2020). An Exploratory Study of Stalking on Christian Campuses: Does that Happen Here? *Christian Higher Education*, 19(3), 177–191.
<https://doi.org/10.1080/15363759.2019.1566101>
- [45] Vázquez, F. L., Torres, A., & Otero, P. (2012). Gender-based violence and mental disorders in female college students. *Social psychiatry and psychiatric epidemiology*, 47(10), 1657–1667.
<https://doi.org/10.1007/s00127-012-0472-2>
- [46] Vidal-Fernández, A., & Megías, J. L. (2014). Attributions of blame to battered women when they are perceived as feminists or as "difficult to deal with". *The Spanish journal of psychology*, 17, E21. <https://doi.org/10.1017/sjp.2014.26>
- [47] Vincent, W., Parrott, D. J., & Peterson, J. L. (2011). Effects of Traditional Gender Role Norms and Religious Fundamentalism on Self-identified Heterosexual Men's Attitudes, Anger, and Aggression Toward Gay Men and Lesbians. *Psychology of Men & Masculinities*, 12(4), 383–400. <https://doi.org/10.1037/a0023807>
- [48] War, R. J., & Albert, S. (2013). Sexuality and 'silence' among Khasi youth of Meghalaya, Northeast India. *Culture, health & sexuality*, 15 Suppl 3, S351–S364.
<https://doi.org/10.1080/13691058.2013.79295>

The Gains and Pains of Pastors' Kids: An Embedded Correlational Study on Positive Self-Concept and Stereotypes

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Abstract: This mixed-method study explored the stereotypes, self-concept, and experiences of children of ministers. Seventy-five (75) Filipino Pastors' Kids (PKs) aged between 15 and 24 participated in this study. Results revealed that the majority of the PKs have both high stereotypical experiences and self-concept. The stereotypical expectation is to be well-mannered and highly spiritual, yet they have a positive self-concept of morality and friendships. Statistically, these two variables have a low but significant positive relationship. Thus, the higher the stereotypical experiences, the higher the self-concept. Qualitative data support and expound the quantitative data. Although the stereotypes are painful for the PKs, the gains outweigh the pains.

Keywords: *pastors' kids, stereotype, self-concept, embedded correlation*

Introduction

Pastors' kids (PKs) join their fathers' public spotlight, which comes with spiritual and moral scrutiny and the need to exhibit "perfect" spirituality and church commitment. These expectations, or scrutiny, then become a struggle as the pastors' kids enter adolescence and adulthood. The pressure of living their private lives on a public stage leaves little room for personal struggles and typical development (Oliver, 2017).

Ajibade (2017) asserted that expectations bombard pastors' kids by both society and their parents. They struggle to express themselves adequately as they are treated special and are not supposed to make blunders that others kids did. It seems not to matter. "PKs are stereotyped to a greater extent than are offspring of almost any other professional group" (Strange & Sheppard, 2001, p. 54). They live under more stress because they believe they are held to a higher standard than the rest of the church (Kinnaman, 2013). The church informs them that they are "church royalty" (Tighe, 2019).

Moreover, when dealing with the difficulties of being a pastor's kid, they internalize and believe in numerous labels (Benjamin et al., 2021). Even the label "PK" increases the pressure to conform and "make people proud" (p.2). Another study found a statistically significant association between pastors' kids recalled expectations and emotional and mental health concerns (Drumm, Sedlacek, & Baltazar, 2020). PKs also bear the weight of their parents' burden on the church, like a junior pastor but without compensation (e.g. salary), and sometimes resent the church due to its conflict with their parents (Tighe, 2019).

Despite the pressures and expectations, a study conducted by Khun (2017) on the experiences of pastors' kids (PKs) and their relationship with God, their friends, family, and the church revealed that none of the pastor's kids completely abandoned their faith as a result of the pressures. However, some took a sabbatical from their church for some time. Also, along with wanting to fit in, PKs wanted to find their spirituality.

PKs experiences of stereotypes are well studied; however, there seems to be a very limited study on the self-concept of PKs. Self-concept is the description and evaluation of oneself, including the qualities, skills, physical characteristics, and the like (APA, 2022). PKs' self-concept was found to have significant positive associations with family functioning and parenting style (Pamba, 2019). That is, if the pastor's family is functioning well and the parents' parenting style has a balance of warmth and control, the positive self-concept of PKs is intact.

This present study will fill in the gap in the limited study on PKs' self-concept. In addition, survey questionnaires investigate the relationship between PKs self-concept and stereotype experiences. Furthermore, this study validates the quantitative correlational data through the qualitative data on the PKs' personal experiences. Specifically, it answers the following research questions:

- What are the participants' levels of self-concept and stereotypes experienced?
- Is there a significant relationship between the level of stereotypes and self-concept?
- How do Pastors' kids' experiences better understand their levels of stereotypes and self-concept?

Methodology

Research Design

An embedded correlational design was utilized in this study. It allows the researcher to embed qualitative data within correlational research. The quantitative data emphasizes this design (Edmonds & Kennedy, 2017). In other words, the correlation result is emphasized, while qualitative data serves as subservient data. Pastor's Kids Stereotype and Self-Concept Questionnaire (SCQ) by Saraswat (2010) was used to collect the quantitative data.). In a correlational study design, the researcher investigates the relationship between variables without manipulating or modifying them (Bhandari, 2021).

On the other hand, the secondary data set can be collected and analyzed before, during, or after the primary data collection and analysis processes (Yu & Khanzanchi, 2017). Open-ended questions on the google form were added, and one-on-one interviews were conducted with five PKs composed of qualitative data.

Participants of the Study

The study used purposive sampling composed of Filipino-born pastors' kids between 15-24 years old. Thirty (40%) were males, and forty-five were females (60%). The majority of the participants were aged 20 (20%), 21 (31%) and 22 (16%). The criteria set in selecting the participants were: A son or a daughter of a Pastor from the Seventh-day Adventist church regardless of whether ordained ministers or not; they are currently in Senior High School or College from different academies, colleges and universities in the Philippines. The age ranges from 15 to 24 years old.

Data Collection Techniques and Procedures

The following are step-by-step data collection procedures:

1. Prepared Interview guides and survey questionnaires;
2. Posted invitations for pastor's kids through social media platforms;
3. Gave informed consent to the qualified prospective participants;
4. Gave the survey questionnaires through google forms;
5. Collected the survey questionnaires;
6. Run correlation analysis for quantitative data;
7. Conducted a one-on-one interview with five participants;
7. Transcribed the interviews;
8. Translated the qualitative data and the transcribed interview into the English language; and
9. Analyzed the data.

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Analysis and Interpretation of Data

Quantitative data were analyzed through SPSS. Means, frequencies, percentages, and Pearson Product Correlations were used to treat the data statistically. Moreover, thematic analysis was used to analyze the qualitative data following Maguire & Delahut (2017).

Step 1. Reading and rereading the written data to become acquainted with it. Making notes and scribbling down early expressions to become acquainted with the facts.

Step 2. Construct the first codes to organize data more systematically and reduce a large amount of data into smaller segments of meaning.

Step 3. Looking for themes that appear in some of the codes that were created.

Step 4. Examining the themes to verify that they make sense and are supported by the data, detecting overlaps, and reexamining if they should be suited to the theme.

Step 5. Describe the themes by discussing the essence of the theme and how the themes affect each other.

Step 6. Creating a report as a representation of the collected and analyzed data.

Ensuring Rigor and Trustworthiness

The Merriam and Tisdell (2016) model was followed to ensure trustworthiness and rigour. The researchers implemented methodological triangulation, member checking, and audit trail.

Since this present study utilized a mixed method design, by nature, it accomplishes methodological triangulation. Results from the quantitative data were triangulated with the verbatim responses from the participants.

Member checking was done by returning the interpreted data to the participants and giving them opportunities to comment on the initial findings (Creswell, 2014). In this study, member checking was done by returning the transcribed interview to the five participants with the initial interpretation.

Finally, an audit trail was implemented by transparently describing the whole process of the research, which enhanced the dependability and confirmability of the study.

Ethical Consideration: Confidentiality and Informed Consent

Ethical consideration gives regard to persons, rights, decision making and dignity of the participants. It minimizes the risks of the different aspects or sides and maximizes the benefit to the participants. Ethical Consideration during the conduct of the study includes the following:

1. Consent Form - The participants were given a consent form before data collection, informing them about the study in which they will be participating. Also, they were free to withdraw from the study anytime they chose.

2. Confidentiality - The researchers ensure that the data are protected to keep confidentiality and for their information to be safe.

3. Anonymity - The researchers did not include any personal information (excluding age and gender) from the participants so they would not be identified and their privacy safely kept.

Results

Levels of Stereotypes and Self-Concept

This section answers research question 1 on the levels of stereotypes and self-concept. In this study, the stereotype is measured as a unidimensional variable. Table 1 below shows the overall mean, standard deviation and interpretation of the extent of stereotypes experienced by the PKs.

Table 1. *Participants' Level of Stereotype*

Items	Mean	St Dev	Verbal Interpretation
I hear, or others make me feel that as a Pastor's Kid...			
1. Cannot miss a single church service/activity.	3.6	1.1	High
2. Can't make a mistake.	3.6	1.31	High
3. To be in church before time.	3.4	1.06	High
4. Leave church later than usual.	3.1	1.26	Average
5. Active participant in church activities.	4.1	.96	High
6. Should be a role model to my peers.	4.3	.90	Very High
7. A super-spiritual.	3.7	1.06	High
8. Never break the rules and never get into trouble.	3.8	1.18	High
9. My father is super strict and controlling.	2.8	1.14	Average
10. My outfits have to be "church approved." Modesty is must	4.2	1.04	High
11. I need to be "closer to God" because of our parents' job.	3.8	1.11	High
12. I have the Bible memorized and know the most answers to Bible trivia questions.	3.5	1.12	High
13. I am academically superior.	3.1	1.26	Average
14. I either possess firm moral values or will indulge in 'wild' behavior.	3.3	1.07	Average
15. I can't say swear words.	3.8	1.89	High
16. Being friends with me will make the person cooler/holier/more popular.	2.2	1.09	Low
17. I am to live up to a standard that other children are not held to.	3.63	1.08	High
18. I am either perfect or utterly rebellious.	2.9	1.29	Average
19. I ought to be good in music and/or well-trained in public speaking.	3.7	1.18	High
20. I ought to be well-mannered.	4.4	.77	Very High
Overall	3.53	0.685	High

Results show that PKs have high overall stereotypical experiences ($M=3.53$). Being well-mannered is the very high ($M=4.37$) stereotype they experience, followed by being a role model to peers ($M=4.3$). It is noteworthy that only one item with a low level (item 16) which is being friends with the PK, will make the person cooler/holier/more popular ($M=2.2$).

The self-concept is divided into six dimensions: Physical, Social, Temperamental, Educational, Moral and Intellectual. The table below shows the mean, standard deviation, and verbal interpretation of the PKs' self-concept.

Table 2. *Participants' Level of Self-Concept*

Dimensions	Mean	St. Dev	Verbal Interpretation
Physical	27.6	3.70	Confident
Social	30.5	3.13	Friendly
Temperamental	27.5	3.34	Mostly Positive
Educational	26.9	3.69	High Academic Engagement
Moral	31.2	2.85	Very Satisfactory
Intellectual	26.5	3.33	High Intelligence
Overall	28.7	3.34	Positive Self-Concept

Results show that PK manifests a positive self-concept in all dimensions ($M=28.7$). Overall, the PK have confidence in their physique ($M=27.6$), are friendly ($M=30.5$), their temperament is mostly positive ($M=27.5$), they are actively engaged academically ($M=26.9$), they are satisfied with their moral values ($M=31.2$). They believe they have high intelligence ($M=26.5$).

Correlation Between Stereotypes and Self-Concept

This section answers the second research question, "Is there a significant relationship between the level of stereotypes and the level of self-concept?" Table 3 below shows the correlation matrix between the stereotypes and the six dimensions of self-concept.

Table 3. *Correlation Between Stereotype and Self-Concept*

Self-Concept Dimensions	<i>r</i>	<i>p</i> -value	Verbal Interpretation
Physical	.122	.148	Not Significant
Social	.225	.026	Significant
Temperamental	.076	.257	Not Significant
Educational	.167	.076	Not Significant
Moral	.104	.188	Not Significant
Intellectual	.335	.002	Significant
Overall Self-Concept	.274	.009	Significant

Table 3 shows that stereotypes are positively correlated with self-concept. However, among the dimensions, only the social and intellectual self-concept yields a significant correlation, although social self-concept yields an almost negligible positive correlation. In contrast, intellectual self-concept yields a low positive correlation.

Experiences of Pastors' Kids

This section answers this study's third research question: "How do Pastors' kids' experiences better understand their levels of stereotypes and self-concept?" Two major themes emerged from the qualitative data: the pains and gains. For the pains, two themes emerged: pressures from expectations and criticisms.

Pressures from Expectations

The participants admitted that they must live up to people's expectations of them as Pastor's kids to make their families proud, or they will disappoint those around them. Expectations are high and tough. It challenges the pastors' kids to strive for greater goals. One of the participants shared:

One of the most challenging parts of being a Pk is how everybody treats you. There are so many expectations placed on us, and when we don't achieve them, we can hear bad comments from others. It can bring forth many emotional issues because we think we let our father down. - PK 11, Female, 19

Other PKs also shared,

Many people think that as a Pastor's kid we can't make mistakes are very spiritual, have good academics, know everything in the Bible, well-behaved, and more. - PK 31, Female, 21

Always given a part in the church, etc. It's hard to refuse if invited to do something, like to play [a musical instrument] at events, etc. - PK 52, Male, 21

Ever since I was a child, I have been reminded that we should behave, especially around other people in church because they look up to us and we should be good examples. - PK 8, Female, 21

The expectations encountered by the PKs include being highly spiritual, active in church activities, good academics, well-behaved, well versed in the Bible, fewer mistakes committed, and other good attitudes. In addition, it is not just people around them but their parents who restrict them to do what they want because of their position. A respondent stated:

... the main struggle is keeping the reputation of the family. I am bound to restrict myself to ordinary things, such as sharing memes with witty content, for it will reflect on my family. Things that may seem normal to others may already be a great deal for my parents. - PK 2, Male, 22

"You are a pastor's kid!"- this creates a stigma that PKs should be perfect and excellent in Bible-related activities. With that, it is encrypted in my mind that we are not allowed to make mistakes which is totally wrong. It created a fear in me regarding criticisms that made me not do some things. And being away from my parents because of their job assignment had created an emotional gap between my dad and me. Contrary to what others expect, PKs are usually the second priority, because the pastor's first priority is the church, the church members, and the church activities. -PK 74, 21

When people expect pastors' kids to act the way they expect them to, they get the message. However, they feel pressured to follow the expectations. If they fail, negative comments through criticisms come around. These affect them emotionally and psychologically.

Criticisms

Another pain that PKs experience is the criticism they receive when they do not meet the expectations of the brethren in the church. They stated:

We are a target of criticisms, and not just the constructive ones, even the hurtful ones. - PK 18, Male, 22

As a daughter of a pastor, there are many struggles that I have experienced. And one of these is that I am often judged and criticized for my behaviour. - PK 63, Female, 15

They tend to be compared to other excelling PKs whenever they make mistakes or if their performance is not enough. Notice the statement from another PK:

... being compared to others may be in academics, attributes and how others behave. It's tiring being treated like a robot which we should not be doing this and that. You should be an example to others. - PK 54, Female, 21

It is hard enough when high expectations are met. However, it is more challenging when PK fails. They are compared to others or criticized. These indeed discourage them in times of failure. It's double jeopardy on their part: failure plus criticisms. On the other hand, the gains of being pastor kin include Privileged and Blessed; and Mature Faith.

Privileged and Blessed

PKs gain privileges and blessings through special treatment in church and other gatherings. They get to many places and stay in different locations, allowing them to meet different people with different backgrounds. Also the financial subsidies that they received. Notice the responses of PKs:

We may move from one location to another, but this became a blessing because God allowed me to meet many people who have inspired and continue to inspire me. Growing up as a PK, I learned to stand in front of a congregation and be approachable -PK 1, Female, 22

I was trained ever since I was little, I saw and joined papa in the serenade, VOY, crusade and it's just fun that I met a lot of people in ministry. -PK 2, Male, 22

I've discovered that there are numerous advantages to participating in the mission. For example, we are subsidized in our schooling, and the hospital will also pay a part of the costs, which is one of the favorable aspects. -PK 4, Female, 22

The participants also witnessed the generosity of the Lord to them, as what is said by another participant:

God provides for His children...So it's a blessing and a great privilege to be a PK. - PK 1, Female, 22

Being a PK can also be a profound blessing and provide an excellent foundation for a godly life. Often most significant challenges are the biggest falls of the great blessing.

Mature Faith

Pastor's Kids believe they are more mature in faith than their age group since growing up. They were molded to know Jesus and witness their parents exercising faith in many circumstances in life.

I have a greater opportunity to be used in God's ministry. My experience in serving God and sharing His good news was a positive experience for me. This is because I can inspire other people and encourage youths of today's generation to be a part of His ministry and, at the same time, bring people closer to God. -PK 1, Female, 22

We learned how to read the Bible from them. For example, my father's lesson about biblical heroes is faithful in that all the people represented Christ-like characters with character development. I've noticed that we are close to God, as if we rely on Him. - PK 4, Female, 22

In this study, the qualitative data support the quantitative data. The high stereotypical experiences from the survey questionnaire coincide with the specific stereotypes PK mentioned during the interview. Moreover, the qualitative data expounds on the positive correlation between stereotypes and self-concept, wherein the gains they receive as PKs mitigate the pains of stereotypes.

Discussion

The correlation result implies that as the stereotypical experiences increases, the self-concept also increases. Social psychologists have conducted different research studies demonstrating that individuals unknowingly primed with a concept make unconscious changes in their behavior to match the expected behavior related to the prime concept (John, 2011). It indicates that the more stereotypes Pastor Kids experience, their self-concept is also boosted. Furthermore, their self-concept may also have been influenced by their benefits, such as special treatment from the brethren.

However, although stereotypes positively influence their self-perception, it affects them emotionally, as expressed in the interview data. It is noteworthy, specifically in our SDA schools, that PKs feel pressure to excel because they have been paid through educational aid from the mission or conference. Pastor's Kids already know that fact very well and may not need to be reminded. After all, they are like other kids who commit mistakes, experience failures, and learn from them.

Moreover, the results of the quantitative data were supported and strengthened by the qualitative data. The study of Oliver 2017 revealed that being a PK comes with moral scrutiny. And results from the quantitative data confirmed and have shown that PKs are experiencing stereotypes such as possessing firm moral values. It was proven as most of them have very satisfactory conduct in the moral dimension of the self-concept. The qualitative data provided a richer understanding of PKs' experiences, such as being conscious of their actions and aware of what is right and wrong. Growing up, they were taught to be prim and proper as many looked up to them and served as role models. Despite their struggles, these also became their reason to continually strive to improve, which explains why they still hold a positive self-concept despite being scrutinized and stereotyped. It verified why PKs are presumably high scorers in the stereotype and self-concept questionnaire. Overall, both quantitative and qualitative data are consistent with their results.

Limitations and Implications

This study is limited to Filipino pastors' kids of Seventh-Day Adventist Church. Other nationalities and Christian denominations may yield different results as churches, and national cultures differ. Seventy-five participants do not represent the whole PK population. A larger sample would have been better. Also, this study was conducted during the global Covid19 pandemic; thus, online platforms such as google forms for the survey questionnaires and zoom conferencing for the interviews were used. The observation during the interview was limited. However, researchers were able to validate their verbatim responses through member checking. Despite these limitations, this

study gives us a glimpse of the experiences, both pains and gains of being PKs. Intervention programs may be created based on the results conveyed in this study.

Conclusion and Recommendation

In conclusion, this study established that the stereotype of being good and doing good as Pastors' Kids influences their positive self-concept. This study verifies the positive outcome of a psychological phenomenon called the self-fulfilling prophecy of Merton (1948), wherein expectations are fulfilled because the PKs believe them, and their behaviors align with those beliefs or expectations.

It is recommended for PKs that instead of lamenting the high expectations set for them, they may be grateful as it leads them to do good. On the other hand, the church community may be lenient enough to accept PKs' flaws and mistakes because they are humans and can grow from mistakes just like everyone else.

It is also recommended that teachers in Adventist schools not add or bombard the PKs with the high expectations and stereotypes they already carry. Most importantly, learning for PKs would be less burdensome if they feel that their teachers are safe persons to share their struggles with and are unprejudiced. Future researchers may replicate this study in other Christian denominations and different nationalities.

References

- [1] Ajibade, E. A. (2017). Towards An Ethical Life And Conduct In Pastors' Children. Academia. https://www.academia.edu/30162785/Towards_An_Ethical_Life_and_Conduct_in_Pastors_Children_pdf.
- [2] Benjamin, P., Taylor, J., Turns, B., & White, C. (2021). "I'm More Than Just a 'Pastor's Kid'!": Externalizing Labels given to Children of Pastors Through Biblio–Narrative Therapy. *Contemporary Family Therapy: An International Journal*, 1–8. <https://doi.org/10.1007/s10591-021-09591-9>
- [3] Creswell, J. (2014). *Research design: qualitative, quantitative and mixed methods approaches*. USA: SAGE Publications, Inc.
- [4] Drumm, R., Sedlacek, D. A., & Baltazar, A. M. (2020). "My Life Has Been Just Like a Big Expectation": A Retrospective Reflection of Role Expectations and Mental Health Concerns of Adult Children of Seventh-day Adventist Pastors. *Social Work & Christianity*, 47(2), 86–104. <https://doi.org/10.34043/swc.v47i2.65>
- [5] Edmonds, W. A., & Kennedy, T. D. (2017). *An applied guide to research designs: Quantitative, qualitative, and mixed methods*. Thousand Oaks, California: SAGE.
- [6] Kinnaman, D. (2013). Prodigal Pastor Kids: Fact or Fiction? Barna. <https://www.barna.com/research/prodigal-pastor-kids-fact-or-fiction/>.
- [7] Maguire, M. & Delahut, B. (2017) Doing a Thematic Analysis: A Practical, Step-by-Step Guide for Learning and Teaching Scholars. Dundalk Institute of Technology. AISHE-J. Volume 9, Number 3 <https://ojs.aishe.org/index.php/aishe-j/article/view/335>
- [8] Merton, R. K. (1948). The Self-Fulfilling Prophecy. *The Antioch Review*, 8(2), 193–210. <https://doi.org/10.2307/4609267>
- [9] Pamba, DS (2019). Effects of pastoral work on the self-concept of pastors' adolescent children. Institutional Repository of Africa International University. <http://dlibrary.aiu.ac.ke:8080/xmlui/handle/123456789/488>
- [10] "Self-Concept" (2022) APA Dictionary of Psychology.
- [11] Strange, K. S., & Sheppard, L. A. (2001). Evaluations of clergy children versus non-clergy children: Does a negative stereotype exist? *Pastoral Psychology*, 50(1), 53–60. <https://doi.org/10.1023/A: 1010447100488>

- [12] Tighe, S. (2019). Raising Church Celebrities: A Study of the Faith Development of Clergy Children. *Journal of Youth Ministry*, 17(2), 78–101.
- [13] Merriam, S., Tisdell, E. (2016). *Qualitative research: A guide to design and implementation*. San Francisco, California: Jossey-Bass A Wiley Brand.
- [14] Yu, X., Khanzanchi, D. (2017). Using Embedded Mixed Methods in Studying IS Phenomena: Risks and Practical Remedies with an Illustration. DigitalCommons.
[https://digitalcommons.unomaha.edu/
cgi/viewcontent.cgi?article=1069&context=isqafacpub](https://digitalcommons.unomaha.edu/cgi/viewcontent.cgi?article=1069&context=isqafacpub).

Motorcycle Driving Behaviors of Students in a Private University, Saraburi Province

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Abstract: Injury and death rates of young motorcycle drivers in Thailand are still high due to their behavior of riding a motorcycle that is at risk of injury. The purpose of this research was to study the level of motorcycling behavior and compare motorcycle driving behaviors by gender and faculty of students studying in Asia-Pacific International Universities. The sample group was students from the Faculty of Business Administration, the Faculty of Arts and Humanities, and the Mission Faculty of Nursing, which included 180 participants who were selected by stratified random sampling with proportionate sampling and simple random sampling. Data were analyzed using descriptive statistics, independent T-tests, and one-way ANOVA. The results of the research revealed that the students in all 3 faculties had good overall motorcycle driving behavior. Female students had better motorcycling behavior than male students, and the students of each faculty had no different motorcycle driving behaviors. Based on research results, administrators, faculty members, and related organizations should develop a program to raise awareness of safe motorcycle behavior for students and the general public to reduce injuries and deaths from driving motorcycles.

Keywords: *motorcycle driving behavior, private university students*

Introduction and Literature Review

Motorcycle accidents are still a serious problem in Thailand, and they have an upward trend. From the comparison of the number of victims in the year 2022, 53.75 % of the fatalities and injuries from motorcycles were found, compared to 52.55% in 2021. From the statistics of the accumulated deaths in Thailand in 2022, there were up to 80% of the fatalities were caused by motorcycles. In 2021, there were 7,589 motorcycle fatalities and 357,999 injuries between the ages of 19-24 years which accounts for 17.01 %. The majority of the victims were males, 61.05 %, and a driver, 83.75% (ThaiRSC, 2565). This caused Thailand to lose both life and property. It was also found that factors associated with death and injury were improper motorcyclist behaviors (Ruankham & Noosorn, 2019).

From the literature review of the behaviors of motorcyclists that caused death and injury, it was found that driving through red lights, driving the wrong way up, speeding through quickly when seeing the yellow light (Khampukka et al., 2012), having a lack of driving experiences, driving at a high speed, not obeying traffic rules, Drinking alcohol or drugs while driving (Watcharapong Ruankham & Narongsak Noosorn, 2562), using a mobile phone while driving, being lack of knowledge on traffic laws, and not wearing a helmet (Thasai et al., 2021; Department of Land Transport Ministry of Transport, 2016). Then, from the literature review on traffic violation behaviors of Ubon Ratchathani University students, it was found that males had more traffic violation behaviors than females. The second-year and fourth-year students had more traffic violation behaviors than the third-year students, while the students from different faculties have no differences in traffic violation behaviors (Khampukka et al., 2012).

Asia-Pacific International University has regulations that allow students to ride motorcycles with no more than one person riding on the back of a motorcycle, and a helmet must be worn and the strap under the helmet's chin must be firmly fastened when driving outside the campus. Driving without a helmet is permitted only when driving on the campus at a moderate speed of 30 km/h and not driving the wrong way up. It was observed that some students had inappropriate driving behaviors, namely, not wearing helmets, having more than one person riding on the back of a motorcycle, driving a motorcycle the wrong way up, and driving faster than the speed set by the university which cause the injuries. As statistics of injuries from motorcycle driving in universities from 2016-2018, it states that 427, 427, and 260 students were injured, respectively. Therefore, the research team wanted to study the student's

motorcycling behaviors to use the results of the study as a guideline for the administrators to organize training to educate and promote safe motorcycle driving behaviors.

Research objectives

1. To study the level of motorcycle driving behaviors of students in a private university
2. To compare the motorcycle driving behaviors by gender and the faculties that the students are studying at a private university

Research Framework

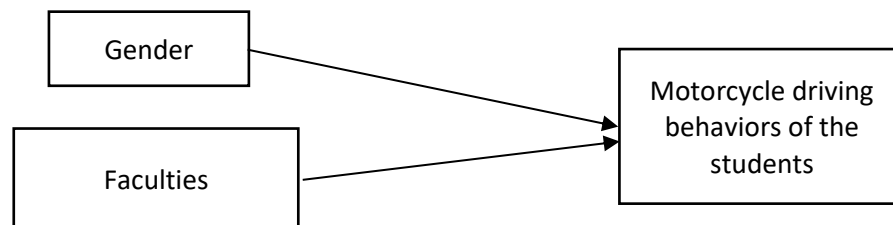


Figure 1. Research Framework

Methodology

This research is Descriptive Research.

The target population is the bachelor's degree/ undergraduate students in Thai programs, consisting of 43 students from the Faculty of Business Administration, 115 students from the Faculty of Arts and Humanities, and 140 students from the Mission Faculty of Nursing, totaling 298 students who are studying in the first semester of Academic Year 2018, Asia-Pacific International University.

The sample group was selected from the target population by calculating the sample size using the autoformat table of Krejcie and Morgan (Krejcie & Morgan, 1970). A total of 180 participants were recruited using a stratified random sampling with a proportionate sampling method and a simple random sampling method by drawing lots from the names of each faculty as shown in Figure 2.

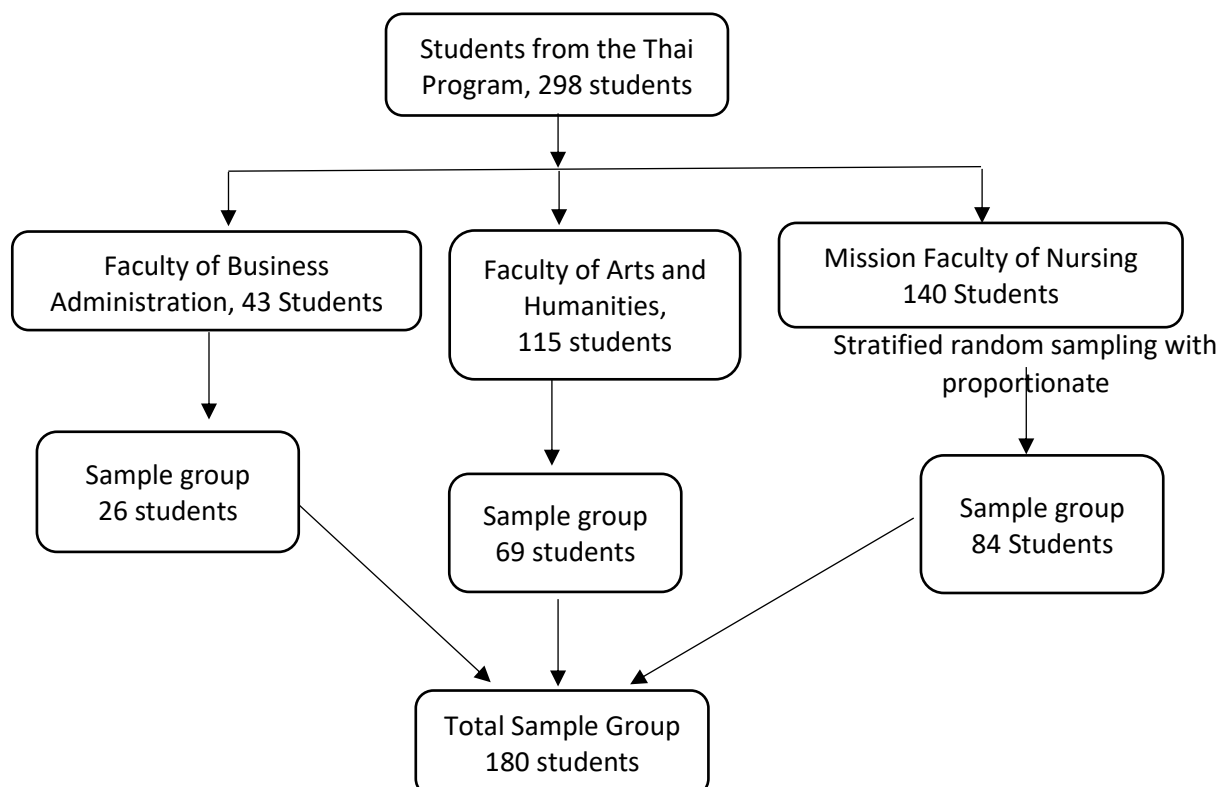


Figure 2 Stratified Random Sampling with Proportionate Sampling**Research Instrument**

Part 1 The questionnaire to collect personal data was created by the researcher with 3 variables consisting of gender, age, and the faculty under study.

Part 2 The questionnaire for students' motorcycle driving behaviors is developed from the research paper "Behaviors of preventing motorcycle accidents of adolescents from Ban Na Fai, Mueang Chaiyaphum District, Chaiyaphum Province" (Kamlanglua et al., 2016) and Department of Land Transport Ministry of Transport (2016). It consisted of 21 questions, 5 levels of the rating scale, and scoring 1 means 'never following the rules' to scoring 5 which means 'following the rules every time'. The total score was between 21 - 105 points. The content was checked by 3 experts. The Content Validity Index: CVI equals 1.00 and the Reliability value using Cronbach's Alpha Coefficient equals 0.83.

There are 10 positive statements: 1, 3, 6, 8, 11, 12, 15, 16, 18, and 20.

There are 11 negative statements: 2, 4, 5, 7, 9, 10, 13, 14, 17, 19, and 21.

The Criteria for interpretation of the score level are:

1.00 – 1.80	means	Having bad motorcycling behaviors
1.81 – 2.60	means	Having fairly good motorcycle driving behaviors
2.61 – 3.40	means	Having moderately good motorcycle driving behaviors
3.41 – 4.20	means	Having good motorcycle driving behaviors
4.21 – 5.00	means	Having very good motorcycle driving behaviors

Data Collection

The researcher coordinated with the Department Deans and the course lecturers ask permission to collect the data from the sample group by clarifying the purpose, and the benefits of doing the research. The participants were able to refuse to do the questionnaire without having any adverse effect on themselves. The results of the research will be presented in an overview. The answers from the questionnaire taken will be kept confidential and will be destroyed immediately after the results are published. When the sample agrees, the researcher gave them the consent form to sign and complete the questionnaire for about 10-15 minute

Data Analysis

The data were analyzed by calculating the percentage, the mean, the standard deviation, interpretation, analysis, Independent t-test, and One-way ANOVA.

Results

1. The answers from the personal data of the samples show that most of the samples were female (76.70 percent), with a mean age of 20.03 (S.D = 1.58). There were students with the age of under 20 years, and between 20 years–22 years old, equally accounting for 40.90%. The students from the Mission Faculty of Nursing account for 47.20%, followed by the Faculty of Arts and Humanities with 38.30% and the Faculty of Business Administration with 14.40%.

2. The motorcycle driving behaviors of the students from all the three faculties were at a good level (\bar{x} = 3.98, SD = 0.18). When considering each variable, it was found that the motorcycle driving behaviors were at a very good level and had the highest average score was "Driving a motorcycle with caution in the community" (\bar{x} = 4.44, SD = 0.79) followed by "Not drinking alcoholic beverages while driving a motorcycle" (\bar{x} = 4.42, SD = 1.17) and "Not taking drugs that cause drowsiness while driving a motorcycle". When considering the motorcycle driving behaviors that was at a good level and with the highest average score, was "Driving a motorcycle with caution when encountering the speed bump pavement" (\bar{x} = 4.18, SD = 1.01), followed by "Driving a motorcycle while the physical body is not ready or is exhausted" (\bar{x} = 4.10, SD = 1.09). The moderate level of motorcycling behaviors with the

lowest average score is "Driving a motorcycle with a motorcycle license" (\bar{x} = 3.02, SD = 1.71), followed by "Talking with friends while driving a motorcycle" (\bar{x} = 3.05, SD = 1.14) as shown in Table 1.

Table 1. Mean, standard deviation, and level of motorcycle driving behaviors of sample (n = 180)

variable	motorcycle driving behaviors		
	\bar{x}	SD	level
- Driving a motorcycle with caution in the community	4.44	0.79	Very Good
- Drinking alcoholic beverages while driving a motorcycle	4.42	1.17	Very Good
- Taking drugs that cause drowsiness while driving a motorcycle	4.42	1.17	Very Good
- Looking at the side mirror before overtaking while driving the motorcycle.	4.38	0.95	Very Good
- Not driving the motorcycle on the sidewalk	4.31	1.12	Very Good
- Not following the traffic rules while driving the motorcycle.	4.27	1.34	Very Good
- Giving a turn signal before overtaking while driving the motorcycle.	4.25	1.01	Very Good
- Violating the traffic lights while driving the motorcycle.	4.23	1.23	Very Good
- Driving a motorcycle on the left side of the road	4.22	1.00	Very Good
- Driving the motorcycle with caution when encountering bumps and holes on the pavement.	4.18	1.01	Good
- Driving a motorcycle while the physical body is not ready or is exhausted.	4.10	1.09	Good
- Give a turn signal in advance when you want to turn at a distance of not less than 30 meters while driving a motorcycle.	4.09	1.05	Good
- Wearing a helmet while driving a motorcycle	4.06	0.97	Good
- Using a mobile phone while driving a motorcycle	4.06	0.97	Good
- Changing the lane immediately while driving a motorcycle.	4.03	1.12	Good
- Overtaking on the left while driving a motorcycle	3.90	1.15	Good
- Not driving the motorcycle on the wrong way up	3.80	1.09	Good
- Driving a motorcycle with no more than 2 people	3.68	1.03	Good
- Driving a motorcycle with a speed no more than 80 kilometers per hour.	3.46	1.20	Good
- Talking with friends while driving a motorcycle	3.05	1.14	Moderate
- Driving a motorcycle with a motorcycle license	3.02	1.71	Moderate
Total	3.98	0.18	Good

3. The Comparison of the students' motorcycle driving behaviors classified by gender

The results of the analysis revealed that females have better motorcycling behaviors than males with statistical significance at the 0.05 level as shown in Table 2.

Table 2. *The Comparison of motorcycle driving behaviors of the students classified by Gender with statistics.Independent t-test (n = 180)*

Sex	N	mean	S.D.	t	P
Male	42	3.87	0.69	-1.95*	.000
Female	138	4.06	0.47		

* p < 0.05

4. The variability of the students' motorcycle driving behaviors classified by the faculties

The results of the analysis revealed that the students in each faculty had no significant difference in motorcycle driving behaviors with the statistical significance at the 0.05 level as shown in Table 3.

Table 3. *The variability of motorcycling behaviors classified by faculty (n = 180)*

Source of variance	Sum of Squares	df	Mean Squares	F	Sig
Between group	0.25	2	0.12	0.43	0.64
Within group	51.94	177	0.29		
Total	52.19	179			

* p < 0.05

Discussion

This research discusses the results according to the following objectives:

1. The overall motorcycle driving behaviors of the students were at a good level. When considering each variable, it was found that most of the students' motorcycle driving behaviors were at very good and good levels. This might be because the students are knowledgeable about driving motorcycles safely and obeying traffic rules. This is consistent with the study "Factor related to motorcycle accident risk behaviors among university students in Northeastern Thailand". It was found that the students had the lowest level of risk behaviors in motorcycling. It was also found that the students had the right knowledge and attitude toward safe driving. Hence, this led to more safety behaviors in driving (Chumpawadee et al., 2015). When considering each variable, it was found that the motorcycle driving behaviors were at a very good level with the highest average score being "Driving motorcycles with caution in the community", followed by "Not drinking alcoholic beverages while driving a motorcycle", and "Not taking drugs that cause drowsiness while driving a motorcycle". This may be due to the fear of injury, the fear of violating the regulations, and the fear of the deduction of the citizenship points. This is consistent with the study "Motorcycle riding accident prevention behaviors among adolescents at Nafai sub-district, Muang district, Chaiyaphum" which found that the behaviors for preventing traffic accidents among adolescents were to drive cautiously in the community and avoid drinking alcoholic beverages while driving a motorcycle (Kamlangluea et al., 2016). For the moderate level of motorcycling behaviors, the lowest average score was "Driving a motorcycle with a driver's license" and the second average score was "Talking with friends while driving a motorcycle". This may be because the students do not realize the importance of obtaining a motorcycle driving license and driving as a group encourages them to talk. This is consistent with the study "Traffic laws violation behaviors of motorcyclists in student of Ubonrajathanee university" which found that only 22.3% of students had a motorcycle driving license (Khampukka et al., 2012).

2. Comparing the motorcycle driving behaviors of the students classified by gender, it was found that females have better motorcycling behaviors than males, probably because most of the participants from the sample group were female (76.70 percent), while males were at the age of being reckless, risk-taking, adventurous, and love driving fast. This is consistent with the study of

Chumpawadee, Homchampa, Thongkrajai, Suwanimitr, and Chadbunchachai (2015) which found that males have motorcycle accident risk-taking behaviors more than females and more men (55.2%) engaged in moderate to a high level of motorcycle accident risk-taking behaviors than women (44.8%). This is also consistent with the study of Khampukka et al. (2012) which found that male students had more traffic violation behaviors than female students.

3. The comparison of motorcycle driving behaviors of students classified by the faculty found that there was no difference which is inconsistent with the study of Thasai et al. (2021) which found that the students in the Science-Mathematics Department had fewer risk behaviors from motorcycle accidents than the students from the Language Arts Department. The students of the Faculty of Business Administration, the Faculty of Arts and Humanities, and the Mission Faculty of Nursing had no differences regarding their behaviors of driving motorcycles. This is possibly because the Student Affairs Department has organized a training course on safe motorcycle driving. This gives students knowledge about traffic rules and how to drive safely. This is consistent with the study of Kamlanglua and the team (Kamlanglua et al., 2016) found that the teenagers of Ban Na Fai had the top 3 preventive behaviors of motorcycle accidents which were not driving motorcycles at high speed, not using a mobile phone while driving, and not driving with multiple passengers.

Limitations and Implications

The limitations of this research are not generalized to other students at Asia-Pacific International University. This research provided a representative sample of Thai curriculum students from the Faculty of Business Administration, the Faculty of Arts and Humanities, and the Mission Faculty of Nursing. Moreover, they were studying at private university. Therefore, the finding can only be generalized to similar private Thai curriculum. There are two recommendations for future research suggested by these findings. First, it would be useful to develop a program for motorcycle driving safety behaviors. The second would be to do a study in a public or government university in order to find out the factors that can be used to predict motorcycle driving safety behaviors.

Conclusion

This study showed several behaviors of students that were not motorcycling safety drivers, especially talking with friends while riding a motorcycle and not having a motorcycle license.

Moreover, female students had better motorcycling behaviors than male students at the level of 05.

Therefore, these findings suggest that administrators and student affairs should develop strategies to promote students' knowledge, attitude, and motorcycle driving safety behaviors. Especially for male students.

References

- [1] Chumpawadee, U., Homchampa, P., Thongkrajai, P., Suwanimitr, A., & Chadbunchachai, W. (2015). Factor related to motorcycle accident risk behaviors among university students in Northeastern Thailand. *Southeast Asian J Trop Med Public Health*, 46(4), 805-821. Retrieved from <https://www.tm.mahidol.ac.th/seameo/2015-46-4/29-629626.pdf>
- [2] Department of Land Transport Ministry of Transport. (2016). คู่มือการขับขี่รถจักรยานยนต์อย่างปลอดภัย. [Guide to safe motorcycle driving]. Retrieved from https://www.dlt.go.th/minisite/m_upload/m_files/phichit/file_2fd86f5d0a1e6936e626093892e36a3a.pdf
- [3] Kamlanglua, K., Chuntum, K., Tongsrisk, T., & Mahamit, W. (2016). พฤติกรรมการป้องกันอุบัติเหตุจากการขับขี่รถจักรยานยนต์ของวัยรุ่นบ้านนาฝาย อำเภอเมืองชัยภูมิ จังหวัดชัยภูมิ. [Motorcycle riding accident prevention behaviors among adolescent at Nafai sub-district, Muang district, Chaiyaphum]. *Journal of Research and Development Buriram Rajabhat University*, 11(Special), 157-164. Retrieved from <https://so03.tci-thaijo.org/index.php/RDIBRU/article/view/130422/97836>

- [4] Khampukka, P., Yamram, U., & Chomchuen, S. (2012). Traffic laws violation behaviors of motorcyclist in student of Ubonrajathane university. *JMS-UBU*, 1(2), 59-75. Retrieved from https://so03.tci-thaijo.org/index.php/jms_ubu/article/view/85788/68232
- [5] Krejcie, R. V., & Morgan, D. W. (1970). Determining sample size for research activities. *Educational and psychological measurement*, 30(33), 607-610.
- [6] Ruankham, W. & Noosorn, N. (2019,). อุบัติเหตุรถจักรยานยนต์ในประเทศไทย: มุมมองทางวิทยาการระบาด. [Motorcycle accidents in Thailand: Epidemiology perspective]. *HCUJOURNAL*, 23(1), 146-60. Retrieved from <https://he01.tci-thaijo.org/index.php/HCUJOURNAL/article/view/149609>
- [7] ThaiRSC. (2022, August 13). ศูนย์ข้อมูลอุบัติเหตุ เพื่อสร้างเสริมวัฒนธรรมความปลอดภัยทางถนน. [Accident Information Center To foster a road safety culture]. Retrieved from <https://www.thairsc.com/>
- [8] Thasai, K., Musigapong, P., & Pundee, R. (2021). Factors affecting risk behaviors influencing motorcycle accident among senior high school student. *Journal of safety and Health*, 14(1), 50-67. Retrieved from <https://he01.tci-thaijo.org/index.php/JSH/article/view/244301/169212>

Optimization of a Fuzzy-Neural Network Robot Controller Using a Genetic Algorithm

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Abstract: Mobile robotics is a trend in robotics where the physical agent acts on its goal by interacting with its environment through motion and sensors. This field has caught more interest given its wide field of real-life applications (e.g., military, consumer electronics, transportation, etc.). With the rise of new challenges to master its control, several computational algorithms has been researched to develop a more intelligent machine that could effectively fulfill its tasks for different robot anatomy and terrain of operation. To solve this, two sets of classifier models were developed: first, a Neural Network (NN) model which yields 93.29% train accuracy and 88.92% test accuracy; second, a fuzzy-NN model which yields 88.80% train accuracy and 84.62% test accuracy. The underperformance of the fuzzy-NN model led to the exploration and integration of Genetic Algorithm (GA), to help reduce the fuzzy logic's dependency to the implementor's domain knowledge for its membership functions. The results show that the GA-optimized fuzzy-NN model demonstrated the best model performance with 95.39% train accuracy and 90.2% test accuracy. Finally, the developed strategy introduced a domain-agnostic algorithm for robot control; thus, it will be effective without requiring prior expertise to the area of application.

Keywords: *mobile robotics, classifier, neural network, genetic algorithm, fuzzy logic*

Introduction and Literature Review

Mobile robotics has been one of the research interests of scientists and engineers in the earlier years. This field of science allows the development of physical agents that could automate or perform tasks that tends to be tedious or dangerous to human beings. One issue, however, that has always been present in this arena is the movement and/or response of these robots to environmental information—how to design policies that could deliver the robot from one point to another? (Santiago et al., 2017)

To achieve a complete navigation task, three questions should be answered: Where is the robot, where should it go, and how would it get there (Koubaa et al., 2021). These fundamental questions for navigation are answered by the three major elements of navigation: localization, mapping, and motion or path planning. Localization is achieved through numerous methods, such as using cameras (Park & Sim, 2008), ultrasonic sensors (Lim et al., 2015), or ultra wideband technology (Lv & Jiang, 2018), among others. The localization data is usually expressed in terms of coordinates using latitude and longitude. In consideration to the environmental data that the robot can collect from its environment, the integration of modern computational techniques (e.g., Machine Learning, Deep Learning, etc.) were investigated (Harris, 2020). One technique that is thoroughly related to control systems is the use of Fuzzy Logic. This technique, despite research-based evidences supporting its significant effectiveness in improving the robot's "intelligence", the development of its membership functions are left at the domain expertise of the implementer (Sadollah, 2018). Thus, the implemented fuzzy membership for a given robot system may not always be ~~the~~ that could have been made.

Mobile Robots

In the context of science and technology, the term robot has several definitions. According to the Robotics Institute of America (RIA), a robot is a reprogrammable manipulator designed to transport materials such as parts or tools (Dongshu et al., 2011). This definition is later adopted in the European Standard EN775/1992 which states that robots are automatically controlled reprogrammable and multipurpose machines with several degrees of freedom designed to be fully manipulative for use in industrial automation applications. Arkin and Brooks define robots as machines that are able to gather information about their work and environment, and navigate safely with purpose. In summary, robots are intelligent machines that have a degree of perception and action in which they are able to operate autonomously, without human intervention (Tzafestas, 2013).

Robotics and Artificial Intelligence

Robotics is a system of hardware and software that has been the sole agency for the application of artificial intelligence. The renewed interest in the marriage of these two areas could be traced to the dissemination of more mature techniques from both areas (Ingrand & Gallab, 2014). The progression of more robust computational techniques allow the integration of robotics in wide array of operations. Consequently, the emergence of this trend made practitioners to instate ethical considerations in the deployment of robotics and artificial intelligence (Winfield & Marina, 2021).

Fuzzy Logic

Fuzzy logic deals with the abstraction of reasoning that is suggested from the traditional logic such as binary logic (Zadeh, 1988). This mathematical abstraction system has been highly useful as it resolves conditional conflicts that emerges from discrete separation through traditional logic. As Zadeh mentioned, fuzzy logic is the underlying logic for uncertain values with vast applications ranging from process control and medical diagnosis. (Zadeh, 1988)(Isaai et al., 2011) (Fernando et al., 2017)

Fuzzy Inference System

A fuzzy inference system (FIS) is a system that utilizes fuzzy logic or fuzzy set theory to mimic the intuition of the human operator. In the context of fuzzy inference systems, an expert can be a researcher or a designer with heuristic knowledge or knowledge based on experience that is used for decision-making for the system being controlled (Liu et al., 2013)(Sybingco et al., 2021). Such systems embed the principles of fuzzy to create a model that can represent imprecise or vague information. The block diagram of the fuzzy inference system is shown below (Javel et al., 2019).

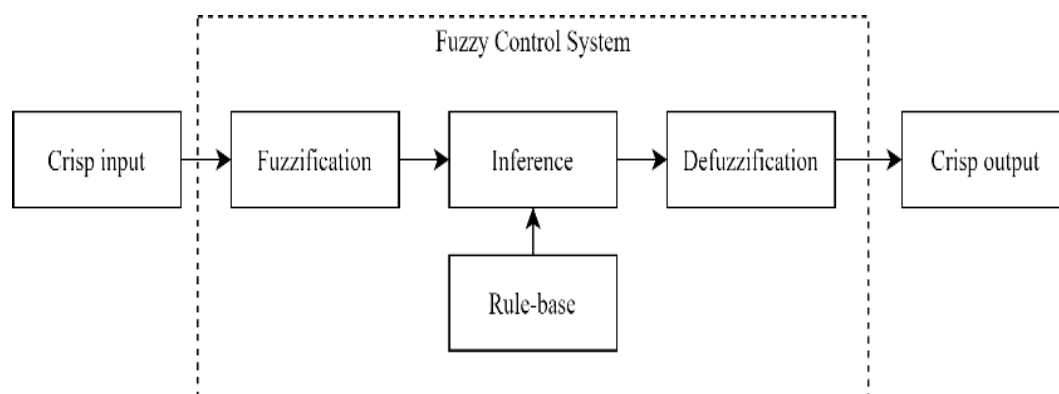


Figure 1. Fuzzy Inference System Architecture

The fuzzy Inference system is composed of six (6) blocks (refer to Figure 1).

- i. Crisp input – A crisp input is actual data measured or gathered from various sensor readings (Javel et al., 2019).
- ii. Fuzzification – A fuzzy inference system utilizes membership functions to model imprecise data. Fuzzification is the process of mapping the crisp input into a certain degree of membership (Javel et al., 2019)(Carr, 2014).
- iii. Inference – The inference is responsible for deriving a fuzzy output based on the membership functions and rule-base set by the expert or designer (Bai & Wang, 2006).
- iv. Rule-base – The rule-base is responsible for the behavior of the fuzzy inference system. This contains all the ruleset by the expert or designer which are based on human intuition (Liu et al., 2013) (Bai & Wang, 2006).
- v. Defuzzification – Defuzzification is the reverse process of fuzzification. Since the output of the inference is a fuzzyvalue, and it must be converted back into a crisp value for it to be used (Bai & Wang, 2006).
- vi. Crisp output – The crisp output is an actual value that can be used for decision-making or process control.

Genetic Algorithm

Genetic algorithms (GA) is an optimization algorithm that is used to file the optimal solutions to a given computational problem that maximizes or minimizes a particular function. According to ScienceDirect (2021) and Mallawaarachchi (2020), it is inspired from Charles Darwin's theory of evolution on which the GA performs evolutionary computation, imitating biological processes and natural selection. [21]

Since GA is designed to simulate biological processes, most of its components and terminology were derived from biology. However, GA's assumptions and methodology is much simpler as compared to its biologic counterparts (Carr,2014). The basic components of GA are as follows:

- i. Fitness function – A function that serves to govern the evolutionary procedure.
- ii. Population of chromosome – A pool of entities that undergoes the evolutionary procedure.
- iii. Selection or Mating – The procedure for the determination of entities that will be "tested" for a given generation.
- iv. Reproduction or Crossover – A methodology in reproducing new entities (offsprings) subsequent to theMating process.
- v. Mutation – The uncontrolled tendency for offsprings to possess new chromosome(s) that may not previouslybepossessed by the parent entities.

SCITS G5 Wall-following Robot

The data used in this paper came from the sensor reading of the SCITS G5 wall-following robot (refer to Figure 2). Thedataset is composed of 24 ultrasonic sensors that are arranged circularly around its waist. The provided sensor readings are also simplified; thus, previous preprocessing has been implemented to the data prior to its publication. The target variable, on the other hand, was

dedicated to the robot's movement response from the sensor readings that it has collected, namely: *Move_Forward*, *Slight_Right_Turn*, *Sharp_Right_Turn*, and *Slight_Left_Turn*. Class-wise, the *Move_Forward* has the most entry which consists of 40.1% of the data, followed by *Sharp_Right_Turn* (38.43%), *Slight_Right_Turn* (15.13%), and *Slight_Left_Turn* (6.01%).

Finally, this robot was designed to test the hypothesis that this apparently simple navigation task is indeed a non-linearly separable classification task. Thus, linear classifiers, such as the Perceptron network, are found incapable to learn the task and command the robot around the room without collisions. Nonlinear neural classifiers, such as the MLP network, are able to learn the task and command the robot successfully without collisions (Lichman, 2013).



Figure 2. SCITOS G5 robot

This paper explores the improvement of a Fuzzy-Neural Network robot movement classifier using GeneticAlgorithm. This will be done through an evolutionary search of the best fuzzy membership for the given robot data. This shows that we can reach a generation that could provide the optimal membership setup for our data resulting to an optimal intelligence to help the robot navigate through its course.

Methodology

Development of a Neural Network Classifier

A Fully-connected Neural Network is designed to serve as the intelligence of the robot to aid its wall-navigation task effectively. This will be implemented using Keras, a deep learning library in python. (Gulli & Pal, 2017) Given the navigation data, the Neural Network classifier was designed to facilitate a multi-class, multilayer output—one output for each robot movement—given the nature of the target variable. The training, validation, and test data were split using a stratified split with respect to the class movements to reduce any class bias that could affect the training of the model.

The Neural Network is composed of 9 layers, 7 of which are hidden layers. Referring to Figure 3, there is approximately 1.4 Million neurons implemented to the deployed neural network-based classifier. In extension to the normal set of neurons in the deployed model, dropout layers are initiated in order to prevent potential overfitting given the complexity of the neural network.

With a delegated 50 epochs of training, the training time is expected to take some time without a high-performance computing machine. As such, the development of the model was performed using

Acer Predator Helios300 Intel(R) Core(TM) i7-10750H CPU @ 2.60GHz with 24.0 GB RAM.

Layer (type)	Output Shape	Param #
dense (Dense)	(None, 64)	1600
dense_1 (Dense)	(None, 128)	8320
dense_2 (Dense)	(None, 256)	33024
dropout (Dropout)	(None, 256)	0
dense_3 (Dense)	(None, 512)	131584
dense_4 (Dense)	(None, 1024)	525312
dropout_1 (Dropout)	(None, 1024)	0
dense_5 (Dense)	(None, 512)	524800
dense_6 (Dense)	(None, 256)	131328
dropout_2 (Dropout)	(None, 256)	0
dense_7 (Dense)	(None, 128)	32896
dense_8 (Dense)	(None, 32)	4128
dense_9 (Dense)	(None, 4)	132
Total params: 1,393,124		
Trainable params: 1,393,124		
Non-trainable params: 0		

Figure 3. Neural Network classifier structure

Creating the fuzzy membership for sensor readings

The initial input membership functions are shown in Figure 4. Here, the observed distance measurements are approximately within the range of 0 to 5 which is parallel to the range of values observed in the given data. As such, without prior background to the nature of the data, the membership function was naively approximated as follows (refer to Figure 4). Three membership categories are initialized, namely: *near*, *medium*, *far*. These three categories were assumed to have overlapping values at some distance measurements.

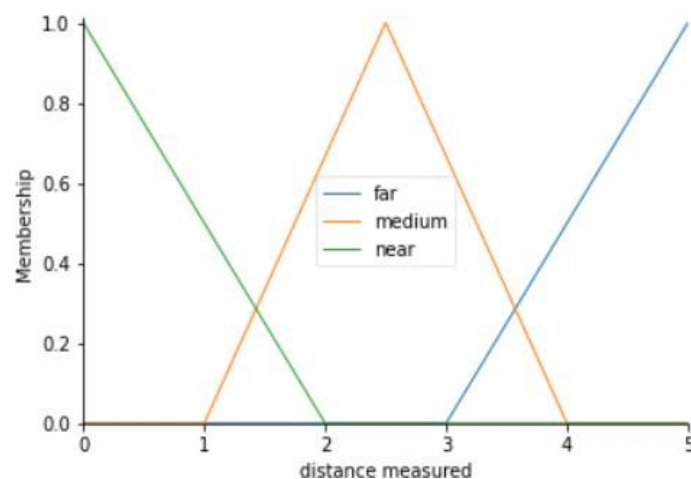


Figure 4. Proximity sensor membership function

Moreover, the shown input membership functions for the measured distances were assumed to fit a triangular membership function. Furthermore, *near* meant that a low value sensor reading, *medium* meant an average sensor reading, and *far* meant high value sensor reading. As shown, the approximations in the membership distributions covers critical measurements (overlapped regions) were approximations which could provide confusion to the robot.

GA-based search for the Optimal Membership distribution

This procedure was performed as a solution to an engineer's lack of prior understanding to the background of the data. This involves the development of a Genetic Algorithm to determine the optimal fuzzy membership distribution.

For this proposition, we only assumed that there are three triangular membership functions for the data's fuzzy membership. Aside from this, we let the evolutionary algorithm to run through combinations of membership distributions to come up with an optimal fuzzification to our data.

The algorithm was initialized with 10 sets of entities whose chromosomes are composed of randomized membership distribution for three membership functions. Random crossover is then performed. No bias towards the bestperforming entities are initiated in this step. The mutation is then handled through a random selection of a gene whose values are to be transmuted whereas the new set of gene values are within the measurement range manifested in the data. Finally, the cost function is provided by a fully connected neural network that is similar with what is shown in Figure 3. This cost function will provide feedback to understand which set of individuals produced a much better model performance. Consequently, the best two individuals were placed back in the population pool, and the process restarts for the new generation.

Findings

Referring to Figure 5, the developed neural network model without prior application of fuzzification proceeds with a fair performance of 93.29% and 87.17% train and validation accuracies, respectively. It is notable that despite the "deepness" of the developed network structure, the learning converges early at approximately 10 epochs despite the initiated layer dropouts in the network model. Finally, this model has 88.92% recorded accuracy for the test dataset.

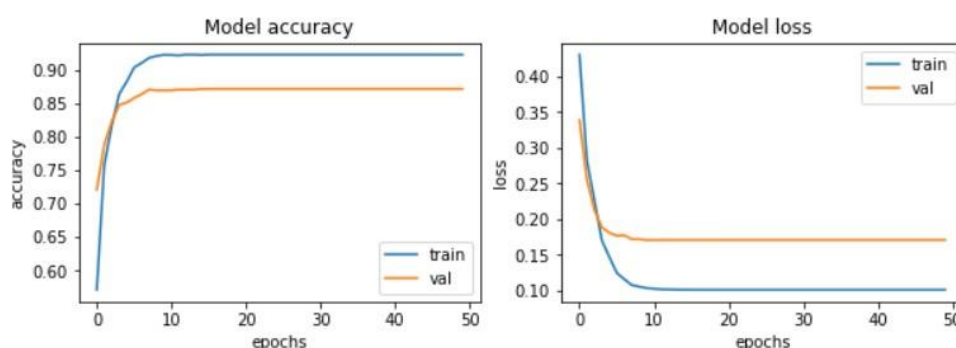


Figure 5. Model performance from raw value data

On the other hand, the model performance for the fuzzified data using the membership distribution shown in Figure 6 demonstrates a performance pattern that is similar to the previous model. However, this model has only 88.80%, 84.19%, and 84.62% for train, validation, and test accuracies, respectively.

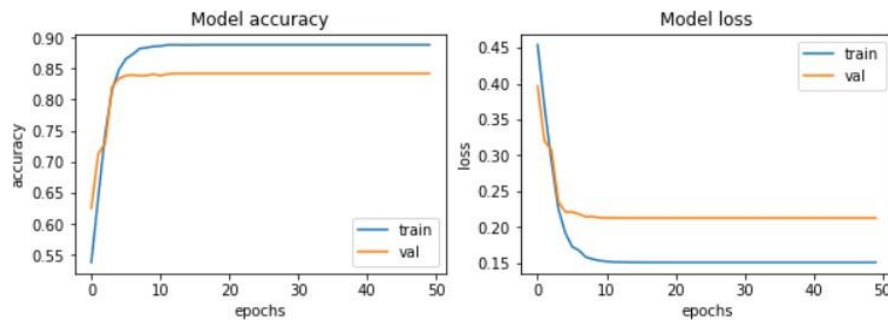


Figure 6. *Model performance from fuzzified data*

Finally, the GA-based search for optimal membership distribution produced the membership distribution shown in Figure 7. The membership functions are labeled membership A, B, and C for its lack of interpretation (given that the abstraction is only suggested through Genetic Algorithm). This resulting membership function produced 95.39% and 91.06% for train and validation accuracies, respectively, and the test performance is at 90.02%. Also, it was found that there was no significant improvement to the model performance with the increase of GA algorithm complexity.

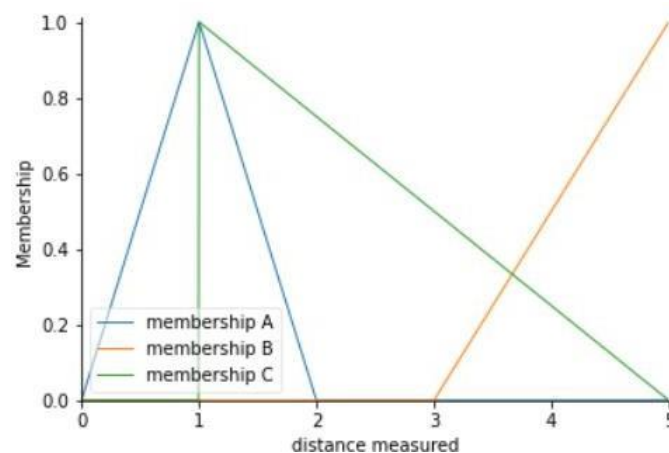


Figure 7. *GA-based membership distribution*

Discussion

The performance of the fuzzy-NN model was found to be subpar in comparison to the NN model performance that we recorded with the raw value data. These counter-intuitive results could be accounted to the reasoning that the data may have already been abstracted given its “simplified” description in its raw data. Another potential reason behind this result could be that the fuzzy membership function shown in Figure 4 is not the optimal fuzzifier in order to generate better model.

On the other hand, it is evident that the GA-based fuzzy-neural network classifier outperformed other models that are applied with raw data and user-directed fuzzification data values. This feat is significant as the GA automated the search for the optimal membership distribution, bypassing the requirement of domain expertise from the user.

The results that we have in this study envelopes a huge potential as it shows that a domain-agnostic GA-optimized fuzzy-NN model is effective in controlling a mobile robot.

Limitations and Implications

In extension of this study, it is envisioned that more applications be investigated with the use of the proposed algorithm. Subjecting it for wide array of research problems could bring forth other redevelopments to transform the proposed algorithm to be ready for real-world applications.

Furthermore, this study only considers the triangular membership function for its fuzzifier. A more elaborated study could be further developed by using different shapes of membership distribution that is looped in the evolution of the Genetic Algorithm.

Conclusion

This project demonstrates the capability of the performed hybrid algorithm to be a substitute to user heuristics in terms of fuzzy logic. In addition, the GA-optimized fuzzy-NN robot controller has a higher performance as compared

to the NN and fuzzy-NN models. The optimization offered by GA was found to be an effective determination engine for the user-defined hyperparameters of fuzzy logic.

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References

- [1] R. M. C. Santiago, A. L. De Ocampo, A. T. Ubando, A. A. Bandala, and E. P. Dadios, "Path planning for mobile robots using genetic algorithm and probabilistic roadmap," in *HNICEM 2017 - 9th International Conference on Humanoid, Nanotechnology, Information Technology, Communication and Control, Environment and Management*, Jul. 2017, vol. 2018-January, pp. 1–5, doi: 10.1109/HNICEM.2017.8269498.
- [2] A. Koubaa *et al.*, "Introduction to Mobile Robot Path Planning," 2018, pp. 3–12.
- [3] J.-H. Park and K. B. Sim, "A design of mobile robot based on Network Camera and sound source localization for intelligent surveillance system," in *2008 International Conference on Control, Automation and Systems*, 2008, pp. 674–678, doi: 10.1109/ICCAS.2008.4694586.
- [4] J. Lim, S. Lee, G. Tewolde, and J. Kwon, "Indoor localization and navigation for a mobile robot equipped with rotating ultrasonic sensors using a smartphone as the robot's brain," in *2015 IEEE International Conference on Electro/Information Technology (EIT)*, 2015, pp. 621–625, doi: 10.1109/EIT.2015.7293407.
- [5] Y. Lv and P. Jiang, "The Design of Indoor Mobile Robot Navigation System Based on UWB Location," in *2018 Eighth International Conference on Instrumentation Measurement, Computer, Communication and Control (IMCCC)*, 2018, pp. 334–338, doi: 10.1109/IMCCC.2018.00077.
- [6] Harris, T. (2020, January 27). *How robots work*. HowStuffWorks Science. Retrieved September 19, 2021, from <https://science.howstuffworks.com/robot6.htm>.
- [7] Sadollah, A. (2018, October 31). *Introductory chapter: Which membership function is appropriate in fuzzy system?* IntechOpen. Retrieved September 19, 2021, from <https://www.intechopen.com/chapters/62600>.

- [8] W. Dongshu, Z. Yusheng, and S. Wenjie, "Behavior-based hierarchical fuzzy control for mobile robot navigation in dynamic environment," in *2011 Chinese Control and Decision Conference (CCDC)*, 2011, pp. 2419–2424, doi:10.1109/CCDC.2011.5968614.
- [9] S. G. Tzafestas, *Introduction to Mobile Robot Control*. Elsevier Inc., 2013.
- [10] Ingrand, F., & Ghallab, M. (2014, January 1). *Robotics and artificial intelligence: A perspective on deliberation functions*. AI Communications. Retrieved September 20, 2021, from <https://content.iospress.com/articles/ai-communications/aic578>.
- [11] Winfield Alan F. T. and Jirotko Marina, Alan F. T. Winfield Alan F. T. Winfield <http://orcid.org/0000-0002-1476-3127> Bristol Robotics Laboratory, Winfield, A. F. T., Alan F. T. Winfield <http://orcid.org/0000-0002-1476-3127> Bristol Robotics Laboratory, Jirotko, M., Marina Jirotko Department of Computer Science, & One contribution of 9 to a theme issue 'Governing artificial intelligence: ethical. (2018, October 15). *Ethical governance is essential to building trust in robotics and artificial intelligence systems*. Philosophical Transactions of the Royal Society A: Mathematical, Physical and Engineering Sciences. Retrieved September 20, 2021, from <https://royalsocietypublishing.org/doi/full/10.1098/rsta.2018.0085>.
- [12] L. A. Zadeh, "Fuzzy Logic," *Computer (Long. Beach. Calif.)*, vol. 21, no. 4, pp. 83–93, 1988, doi: 10.1109/2.53.
- [13] M. T. Isaai, A. Kanani, M. Tootoonchi, and H. R. Afzali, "Intelligent timetable evaluation using fuzzy AHP," *Expert Syst. Appl.*, vol. 38, no. 4, pp. 3718–3723, Apr. 2011, doi: 10.1016/j.eswa.2010.09.030.
- [14] E. A. H. Fernando *et al.*, "Design of a fuzzy logic controller for a vent fan and growlight in a tomato growth chamber," in *HNICEM 2017-9th International Conference on Humanoid, Nanotechnology, Information Technology, Communication and Control, Environment and Management*, Jul. 2017, vol. 2018-January, pp. 1–5, doi: 10.1109/HNICEM.2017.8269526.
- [15] W. Y. Liu, J. G. Han, and X. N. Lu, "A high speed railway control system based on the fuzzy control method," *Expert Syst. Appl.*, vol. 40, no. 15, pp. 6115–6124, Nov. 2013, doi: 10.1016/j.eswa.2013.04.034.
- [16] M. F. Q. Say, E. Sybingco, A. A. Bandala, R. R. P. Vicerra, and A. Y. Chua, "2D Position Control of a UAV Using Fuzzy Logic Control," in *2021 IEEE/SICE International Symposium on System Integration, SII 2021*, Jan. 2021, pp. 679–683, doi: 10.1109/IEEECONF49454.2021.9382784.
- [17] I. M. Javel, A. A. Bandala, R. C. Salvador, R. A. R. Bedruz, E. P. Dadios, and R. R. P. Vicerra, "Coconut fruit maturity classification using fuzzy logic," Mar. 2019, doi: 10.1109/HNICEM.2018.8666231.
- [18] Y. Bai and D. Wang, "Fundamentals of fuzzy logic control — fuzzy sets, fuzzy rules and defuzzifications," in *Advances in Industrial Control*, no. 9781846284687, Springer International Publishing, 2006, pp. 17–36.
- [19] Carr, J. (2014). *An Introduction to Genetic Algorithms*.
- [20] *Genetic algorithm*. Genetic Algorithm - an overview | ScienceDirect Topics. (n.d.). Retrieved September 20, 2021, from <https://www.sciencedirect.com/topics/engineering/genetic-algorithm>.
- [21] Mallawaarachchi, V. (2020, March 1). *Introduction to genetic algorithms - including example code*. Medium. Retrieved September 20, 2021, from <https://towardsdatascience.com/introduction-to-genetic-algorithms-including-example-code-e396e98d8bf3>.
- [22] Lichman, M. (2013). UCI Machine Learning Repository [<http://archive.ics.uci.edu/ml>]. Irvine, CA: University of California, School of Information and Computer Science.

Mobile-Based User Interface and User Experience Learning Management System Design, Case Study: Faculty of Computer Science, Klabat University

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Abstract: Klabat University is a university located in North Sulawesi. One of the faculties at the Klabat University is the Faculty of Computer Science. As yet, The Faculty of Computer Science does not have a Learning Management System platform for carrying out learning. Because of this, the researchers designed a User Interface and User Experience Learning Management System at the Klabat University. Heuristic Evaluation was used to guide in designing the user Interfaces and their experience. Researchers used the System Usability Scale questionnaire to evaluate the designed User Interface and User Experience (UI/UX). The result of this research is that the UI/UX design gets a System Usability Scale score of 77.3 with the category "acceptable" and the rating "good," which means that the UI and UX LMS display design has met the standards set by the method used for evaluation and the needs of the users.

Keywords: *user interface, user experience, learning management system, heuristic evaluation, system usability scale questioner*

Introduction and Literature Review

Information technology is needed in the field of education today. The COVID-19 pandemic has directly changed the interaction model in learning because it must comply with the Ministry of Education and Culture (Kemendikbud) policy, which requires students to study from home. (Pusat Data dan Teknologi Informasi, 2020) One example of technological advances in education is the Learning Management System (LMS) platform. Based on the opinion of Ryan K. Ellis, LMS is a software that assists users in administrative purposes, finding materials, reporting activities, and documenting training materials for learning and teaching activities. These functions can be used when the user is directly connected to the internet. (Komendangi et al., 2017)

Apart from the functions of the LMS application, the UI/UX are also the main elements. This can happen because the user interface design can shape the user's view of the application or website he visits. (Susilo et al., 2018) The user interface can be said to be good if it makes the user want to linger in accessing the application so that the user directly gets a good user experience (Heny, 2016). On the other hand, if the application has a bad design, it will make the user to leave the application/interface immediately (Rochmawati, 2019).

These things encouraged the researchers to design the UI/UX of LMS. This study used qualitative and quantitative analysis. Researchers used qualitative research when managing needs that come from the user experience. Analysis of these needs analysis aims to design user experience and user interfaces that comes from users' behavior, comments, opinions, and motivations towards the LMS application. Meanwhile, quantitative research was used to measure the design of the UI/UX by using the System Usability Scale. (Rahmalia, 2021)

The Heuristic Evaluation method was chosen by researchers in designing the UI/UX. Researchers used five principles in the Heuristic Evaluation method related to the UI/UX. In comparison, researchers did not use the other five principles in the Heuristic Evaluation method because they are better applicable during application design. The five principles used by the researcher are visibility of system status, a match between the system and the real world, consistency and standards, flexibility and efficiency of use, and aesthetic and minimalist design. Researchers chose these five principles to design UI/UX in LMSs.

Researchers also evaluated the usability of the UI/UX designs that have been made. This measurement uses the System Usability Scale method. This method is needed so that researchers can measure the usability quality of the designed UI/UX. The result of this method is a usability score.

Klabat University is a private university located in North Sulawesi and the Faculty of Computer Science is one of the seven faculties. The Faculty of Computer Science was chosen by the researchers as the object of research because, until now, there has been no development regarding the user interface design and user experience of a mobile-based LMS. This research is expected to help design the UI/UX of the LMS at the Faculty of Computer Science, Klabat University.

Learning Management System (LMS)

LMS is a software with many functions. (Sevima, 2021) The main functions include planning the learning process, storing documents, searching for learning materials, and providing learning reports. All these functions can be accessed when the user is connected to the internet. (Salamah et al., 2020) The functions of the LMS can directly help students and teachers to be more effective in the distance learning process.

The functions that are the advantages of LMS are divided into three categories, including the following: (Sa'diyah et al., 2020) (1) Completeness of learning and teaching, this first category consists of combined functions of courses and their categories, information about the curriculum in courses, text books and multimedia in lecture materials, and having a collection of readings and references for each course. (2) Communication and discussion, this second category consists of forum functions for communicating and mailing lists, providing direct messages, providing bulletin boards, providing media that can communicate with teachers or instructors, and file and directory sharing functions. (3) The function of exams and assignments in the third category consists of online exam functions, assignments, and assessments and evaluations.

Methodology

The initial stage of this research is to look for related research. Furthermore, researchers collected data from students of the Faculty of Computer Science, Klabat University, to find feedback regarding the needs and experiences of users in using the LMS. The data is then processed to determine user needs for the LMS' UI/UX. Then the researchers designed the UI/UX based on the analysis results, which were also adapted to the Heuristic Evaluation method used by researchers as research guidelines. The UI/UX designs that have been designed are then evaluated by researchers using the SUS questionnaire in order to get a usability score. Next, the researcher draws conclusions and suggestions from the designed UI/UX.

Heuristic Evaluation

Heuristic usability, commonly known as Heuristic Evaluation, is a method used as a standard in designing and evaluating the system's appearance so that the display design can function effectively. (Saputra et al., 2019) In this study, researchers used five principles in Heuristic Evaluation to guide UI/UX designs.

The following are five principles in Heuristic Evaluation used in research: (Nielsen, 2020) (1) Visibility of System Status: In this principle, the user can easily find out the status of the system based on the display of information notified by the system at the appropriate time so that the user can determine the steps to be followed. (2) Match Between System and The Real World: In this principle, the display on a system must be able to properly inform the user through phrases, words, and concepts that can be understood by the user and are not guided by the terms on the system. (3) Consistency and Standards: In this principle, it is better if the display of the elements contained on each page in the system must be consistent so as not to make the user confused about the next action to be taken, (4) Flexibility and Efficiency of Use: In this principle the system can give users the freedom to adjust and manage existing functions. Users can also perform activities in the system efficiently. (5) Aesthetic and Minimalist Design: In this principle, the display of the system must contain relevant

information because the less relevant information can interfere with the visibility of users in finding valuable information. It is also a good idea to design elements in the system view that are comfortable to look at, such as color contrast and the appropriate position of icons and space between them.

System Usability Scale

The System Usability Scale, abbreviated as SUS, is a questionnaire technique used to measure the user's view of the system's usability. (Nioga et al., 2019) Measurement of usability on a system is needed to improve user experience. (Dimas Setiawan et al., 2020) SUS has ten questions, each of which can be adapted to the feature or product to be measured for its usefulness. (Brooke, 1996) Calculation on SUS is done using five categories of the Likert scale. The SUS assessment involves research respondents whom the researcher will select. Research respondents will assess the existing product subjectively based on ten questions.

There are three rules when calculating the SUS questionnaire per respondent: (1) Each score of odd-numbered questions will be deducted 1 point. (2) The final score on the even-numbered questions is obtained from the value of 5 minus the response score from the user. (3) The scores processed in the first and second rules are then added up and multiplied by 2.5 to get the final score for each respondent.

After getting the final score from each respondent, then the scores are searched for the average value using the following formula:

$$\bar{x} = \frac{\sum x}{n}$$

$$\begin{array}{rcl} \bar{x} & = & \text{skor rata-rata} \\ \sum x & = & \text{jumlah skor SUS} \\ n & = & \text{jumlah responden} \end{array}$$

Figure 1. Average Formula SUS Score.

The minimum score limit of the SUS evaluation is 68. If the score obtained is less than 68, the object must be repaired because it has problems with its usability. (Susilo, 2019)

Data Collection Instruments

Data Type

Researchers used primary and secondary data. Primary data is still raw and has not been processed because the existing data is obtained directly from the source without any intermediary. (Dqlab, 2021) The primary data in this study were obtained from the research instrument in the form of a questionnaire distributed to the selected research respondents. While secondary data is obtained through journals, books, websites, government publications, and other supporting sources. (Populix, 2021) Secondary data in this study as supporting data, obtained through studies such as journal articles, literature, and related research.

Data Collection Techniques

The data collection technique in this study used a questionnaire. The questionnaire was distributed through Google Forms, which had been filled in by students of the Faculty of Computer Science as respondents and active users of LMSs such as Google Classroom and Microsoft Teams.

Data Collection Procedure

In collecting data, researchers carried out the process by distributing questionnaire via google form to students of the Faculty of Computer Science who were still actively studying. The questionnaire that the researcher has two parts. The first part contains questions about the identity of the respondents, while the second part contains questions specifically about the needs in display in LMS.

Needs Analysis

At this stage, the researcher processes the user experience design needs from the questionnaire results. This stage aims to find helpful information for researchers in making decisions or actions on formulating problems in research.

Findings/ Results

Researchers conducted recruitment related to the evaluation of the SUS questionnaire. The following are expert evaluators who provided an assessment.

Table 1. Expert Evaluator Profile.

No	Evaluator	Field	Degree	Gender
1	Gilbert Evander Aligoey	UI/UX Designer of Aleph-Labs	Bachelor of Interactive Multimedia Design	Male
2	Dipta Divakara Pius Purwadaria	Practitioner UI/UX Project	Magister of Communication Design	Male

The researcher distributed the SUS questionnaire along with the results of the UI/UX design in the LMS for evaluation. The researcher also involved 18 students with conditions who had/while taking HCI (human-computer interaction) course or is an ACP (Adobe Certified Professional).

Then the SUS Evaluation data from each of the 20 evaluators were inputted into Microsoft Excel tools which already contained the SUS questionnaire calculation formula. The following results from the SUS questionnaire data processing using Microsoft Excel.

Calculated Score											TOTAL	VALUE
Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10			(TOTAL X 2.5)
2	4	4	4	4	1	3	3	3	0	28		70
4	3	4	4	4	2	3	3	3	1	31		77,5
4	3	3	3	3	2	3	3	1	2	27		67,5
4	3	4	3	4	3	3	3	4	4	35		87,5
4	3	4	2	3	4	4	4	4	4	36		90
4	3	4	2	4	2	4	3	3	0	29		72,5
4	3	3	3	4	3	3	4	3	1	31		77,5
3	3	4	2	3	3	4	3	4	1	30		75
3	3	3	3	3	3	4	4	3	3	32		80
3	3	4	1	4	3	4	2	3	1	28		70
3	2	2	3	2	2	2	3	2	1	22		55
3	3	3	3	3	3	3	3	3	1	28		70
3	3	3	3	3	3	3	3	3	3	30		75
3	4	4	4	3	4	3	4	3	2	34		85
1	4	4	3	4	4	4	4	4	0	32		80
3	3	4	4	4	3	4	3	4	2	34		85
3	3	3	3	3	3	3	3	3	3	30		75
3	4	4	4	4	3	4	4	4	3	37		92,5
4	3	3	2	3	3	3	4	4	1	30		75
3	4	4	3	3	4	3	4	3	3	34		85
Average Score												77,25

Figure 2. The results of the SUS Questionnaire data processing using Microsoft Excel

As seen in Figure 2, the average score for the user interface display and user experience of LMS in the Faculty of Computer Science is 77.3, with the "acceptable" category and the "good" rating.

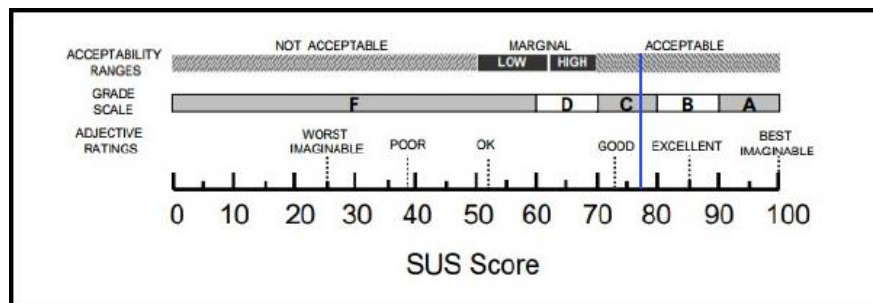


Figure 3. *SUS Score Calculation Results*

Discussion

At this stage, researchers collected data from questionnaire distributed to active students of the Faculty of Computer Science, Klabat University. The questionnaire results are then processed to find user needs in designing the user experience of the LMS, Faculty of Computer Science, Klabat University. Table 2 shows the results of the needs analysis that researchers got based on the questionnaires that have been distributed and the solutions provided by the researchers in designing the user experience and user interface of the LMS in the Faculty of Computer Science, Klabat University.

Table 2. *User Need Analysis.*

No	Need	Definition	Solution
1	Incomprehensible feature icon display	Icons that have different meanings from feature functions	The feature function display that the researcher designed has an icon that can represent the function of each designed feature. This can be seen in all frames that the researcher has designed
2	Lack of feedback from icons	Icons can provide feedback on the current action	In Figure 4, the navigation icon can change color when the user acts.
3	Add chat feature	Make it easy for users to communicate and get information with other users through the LMS platform.	In Figure 5, the researcher adds a discussion feature to make it easier for users to get information and communicate through the LMS platform.
4	Clear information	The system display contains clear and easy-to-understand information for users.	Figure 7 shows that users can understand the information displayed in this image. Users can get information when it is time to collect assignments, task titles, and status.
5	Using pastel colors	Display design using pastel colors	Researchers design pastel colors in Figure 3 based on user experience
6	Simple display design and not too many clicks	Makes it easy as users need not perform additional actions	The researcher's design in Figure 4 makes it easier for users to search for classes with the search feature, as well as features such as notifications, settings, adding classes, and profiles that do not require many clicks to arrive at the intended feature.

7	Attractive view	Selection of colors and fonts in display	Researchers use colors and fonts that have meaning.
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Design Implementation UI/UX

Based on the results of the needs analysis carried out in the previous stage, the next step is to design the user interface design and user experience LMS using the Heuristic Evaluation method as a guide in designing the interface design.

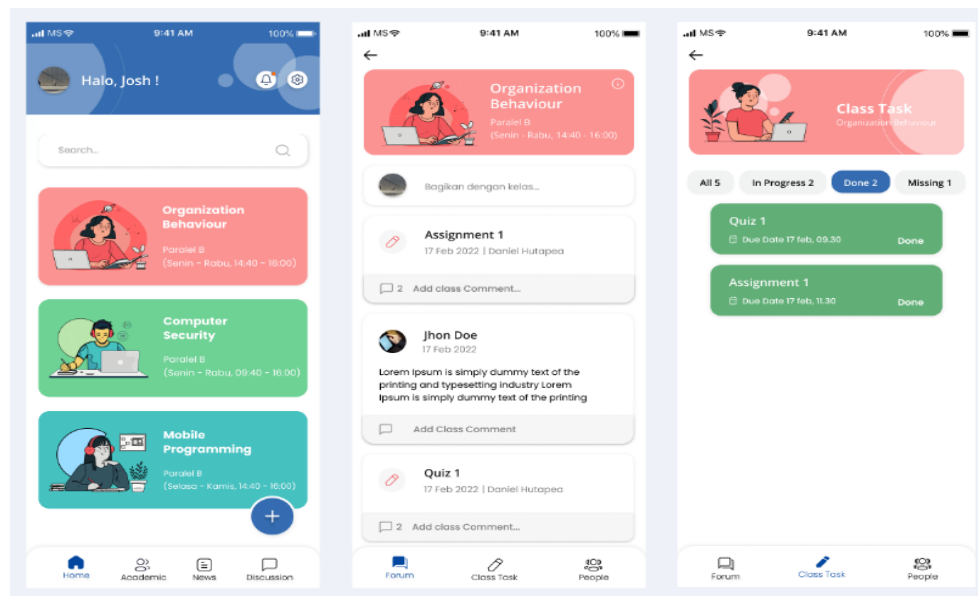


Figure 4. UI/ UX Learning Management System Design 1

Visibility of System Status

The system's display can provide feedback on the existence of the user's current activity. (Pangaribuan et al., 2020) In the home display below the navigation bottom, it will provide feedback in the form of icons that change color and move up when the user is on a page. This indicates that the system display provides feedback to the user so that the user knows the action taken. When the user accesses the sub-class view, the header display in the sub-class will change because it adapts to the class name.

When the user clicks on a page in the navigation bottom, the name in the header will change to follow that page. Furthermore, in the design of the class task feature, the system also provides feedback, namely, the color of the category changes to blue, which indicates that the user is currently in a specific category in the classification task.

Match Between System and the Real World

When the user presses the submit button to perform a task, the text on the button changes to unsubmit, and the color on the other buttons become gray, indicating the user's status who has entered the task.

The system must adequately inform the user with words and phrases that are easy to understand and do not use the system's vocabulary. (Gorasia, 2020)

In Figure 5, the user is given the option to change the language of the system display. This function is made so that users can easily understand the message the system displays as it can be in the language of their choice.

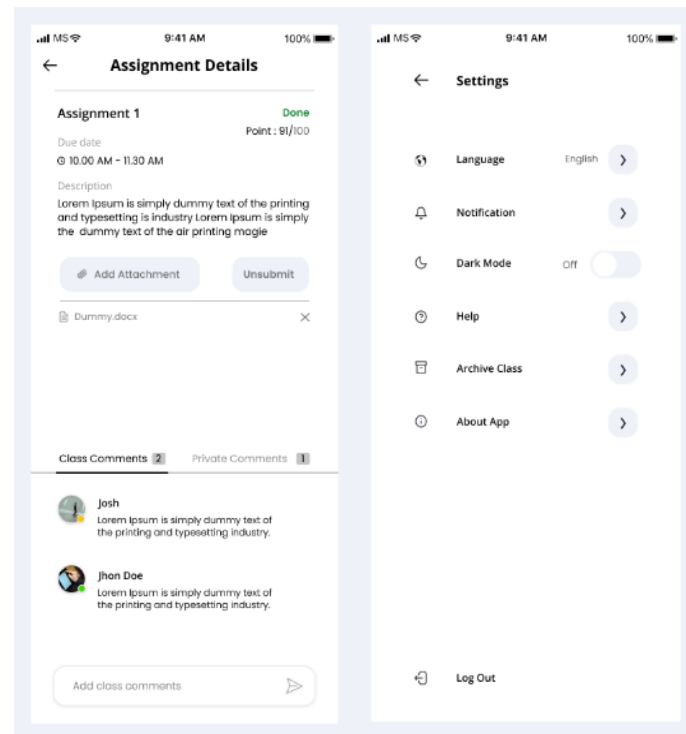


Figure 5. *UI/UX Learning Management System Design 2*

Consistency and Standards

The system's appearance should be consistent so as not to confuse the user about the actions he takes. (Krause, 2021)

Consistency can be seen in the UI/UX that is designed. For example, it can be seen from the color of the icon, which constantly changes color to blue when the user switches pages in the bottom navigation, the icon that follows the standard according to the feature function, the font used has two typefaces, namely Poppins as the primary typeface and Open Sans as secondary typeface, as well as the color of the header display which consistently shows blue where blue is the primary color for the user interface design and user experience of the LMS, as seen in Figure 5.

Flexibility and Efficiency of Use

The appearance of the system should provide flexibility and efficiency in serving both expert and novice users. (Waralalo, 2019)

In the display in Figure 6, the researchers designed the quiz display menu to be more flexible and less complex so that users can immediately know and understand the actions that can guide users in starting the quiz so that users no longer need to seek help to perform these actions.

Furthermore, in Figure 6, the researchers designed by adding a notification feature so that users are more efficient in finding new information so that users no longer need to take additional actions in finding new information or notifications.

Furthermore, in Figure 6, the researcher also designed by adding a class search feature on the home menu, which functions so that users can find other classes faster without needing additional actions such as scrolling down or clicking on the burger button menu to find the intended class.

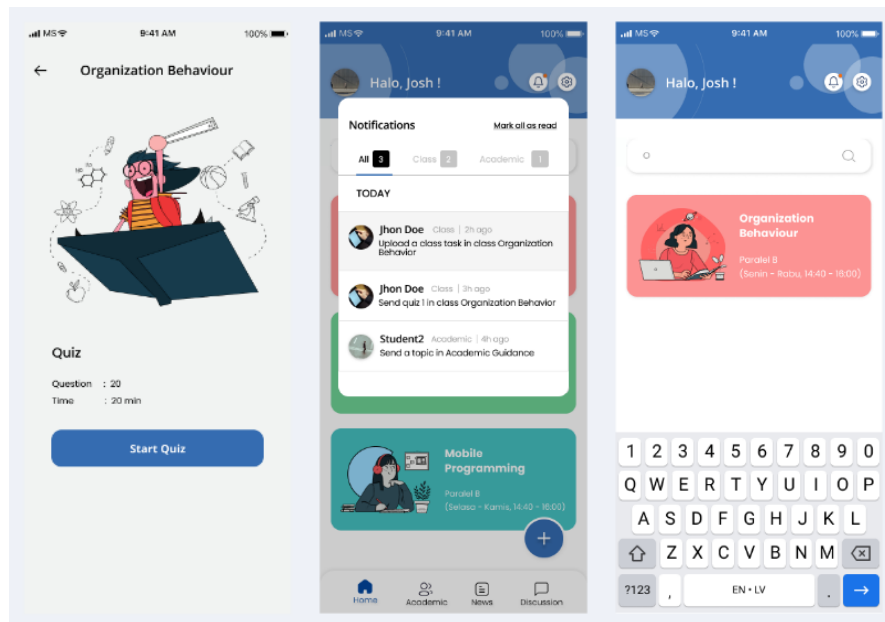


Figure 6 UI/ UX Learning Management System Design 3

Aesthetic and Minimalist Design

The information in the system user interface must be related, and the system display must also be comfortable to look at. (Ahlyar & Afani, 2019) In this figure, the class task display displays specific information about the user's tasks to get the information as desired. Color selection on task status also reflects information from the task so that users can quickly identify the task's status based on color. The class task display also displays colors that are consistent and in harmony with the illustrator's colors on the header so that users see this display as comfortable to look at and give an aesthetic impression.

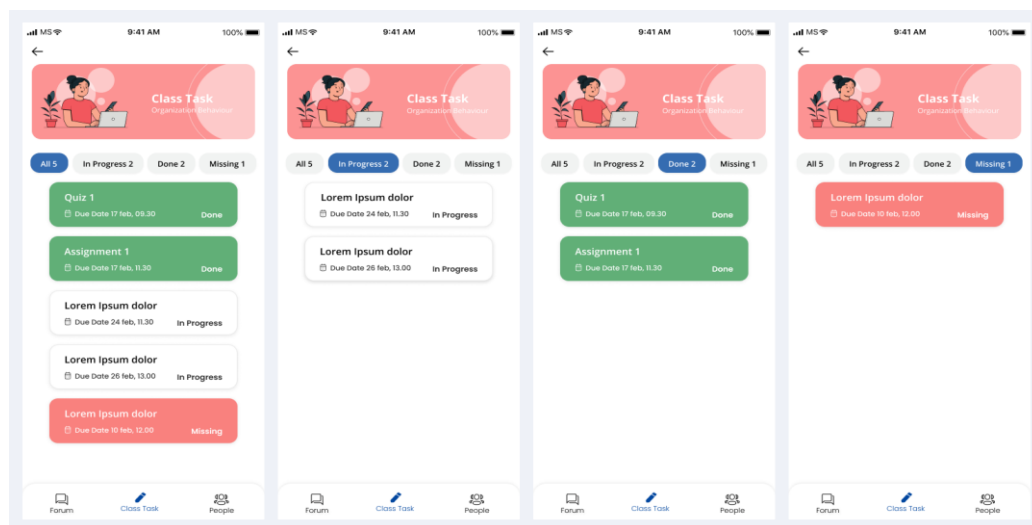


Figure 7. UI/ UX Learning Management System Design 4

Limitations and Implications

This research will not implement the LMS application. This research was only conducted with the students in the Faculty of Computer Science who are still active in lectures. The theory of this study does not use heuristic evaluation criteria other than those covered by the first point.

In this study, the researcher hopes to contribute ideas and suggestions that will later be useful, in this case, when needed in designing an interface or UI/UX, especially in designing a mobile-based LMS. The benefits of this research are divided into three parts for the Klabat University Contributing to the Klabat University, more precisely, the Faculty of Computer Science in designing a UI/UX based on the Heuristic Evaluation method. For writers, the contribution of this research researcher is to increase knowledge and enable authors to create a UI/UX following existing standards. Other Researchers contribute in the form of suggestions or ideas for other researchers regarding the design of user interfaces and user experience in building LMS applications based on standard rules or guidelines that must be followed.

Conclusion

The results of the UI/UX Learning Management System of Klabat University can be fulfilled using the Heuristic Evaluation method as a guide in carrying out the design.

The results of the evaluation of the design made obtained a SUS score of 77.3 with the category "acceptable" and a rating of "good," which means that the display design of the User Interface and User Experience LMS has met the standards set by the method used for evaluation and has met the needs from the user.

The design of the UI/UX LMS, Faculty of Computer Science, Klabat University, can be continued to be implemented into a mobile application. Furthermore, the results of this research can also be used as a reference for research related to UI/UX to develop a mobile-based interface, in this case, the LMS.

References

- [1] Ahsyar, T. K., & Afani, D. (2019). EVALUASI USABILITY WEBSITE BERITA ONLINE MENGGUNAKAN METODE HEURISTIC EVALUATION. *Jurnal Ilmiah Rekayasa Dan Manajemen Sistem Informasi*, 5(1). <https://doi.org/10.24014/rmsi.v5i1.7373>
- [2] Brooke, J. (1996). Intelligent Phone applications for people with Brain Injury The Project SUS -A quick and dirty usability scale Usability and context. *Usability Evaluation in Industry*, 189(194).
- [3] Dimas Setiawan, Suluh Langgeng Wicaksono, & Naufal Rafianto. (2020). Evaluasi Usability e-Learning Moodle dan Google Classroom menggunakan SUS Quisionnare. *JAMI: Jurnal Ahli Muda Indonesia*, 1(1). <https://doi.org/10.46510/jami.v1i1.13>
- [4] Dqlab. (2021). *Perbedaan Data Primer dan Data Sekunder*. <https://dqlab.id/perbedaan-data-primer-dan-data-sekunder#:~:text=Data primer merupakan data yang,organisasi yang telah dikumpulkan sebelumnya>
- [5] Gorasia, H. (2020). *Heuristics #2: Match Between the System and the Real World-Simplified by the examples*.
- [6] Heny, D. N. (2016). Analisis User Interface dan User Experience pada Website Sekolah Tinggi Teknologi Adisutjipto Yogyakarta. *Conference SENATIK STT Adisutjipto Yogyakarta*, 2. <https://doi.org/10.28989/senatik.v2i0.77>
- [7] Komendangi, F. K., Molenaar, R., & Lengkey, L. (2017). ANALISIS DAN PERANCANGAN APLIKASI E-LEARNING BERBASIS LEARNING MANAGEMENT SYSTEM (LMS) MOODLE DI PROGRAM STUDI TEKNIK PERTANIAN UNIVERSITAS SAM RATULANGI. *COCOS*, 1(3).
- [8] Krause, R. (2021). *Pertahankan Konsistensi dan Patuhi Standar (Usability Heuristic #4)*. <https://www.nngroup.com/articles/consistency-and-standards/>.
- [9] Nielsen, J. (2020). *10 Usability Heuristics for User Interface Design*.

- <https://www.nngroup.com/articles/ten-usability-heuristics/>
- [10] Nioga, A., Brata, K. C., & Fanani, L. (2019). Evaluasi Usability Aplikasi Mobile KAI Access Menggunakan Metode System Usability Scale (SUS) Dan Discovery Prototyping (Studi Kasus PT KAI). *Jurnal Pengembangan Teknologi Informasi Dan Ilmu Komputer*; Vol 3 No 2 (2019), 3(2).
- [11] Pangaribuan, E. P. B., Utomo, K. P., Mas'ud, I., & Tandirau, D. B. (2020). Analisis User Interface pada Situs Web Dinas Ketenagakerjaan Kota XYZ dengan Metode Heuristic Evaluation. *SPECTA Journal of Technology*, 4(2). <https://doi.org/10.35718/specta.v4i2.213>
- [12] Populix. (2021). *Pengertian Data Primer & Perbedaannya dengan Data Sekunder*. <https://www.info.populix.co/post/data-primer-adalah>.
- [13] Pusat Data dan Teknologi Informasi. (2020). *Pembelajaran Online di Tengah Pandemi Covid-19, Tantangan yang Mendewasakan*. <https://pusdatin.kemdikbud.go.id/pembelajaran-online-di-tengah-pandemi-covid-19-tantangan-yang-mendewasakan/>
- [14] Rahmalia, N. (2021). *User Research Kuantitatif vs Kualitatif untuk UX: Apa Bedanya, ya?* <https://glints.com/id/lowongan/user-research-kuantitatif-kualitatif-ux/#.YZovPdDP1Pb>
- [15] Rochmawati, I. (2019). IWEARUP.COM USER INTERFACE ANALYSIS. *VISUALITA*, 7(2). <https://doi.org/10.33375/vsilt.v7i2.1459>
- [16] Sa'diyah, H., Soedijono, B., & Arief, M. R. (2020). Implementasi Framework Zachman Sebagai Salah Satu Metodologi Terstruktur Perancangan Learning Management System. *Creative Information Technology Journal*, 6(1). <https://doi.org/10.24076/citec.2019v6i1.243>
- [17] Salamah, I., Lindawati, L., Fadhli, M., & Kusumanto, R. (2020). EVALUASI PENGUKURAN WEBSITE LEARNING MANAGEMENT SYSTEM POLSRI DENGAN METODE WEBQUAL 4.0. *Jurnal Digit*, 10(1).
- [18] Saputra, I. M. A. D., Pradnyana, I. M. A., & Sugihartini, N. (2019). USABILITY TESTING PADA SISTEM TRACER STUDY UNDIKSHA MENGGUNAKAN METODE HEURISTIC EVALUATION. *Jurnal Pendidikan Teknologi Dan Kejuruan*, 16(1). <https://doi.org/10.23887/jptk-undiksha.v16i1.18171>
- [19] Sevima, A. (2021). *Pengertian Learning Management System (LMS), Manfaat & Penerapannya*. <https://sevima.com/pengertian-learning-management-system/>.
- [20] Susilo, E. (2019). *Cara Menggunakan System Usability Scale (SUS) Pada Evaluasi Usability*. <https://www.edisusilo.com/cara-menggunakan-system-usability-scale/>
- [21] Susilo, E., Wijaya, F. D., & Hartanto, R. (2018). Perancangan dan Evaluasi User Interface Aplikasi Smart Grid Berbasis Mobile Application. *Jurnal Nasional Teknik Elektro Dan Teknologi Informasi (JNTETI)*, 7(2). <https://doi.org/10.22146/jnteti.v7i2.416>
- [22] Waralalo, M. haya. (2019). Analisis User Interface (UI) dan User Experience (UX) pada AIS UIN Jakarta Menggunakan Metode Heuristik Evaluation dan Webuse dengan Standar Iso 13407. *Journal of Chemical Information and Modeling*, 53(9).

Review of Computational Thinking Assessment in Higher Education

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Abstract : As awareness of the critical role of computational thinking in problem solving increases, efforts to promote this skill at all levels of education increase. This paper provides an insight into computational thinking (CT) studies in higher education. This study systematically reviewed how CT has been assessed. The findings show that CT assessments in higher education fall short of the efforts made to incorporate them into classrooms. In most CT studies, the measured skills and abilities were identified differently. In addition, CT studies in higher education mostly focus on cognitive skills. The most common skills assessed are algorithm and abstraction, followed by decomposition, modeling, logical thinking, evaluation, problem solving, pattern recognition, and critical analysis. Interest in non-cognitive skills as another notable aspect of CT is low. These findings provide researchers with insights into under-explored CT assessment research areas as well as assistance to instructors in picking appropriate CT assessment techniques for use in higher education.

Keyword: *computational thinking; assessment; higher education*

Introduction

CT has been appealing to researchers since the publication of Wing's "Computational Thinking" article in 2006. Wing described CT as a way of formulating solutions to problems, designing systems, and understanding human behavior by using fundamental concepts of computer science (Wing, 2006). Furthermore, Li & Wang (2012) describe the role of computing, which is the core idea of CT, in problem solving. The use of computing for problem solving is divided into two levels, the lowest and the highest. At the lowest level, computing has a role just as tools and information are utilized to solve problems, whereas at the highest level, solving problems involves creating new tools and information. CT's core concept is the most fundamental.

CT is a kind of problem-solving method that engages abstraction, algorithmic thinking, decomposition, and related processes to solve problems. These techniques allow us to tackle a large and complex problem and reformulate a seemingly difficult problem into one we know how to solve (Wing, 2006). Therefore, applying CT to problem solving develops more efficient problem solvers (Czerkowski & Lyman III, 2015). It provides the techniques to solve complex problems (Garrido, 2014; Wing, 2006, 2008). The output of CT is a computational solution that can be executed by a human, a machine, or a combination of humans and machines (Wing, 2011). CT is not computer literacy, more than that, it adopts computation techniques in order to solve complex problems. It is important for everyone who wants to survive and work smart in the digital information age to master these kinds of skills. Why is the CT skill important? CT has become the third pillar of the scientific method, along with theory and experimentation (Wing, 2011).

Moreover, CT enables the creation of new tools and information (Li & Wang, 2012). It is also notable that it empowers its learners to be technology creators rather than users, as well as future cultural inventors, innovators, and shapers (Pearson, 2009). It is highly beneficial if the human mind can collaborate with the computer and digital tools to provide solutions to real-life problems (Barr et al., 2011). Students of the new, 21st-century generation required CT as a set of problem-solving skills (Repenning, Basawapatna, & Escherle, 2016; Román-González, 2015; Yadav, Zhou, Mayfield, Hambrusch, & Korb, 2011). CT is a fundamental and applicable set of attitudes and skills that everyone has to master (Wing, 2006).

CT started to draw researchers' attention in the education and even computer science fields since Wing published her viewpoint on this thinking skill in March 2006 in the Communication of the ACM.

CT research in higher education has primarily focused on developing curricula to promote CT as fundamental skills for computer science majors (Kafura & Tatar, 2011; J. Liu & Wang, 2010; Manson & Olsen, 2012; L. D. Miller et al., 2013; Walden, Doyle, Garns, & Hart, 2013). Chowdhury (2015) investigated the collaborative learning approach for teaching CT, whereas (Basawapatna, Koh, Repenning, Webb, & Marshall, 2011; Berland & Lee, 2011; Boechler, Artym, Dejong, Carbonaro, & Stroulia, 2014; Kazimoglu, Kiernan, Bacon, & MacKinnon, 2012; C. C. Liu, Cheng, & Huang, 2011; SeWing's vision is that CT, the way computer scientists think of solutions, will be an essential skill, as fundamental as reading, writing, and arithmetic. In response to Wing's essay, studies devoted to computational thinking have been conducted, investigating how to teach and assess computational thinking.

Methodology

The study is a systematic literature review on CT assessment in higher education. The first step was conducting a literature search. The researcher searched through computerized databases such as Google Scholar, ScienceDirect, ACM, and IEEE, using the terms 'Computational Thinking Assessment' AND 'higher education.' Both journal articles and conference papers were included in this review. There have been 156 pieces of literature identified. The following inclusion criteria were used to select the articles and papers: First, they are written in English and available in full text. There were 46 texts that failed to meet both of the criteria. Second, the literature should contain the term "computational thinking" in the title, abstract, keywords, or main text. There were 21 excluded at this screening stage. Third, the study aimed at a higher education level. The number of pieces of literature excluded at this screening stage was 48. Fourth, they are empirical studies that contain CT-related skills assessment outcomes. Twenty-five texts that focused on CT teaching were eliminated.

Findings

In this study, 41 publications related to CT research in higher education were examined. As shown in Fig. 2, CT studies at the higher education level involve course, assessment, or a combination of course and assessment. The majority (60%) of the 41 studies (25 studies) focus on teaching CT, followed by assessment (8 studies), and the combination of course and assessment (8 studies)

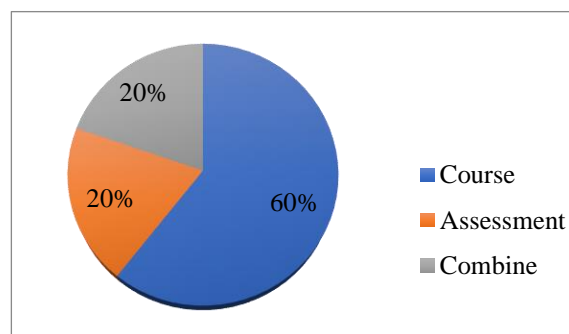


Figure 1. *Computational Thinking Studies in Higher Education*

A. Skills Assessed

CT has gained its new currency for a decade. However, researchers have yet to reach an agreement on its definition, as well as the skills and abilities that defined CT itself. In most CT studies, the measured skills and abilities were identified differently. As shown in Table 1, each study has adopted many different groups of CT skills. The most common skills are algorithm and abstraction,

followed by decomposition, modeling, logical thinking, evaluation, problem solving, pattern recognition, and critical analysis. They are all cognitive skills.

Despite the fact that Wing defines CT as a set of attitudes and skills that everyone can use to solve problems (Wing, 2006), CT studies in higher education primarily focus on cognitive skills. There are only 3 of 41 studies that incorporate non-cognitive skills; problem solving (Ambrosio et al., 2014; Gouws, Bradshaw, & Wentworth, 2013a; Gouws et al., 2013b; Korkmaz, Cakir, & Ozden, 2017), and cooperation (Korkmaz et al., 2017). The outcome of higher education, on the other hand, which will become the future generation of workforces, is highly required to become proficient in such skills that enable him/her to be flexible and competitive. As a result, mastering both cognitive and non-cognitive problem-solving skills is critical.

TABLE 1. COMPUTATIONAL THINKING SKILLS ASSESSED IN HIGHER EDUCATION

Reference	CT Concept Assessed in Higher Education																			
	Abstraction	Decomposition	Algorithm	Visualization	Modeling	Automation	Logical thinking	Communication	Evaluation	Debugging	Data structure	Data analysis	Problem Solving	Generalization	Systematic analysis	Data	Pattern recognition	Critical analysis	Data manipulation	Information
(Cortina, 2007)			√																	
(Raubenheimer, D., Joines, J.A., Craig, 2010)	√	√	√																	
(Yeh et al., 2011)	√								√						√	√				
(Caballero et al., 2011)			√																	
(Basawapatna et al., 2011)			√														√			
(Settle, 2011)	√		√																	
(Manson & Olsen, 2012)				√	√													√		
(Walden et al., 2013)			√					√				√								
(Gouws et al., 2013a, 2013b)	√	√	√		√		√	√					√							
(Ambrosio et al., 2014)	√						√						√				√			
(Ambrósio, Xavier, & Georges, 2014)	√		√				√							√			√			
(Vergara et al., 2015)	√		√		√														√	
(Csernoch et al., 2015)			√																	
(Sense, 2017)	√	√	√			√			√	√	√							√		
(Korkmaz et al., 2017)	√												√					√		√
FREQUENCY	9	3	11	1	3	1	3	1	3	1	1	1	3	1	1	1	3	3	1	1

Discussion

The issue of assessment is considered crucial in the CT study. Román-gonzález argues that considering assessment will support the process of merging CT into the curriculum (Román-gonzález, 2015). Assessment is needed to measure students' understanding of CT concepts. However, the studies exploring CT assessment in higher education are found to be lacking. Some assessments are conducted along with courses. In a 2010 study, Joines, Raubenhimer, and Craig used a case-based approach to investigate the role of computing on engineering students' problem-solving abilities. Students at several freshman and senior levels were asked to solve a common problem-solving task and reflect on the process they used to solve the problem. They used a rubric called "Steps for Better Thinking" as the basis for judging the students' solutions. The rubric defines thinking skills at four levels: identify, explore, prioritize, and envision.

Yeh et al. (2011) conducted a pre-test study for non-computer science major college students using spreadsheet functions to identify the computational knowledge gap between these students and computer science major students. The researchers classified spreadsheet function learning into three categories: recall, application, and problem solving. The recall category is a simple test of memorization of spreadsheet function definitions and arguments. In the application category, students are presented with a set of data and a cue for which function they should use to generate the answer. In the problem-solving category, students are asked to solve a problem scenario without any indication of the function to be used. Researchers claimed the application category represented an abstraction of a problem. Yet, the analysis focused only on the students' understanding of data representation, and ignored the abstraction process itself. Furthermore, there is no additional evidence in the problem-solving category about the relationship between answering the problem without a cue and the use of CT-related concepts (algorithmic thinking, decomposition, evaluation, and generalization) in problem solving. Therefore, this study tends to assess students' mastery of spreadsheet functions. Moreover, the discussion mostly focuses on finding out in which category novice learners struggle the most and the relationships among the three.

A study conducted by Walden et al. (2013) examined the relationship between CT and critical thinking from the perspective of informatics (computer science). Researcher developed an introductory course that contains the principles of computer science, or CT, which is a computer literacy course for the 21st century (Walden et al., 2013). Pre- and post-course exams are administered prior to the course and at the end of the course in order to explore the relationship between CT and critical thinking, particularly to examine whether the learning of CT would lead to growth in critical thinking skills. To do so, researchers developed their own CT instrument while using commercially available critical thinking tests. The CT instrument comprises of combination of multiple choice and short answer questions on simple algorithms, sorting, digital information storage, and file structure. However, the developed instrument is not validated.

Gouws, Bradshaw, & Wentworth (2013) applied a game-based approach to assess students' understanding of CT, by completing an educational game called "Light-Bot." The "Light-Bot" is based on the Computational Thinking Framework (CTF) proposed by the author and is intended to be used as the foundation for designing CT course materials and as an evaluation tool (Gouws, Bradshaw, & Wentworth, 2013b). It divided CT into six skills: processes and transformations, models and abstractions; patterns and algorithms, tools and resources, inference and logic; and evaluations and improvements. Then, the skills are mapped to Bloom's Taxonomy's cognitive domain: recognize (remember), understand, apply (apply and create), and assimilate (analyze and evaluate).

An exploratory study was carried out to identify assessment tests for identifying CT cognitive processes and their relationship to academic success. The focus is on programming, which is to find out which thinking skills students must develop for them to succeed in learning introductory programming, and how these skills are related to academic success. Subsequently, an appropriate pedagogic methodology can be applied to stimulate and promote it at all educational levels (Ambrosio, Almedia, Macedo, & Franco, 2014).

Csernoch et al. (2015) conducted a study that aimed to assess Hungary's first year informatics students' problem solving abilities in different software environments and, subsequently, their level of computational thinking. Researcher emphasized algorithmic thinking as the benchmark that determines computational thinking ability (Csernoch, Biró, Máth, & Abari, 2015). This study found that the students restricted themselves to thinking in algorithms in traditional programming environments only. As a result, they cannot make generalizations or abstractions when solving problems in non-programming environments. Moreover, test results were compared with students' performance (grade) on leaving school exams. The conclusion is that the results of the leaving school exams do not guarantee the students' algorithmic skills, implying that the development of those skills during secondary school should be increased.

Vergara et al.'s study focuses on characterizing undergraduate engineering students' knowledge, skills, and behaviors associated with the computational competencies required in solving engineering problems. The results showed, modeling and abstraction, digital representation of information, information organization, information systems, algorithmic thinking and programming, limitations of information technology, and networks as the computational problem solving competencies that the engineering workforce needs (Vergara et al., 2015). A framework to assess students' performance was designed based on these competencies. Further analysis also found that there exist non-computational problem solving competencies, including self-awareness, social impact, teamwork, computer and human integration, evaluation, and adaptability. However, these variables were not included in the assessment framework the study proposed.

A programming approach has been applied to teach, and subsequently assess architect students' achievement on the computational thinking course (Senske, 2017). Researcher conducted pre- and post-surveys to investigate improvements in students' perceptions of computing. In addition, results from concept quizzes, lab reports, midterms, and final projects are collected to evaluate students' overall performance. Currently, the course, as well as its assessment, is still in the process of being completed. In a study conducted by Korkmaz et al. (2017), an instrument, called 'Computational Thinking Scale', has been developed for the purpose of determining undergraduate students' levels of CT. The CT skills measured include creativity, algorithmic thinking, critical thinking, problem solving, and cooperation. Researchers argue that, these four skills are based on ISTE's new operational definitions of CT. The scale has been validated. However, it does not cover the other essential skills such as abstraction, decomposition, pattern recognition, and generalization.

Some research on developing assessment instruments to assess students' understanding of fundamental computer science concepts can also be considered. Fundamental CS1 (FCS1) by Tew & Guzdial (2011) and Digital Logic Concept Inventory (DLCI) (Herman, Loui, & Zilles, 2010) have been developed and validated, while concept inventories for reasoning (Krone, Hollingsworth, Sitaraman, & Hallstrom, 2010), discrete mathematics (Almstrum et al., 2006), introductory computing (Goldman et al., 2010), algorithm and data structure (Danielsiek, Paul, & Vahrenhold, 2012), BSTs & hash tables (Karpierz & Wolfman, 2014), operating system, and introductory programming (Caceffo, Wolfman, Booth, & Azevedo, 2016), as for today, have had preliminary work accomplished but neither validated or completed yet. In addition, of the studies mentioned, FCS1 is thought to be the most associated with CT because it examines programming skills.

FCS1 is an assessment instrument developed to measure students' conceptual knowledge, which is fundamental to the Introduction to Programming course. The constructs tested included the fundamentals of programming (variables, assignment, mathematical expression), logical operators, selection statements (if/else), loops (definite, indefinite), arrays, function/method parameters, function/method return values, recursion, and the basics of object-oriented programming (class definition, method calls) (Tew & Guzdial, 2010). Three types of questions were developed to evaluate different conceptual understandings: definitional questions to explore the student's general understanding of a construct, tracing questions to examine the student's ability to predict the execution of code using a particular concept, and code completion questions to evaluate the student's ability to

write code. The instrument developed as a result of this research does place a focus on programming technical ability.

Conclusion and Future Work

Much of the work on CT in higher education has focused on efforts to incorporate CT into classrooms. CT assessment has gained recognition in academic discourse, yet the measured skills and abilities are still identified differently. This could be the consequence of the varied interpretation of CT concepts and the lack of a shared definition of CT. In addition, up to this time, work on CT assessment has emphasized measuring cognitive skills and not covered non-cognitive ones as another essential set for constructing CT. There is still a need in the following areas:

1) Develop a shared model of CT concepts, particularly for the context of higher education, where the future workforce is trained. Such a model provides guidelines about the relevant skills necessary for problem solving.

2) Integrate the non-cognitive skills into the CT assessment. Non-cognitive skills need to be taken into consideration in the problem solving process, for they complement the workforce in a more holistic way, and help with successfully applying the knowledge in practice.

Finally, there is a potential for research on CT in higher education. CT research needs to be improved in this complex educational environment. Additional intensive investigations need to take place in order to understand both the cognitive and non-cognitive aspects of CT, and get insight into how to put these skills into practice in higher education.

References

- [1] Almstrum, V. L., Henderson, P. B., Harvey, V., Heeren, C., Marion, W., Riedesel, C., ... Tew, A. E. (2006). Concept inventories in computer science for the topic discrete mathematics. *ACM SIGCSE Bulletin*, 38(4), 132–145. <https://doi.org/10.1145/1189136.1189182>
- [2] Ambrosio, A. P., Almedia, L. da S., Macedo, J., & Franco, A. (2014). Exploring core cognitive skills of computational thinking. In *Psychology of Programming Interest Group Annual Conference 2014* (pp. 25–34). Retrieved from <http://cs.au.dk/~mic/publications/conference/41--ace2013.pdf>
- [3] Ambrósio, A. P., Xavier, C., & Georges, F. (2014). Digital Ink for cognitive assessment of computational thinking. In *Frontiers in Education Conference (FIE)* (pp. 1–7). IEEE.
- [4] Basawapatna, A., Koh, K. H., Repenning, A., Webb, D. C., & Marshall, K. S. (2011). Recognizing computational thinking patterns. *Proceedings of the 42nd ACM Technical Symposium on Computer Science Education - SIGCSE '11*, 245. <https://doi.org/10.1145/1953163.1953241>
- [5] Berland, M., & Lee, V. R. (2011). Collaborative strategic board games as a site for distributed computational thinking. *International Journal of Game-Based Learning*, 1(2), 65–81. <https://doi.org/10.4018/ijgbl.2011040105>
- [6] Blum, L., & Cortina, T. J. (2007). CS4HS: An outreach program for high school CS teachers. In *Proceedings of the 38th SIGCSE Technical Symposium on Computer Science Education* (pp. 19–23). Covington, USA: ACM. <https://doi.org/10.1145/1227504.1227320>
- [7] Boechler, P., Artym, C., Dejong, E., Carbonaro, M., & Stroulia, E. (2014). Computational thinking, code complexity, and prior experience in a videogame-building assignment. In *2014 IEEE 14th International Conference on Advanced Learning Technologies* (pp. 396–398). Athens, Greece: IEEE. <https://doi.org/10.1109/ICALT.2014.118>
- [8] Caballero, M. D., Kohlmyer, M. a., & Schatz, M. F. (2011). Fostering computational thinking. In *Proceedings of the 2011 Physics Education Research Conference* (p. 4). Omaha, USA. <https://doi.org/10.1063/1.3679982>
- [9] Caceffo, R., Wolfman, S., Booth, K. S., & Azevedo, R. (2016). Developing a computer science

- concept inventory for introductory programming. In *Proceedings of the 47th ACM Technical Symposium on Computing Science Education* (pp. 364–369). Memphis, USA: ACM. <https://doi.org/10.1145/2839509.2844559>
- [10] Chowdhury, B. (2015). Understanding collaborative computational thinking. In *Proceedings of the 11th Annual International Conference on International Computing Education Research* (pp. 251–252). Nebraska, USA: ACM. <https://doi.org/10.1145/2787622.2787736>
- [11] Cortina, T. J. (2007). An introduction to computer science for non-majors using principles of computation. In *Proceedings of the 38th SIGCSE Technical Symposium on Computer Science Education* (Vol. 39, pp. 218–222). Covington, USA: ACM. <https://doi.org/10.1145/1227504.1227387>
- [12] Csernoch, M., Biró, P., Máth, J., & Abari, K. (2015). Testing algorithmic skills in traditional and non-traditional programming environments. *Informatics in Education*, 14(2), 175–197. <https://doi.org/10.15388/infedu.2015.11>
- [13] Czerkawski, B., & Lyman III, E. (2015). Exploring issues about computational thinking in higher education. *TechTrends*, 59(2), 57–65. Retrieved from <http://link.springer.com/article/10.1007/s11528-015-0840-3>
- [14] Danielsiek, H., Paul, W., & Vahrenhold, J. (2012). Detecting and understanding students' misconceptions related to algorithms and data structures. In *Proceedings of the 43rd ACM technical symposium on Computer Science Education* (pp. 21–26). Raleigh, USA: ACM. <https://doi.org/10.1145/2157136.2157148>
- [15] Freudenthal, E., Ogrey, A. N., Roy, M. K., & Siegel, A. (2010). A computational introduction to STEM studies. In *IEEE Education Engineering Conference 2010* (pp. 663–672). Madrid, Spain: IEEE. <https://doi.org/10.1109/EDUCON.2010.5492514>
- [16] Garrido, J. M. (2014). *Introduction to computational modeling using C and Open-source tools*. CRC Press.
- [17] Goldman, K., Gross, P., Heeren, C., Herman, G. L., Kaczmarczyk, L., Loui, M. C., & Zilles, C. (2010). Setting the scope of concept inventories for introductory computing subjects. *ACM Transactions on Computing Education*, 10(2), 1–29. <https://doi.org/10.1145/1789934.1789935>
- [18] Gouws, L., Bradshaw, K., & Wentworth, P. (2013a). First year student performance in a test for computational thinking. In P. Machanick & M. Tsietzi (Eds.), *Proceedings of the South African Institute for Computer Scientists and Information Technologists Conference* (pp. 271–277). East London, South Africa: ACM. <https://doi.org/10.1145/2513456.2513484>
- [19] Gouws, L., Bradshaw, K., & Wentworth, P. P. (2013b). Computational thinking in educational activities: An evaluation of the educational game Light-Bot. In *Proceedings of the 18th ACM Conference on Innovation and Technology in Computer Science Education* (pp. 10–15). Canterbury, England: ACM. <https://doi.org/10.1145/2462476.2466518>
- [20] Hambrusch, S., Hoffmann, C., Korb, J. T., Haugan, M., & Hosking, A. L. (2009). A multidisciplinary approach towards computational thinking for science majors. In *Proceedings of the 40th ACM Technical Symposium on Computer Science Education* (Vol. 41, pp. 183–187). Tennessee, USA: ACM. <https://doi.org/10.1145/1539024.1508931>
- [21] Herman, G. L., Loui, M. C., & Zilles, C. (2010). Creating the digital logic concept inventory. In *Proceedings of the 41st ACM Technical Symposium on Computer Science Education* (p. 102). Wisconsin, USA: ACM. <https://doi.org/10.1145/1734263.1734298>
- [22] Isbell, C. L., Stein, L. A., Cutler, R., Forbes, J., Fraser, L., Impagliazzo, J., ... Xu, Y. (2009). (Re)defining computing curricula by (re)defining computing. *Inroads - SIGCSE Bulletin*, 41(4), 195–207. <https://doi.org/10.1145/1709424.1709462>
- [23] Kafura, D., & Tatar, D. (2011). Initial experience with a computational thinking course for Computer Science students. In *Proceedings of the 42nd ACM Technical Symposium on Computer Science Education* (pp. 251–256). Texas, USA: ACM. <https://doi.org/10.1145/1953163.1953242>
- [24] Karpierz, K., & Wolfman, S. A. (2014). Misconceptions and concept inventory questions for binary search trees and hash tables. In *Proceedings of the 45th ACM Technical Symposium on Computer Science Education* (pp. 109–114). Atlanta, USA: ACM. <https://doi.org/10.1145/2538862.2538902>
- [25] Kazimoglu, C., Kiernan, M., Bacon, L., & MacKinnon, L. (2012). Learning programming at the computational thinking level via digital game-play. *Procedia Computer Science*, 9, 522–531. <https://doi.org/10.1016/j.procs.2012.04.056>

- [26] Korkmaz, Ö., Cakir, R., & Ozden, M. Y. (2017). A validity and reliability study of the computational thinking scales (CTS). *Computers in Human Behavior*, 72, 558–569. <https://doi.org/10.1016/j.chb.2017.01.005>
- [27] Krone, J., Hollingsworth, J. E., Sitaraman, M., & Hallstrom, J. O. (2010). *A reasoning concept inventory for computer science*. Clemson.
- [28] Kuster, C., Symms, J., & May, C. (2011). Developing computational thinking skills across the undergraduate curriculum. In *Proceedings of the 44th Annual Midwest Instruction and Computing Symposium* (pp. 1–12). Minnesota, USA: MISC. Retrieved from <http://www2.css.edu/mics/Submissions/submissions/Developing Computational Thinking Skills across the Undergraduate Curriculum.pdf>
- [29] Li, T., & Wang, T. (2012). A unified approach to teach computational thinking for first year non-CS majors in an introductory course. *IERI Procedia*, 2(2012), 498–503. <https://doi.org/10.1016/j.ieri.2012.06.123>
- [30] Liu, C. C., Cheng, Y. B., & Huang, C. W. (2011). The effect of simulation games on the learning of computational problem solving. *Computers and Education*, 57(3), 1907–1918. <https://doi.org/10.1016/j.compedu.2011.04.002>
- [31] Liu, J., & Wang, L. (2010). Computational thinking in Discrete Mathematics. In *2010 2nd International Workshop on Education Technology and Computer Science* (Vol. 1, pp. 413–416). Wuhan, China: IEEE. <https://doi.org/10.1109/ETCS.2010.200>
- [32] Manson, J. R., & Olsen, R. J. (2012). Assessing and refining an undergraduate computational science curriculum. *Procedia Computer Science*, 1(2012), 857–865. <https://doi.org/10.1016/j.procs.2010.04.094>
- [33] Miller, C. S., Perković, L., & Settle, A. (2013). File references, trees, and computational thinking. In *Proceedings of the 15th Annual Conference on Innovation and Technology in Computer Science Education* (pp. 132–136). Ankara, Turkey: ACM. <https://doi.org/10.1145/1822090.1822128>
- [34] Miller, L. D., Soh, L. K., Chiriacescu, V., Ingraham, E., Shell, D. F., Ramsay, S., & Hazley, M. P. (2013). Improving learning of computational thinking using creative thinking exercises in CS-1 computer science courses. In *2013 IEEE Frontiers in Education Conference* (pp. 1426–1432). Oklahoma City, USA: IEEE. <https://doi.org/10.1109/FIE.2013.6685067>
- [35] Pearson, K. (2009). From a usable past to collaborative future: African American culture in the age of computational thinking. *Black History Bulletin*, 72(1), 41–44.
- [36] Qin, H. (2009). Teaching computational thinking through Bioinformatics to Biology students. *ACM SIGCSE Bulletin*, 41(1), 188–191. <https://doi.org/10.1145/1539024.1508932>
- [37] Raubenheimer, D., Joines, J.A., Craig, A. (2010). Using computational tools to enhance problem solving. *Computers in Education Journal*, 20(4), 101–112. Retrieved from <https://peer.asee.org/using-computational-tools-to-enhance-problem-solving>
- [38] Repenning, A., Basawapatna, A., & Escherle, N. (2016). Computational thinking tools. In *2016 IEEE Symposium on Visual Languages and Human-Centric Computing* (pp. 218–222). Cambridge, UK: IEEE. <https://doi.org/10.1109/VLHCC.2016.7739688>
- [39] Román-gonzález, M. (2015). Computational thinking test : design guidelines and content validation. In *Proceedings of EDULEARN15 Conference* (pp. 2436–2444). Barcelona, Spain: IATED. <https://doi.org/10.13140/RG.2.1.4203.4329>
- [40] Rubinstein, A., & Chor, B. (2014). Computational thinking in Life Science education. *PLoS Computational Biology*, 10(11), 1–6. <https://doi.org/10.1371/journal.pcbi.1003897>
- [41] Senske, N. (2017). Evaluation and impact of a required computational thinking course for architecture students. In *Proceedings of the 2017 ACM SIGCSE Technical Symposium on Computer Science Education* (pp. 252–230). Seattle, WA: ACM. <https://doi.org/10.1145/3017680.3017750>
- [42] Settle, A. (2011). Computational thinking in a game design course. In *Proceedings of the 2011 conference on Information technology education* (pp. 61–66). West Point, New York: ACM.
- [43] Swaid, S. I. (2015). Bringing computational thinking to STEM education. *Procedia Manufacturing*, 3(2015), 3657–3662. <https://doi.org/10.1016/j.promfg.2015.07.761>
- [44] Tew, A. E., & Guzdial, M. (2010). Developing a validated assessment of fundamental CS1 concepts. In *Proceedings of the 41st ACM Technical Symposium on Computer Science Education* (p. 97). Wisconsin, USA: ACM. <https://doi.org/10.1145/1734263.1734297>
- [45] Vergara, C. E., Cavanaugh, M., Sivakumar, S. N., Briedis, D., Dionise, T. D., Esfahanian, A.-H.,

- & Sticklen, J. (2015). Towards a framework for assessing computational competencies for engineering undergraduate students. In *122nd ASEE Annual Conference & Exposition* (pp. 26.1589.1-26.1589.14). Seattle, WA: ASEE.
- [46] Walden, J., Doyle, M., Garns, R., & Hart, Z. (2013). An informatics perspective on computational thinking. In M. Goldwebber (Ed.), *Proceedings of the 18th ACM Conference on Innovation and Technology in Computer Science Education*. (pp. 4–9). Canterbury, England. <https://doi.org/10.1145/2462476.2483797>
- [47] Wing, J. M. (2006). Computational thinking. *Communication of the ACM*, 49(3), 33–35. <https://doi.org/10.1145/1118178.1118215>
- [48] Wing, J. M. (2008). Computational thinking and thinking about computing. *Philosophical Transactions of the Royal Society*, 366, 3717–3725. <https://doi.org/10.1098/rsta.2008.0118>
- [49] Wing, J. M. (2011). Research notebook: Computational thinking—what and why? *The Link Magazine*. Retrieved from <http://www.cs.cmu.edu/link/research-notebook-computational-thinking-what-and-why>
- [50] Yadav, A., Zhou, N., Mayfield, C., Hambrusch, S., & Korb, J. T. (2011). Introducing computational thinking in education courses. In *Proceedings of the 42nd ACM Technical Symposium on Computer Science Education* (pp. 465–470). Texas, USA: ACM. <https://doi.org/10.1145/1953163.1953297>
- [51] Yeh, K. C., Xie, Y., & Ke, F. (2011). Teaching computational thinking to non-computing majors using spreadsheet functions. In *2011 Frontiers in Education Conference* (pp. 3–7). Rapid City, SD: IEEE. <https://doi.org/10.1109/FIE.2011.6142980>

Time series forecasting of cafeteria visitors of Universitas Advent Indonesia

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Abstract: Universitas Advent Indonesia (UNAI) is a full-boarding university that mandates its students to stay in the dormitories located on campus and thus provides meal service at the university's cafeteria. The cafeteria is open at a specific time every day at a predetermined time to provide students with three meals per day. Good preparations must be done by the cafeteria manager to ensure there is enough food available for the cafeteria visitors. If there is too much food prepared for a meal session, there will be more food waste, but if there is not enough food prepared, this will lead to dissatisfaction from the students due to the need to wait for the food to be prepared. The aim of this research is to predict the number of cafeteria visitors at UNAI. The cafeteria visitors' data were obtained from the system that authenticated and recorded the visitor based on the RFID card tapped on the cafeteria's gate. The data was analyzed using Seasonal Autoregressive Integrated Moving Average (SARIMA), Facebook Prophet, and NeuralProphet. The research findings show that the predictions obtained from the two latter schemes provided better results in predicting the number of visitors.

Keywords: *artificial intelligence, prediction, SARIMA, facebook prophet, neuroprophet*

Introduction

Universitas Advent Indonesia (UNAI) is an Adventist education institution located in West Bandung, west Java, Indonesia. UNAI provides dormitory services for around one thousand students to stay inside the campus and provides meal services for the students. UNAI cafeteria/dining room provides the students three meals a day during some certain hours. In 6AM – 7AM, 12AM – 1PM, 5PM – 6 PM for the breakfast, lunch, and supper meal service respectively (Pakpahan, 2019).

The UNAI cafeteria only opens at certain hours; therefore, the staff who works in the cafeteria must carefully plan the menu and the amount of food that needs to be prepared. The amount of food prepared needs to match the number of visitors, or students, who come to the cafeteria at a particular time of day. In preparing the food for the students, the cafeteria prepared it hours before the meal time. The chef orders food materials from the warehouse and cooks them in time to be ready for a particular meal time (Sihotang & Pakpahan, 2020). Thus, the preparation steps in providing the food are an important step to make sure the food is ready for the students. If the amount of food prepared is less than the number of cafeteria visitors, there are students who do not get food at mealtime or who need to wait while the staff prepares food for them. Moreover, during mealtime, the staff is concentrated on serving the prepared food to students and may not be ready to cook at that particular time. This can make the students dissatisfied with the cafeteria service and make them complain. Meanwhile, if the food prepared is more than the number of visitors, this may lead to food waste and inefficiency of the food materials. Thus, it is desirable that, in preparing food, the cafeteria staff be able to match the amount of food with the number of visitors.

Matching the amount of food to the number of visitors can be difficult due to the variation in visitor numbers from time to time. When compared to other meal services, breakfast usually has the fewest visitors, while lunch has the most. Because the number of visitors is not fixed, the cafeteria staff often relies on their experience in deciding the amount of food to be prepared. Moreover, to avoid complaints from the students, the cafeteria staff may tend to overprepare the amount of food, which leads to food waste. Therefore, to save money that is spent on wasting food, it is beneficial if there is a mechanism or system that can provide forecasting on the visitor numbers for each mealtime.

The aim of this research is to explore different models for forecasting the number of UNAI cafeteria visitors. The findings of this research can be useful in building an application that can help

the cafeteria staff prepare the correct amount of food for the visitors and avoid running out of food while enhancing efficiency by avoiding unnecessary food waste.

Literature Review

Forecasting the number of cafeteria visitors can be considered a time series prediction. A time series is based on chronological observation, and the data gathered is numerical and continuous (Fu, 2011; Box et al., 2016; Sezer et al., 2020). Special attention is given to exploring historic trends and patterns (seasonality) and predicting future values based on the trends and patterns that have been identified (Song & Li, 2008). The number of UNAI cafeteria visitors for each meal is recorded in numerical and continuous form, and based on these time series data, certain models need to be used to analyze the historic trends and forecast the future values of cafeteria visitor numbers.

In the literature, time series models have been used for different purposes, such as:

- forecasting tourism demands (Song & Li, 2008; Andariesta & Wasesa, 2022) ,
- prediction of stock price (Ariyo et al., 2014),
- Bitcoin price prediction (Wirawan et al., 2019),
- prediction of traffic congestion (Alghamdi et al., 2019; Chikkakrishna et al., 2019),
- prediction of network traffic, rainfall (Mislán et al., 2015),
- prediction of workload (Calheiros et al., 2015),
- prediction of coronavirus disease (Aditya Satrio et al., 2021)

ARIMA

In time series modeling, the ARIMA (autoregressive moving-average models) model that was developed by Box and Jenkins (1976) is a prominent model (De Gooijer & Hyndman, 2006). ARIMA is an abbreviation of Autoregressive (AR), integrated (I), and Moving Average (MA). The first component of ARIMA is autoregressive (AR) which uses the collected historical data to forecast tomorrow's values. Thus, lagged values of the target variable are used as X variables, as can be seen in Equation (1):

$$Y = B_0 + B_1Y_{\text{lag}1} + B_2Y_{\text{lag}2} + \dots + B_nY_{\text{lag}n} \quad (1)$$

where n is a parameter, we choose and B₀, B₁, etc. are the regression betas that are used to train the model. Then, based on this equation, the forecast can be made by modifying the equation as in Equation (2):

$$Y_{\text{forward}1} = B_0 + B_1Y + B_2Y_{\text{lag}1} + B_3Y_{\text{lag}3} + \dots B_nY_{\text{lag}(n-1)} \quad (2)$$

where the future value is predicted using the current value and the past lags.

ARIMA's second component is I (integrated), which indicates that a differencing step is applied to the data, as shown in Equation (3):

$$Y_{\text{forward}1} - Y = B_0 + B_1(Y - Y_{\text{lag}1}) + B_2(Y_{\text{lag}1} - Y_{\text{lag}2}) + \dots \quad (3)$$

Equation (3) says that the future change in Y is a linear function of the past changes that happened in Y. The Y variable s are expected to be stationary, that means the statistical properties of the model are consistent and not vary depending on when the sample was taken.

The last component of ARIMA, is moving average(MA), that can summarize by the Equation (4):

$$Y = B_0 + B_1E_{\text{lag}1} + B_2E_{\text{lag}2} + \dots + B_nE_{\text{lag}n} \quad (4)$$

where the E represents the error, that is the random residual deviations of the target variable and the model.

SARIMA

Seasonal Autoregressive Integrated Moving Average (SARIMA) or seasonal ARIMA, is an adaptation of ARIMA that supports univariate time series with the addition of a seasonal component (S in SARIMA). The SARIMA arises due to a problem in ARIMA that does not support seasonal data, that is, time series with repeating patterns. Thus, SARIMA can analyze time series data based on events such as holidays, summer vacation, back-to-school week, etc. The seasonality component is useful if we know something is likely to happen at a regular cadence and can impact the target variable when it occurs. Equations (5-9) represent the SARIMA model (E et al., 2016).

$$\Phi_P(B^s)\phi_p(B)(1-B)^d(1-B^s)^D(y_t-\mu) = \theta_q(B)\Theta_Q(B^s)a_t, \quad (5)$$

where $\Phi_P(B^s)$, $\phi_p(B)$, $\Theta_Q(B^s)$ and $\theta_q(B)$ are defined as;

$$\Phi_P(B^s) = 1 - \Phi_1 B^s - \Phi_2 B^{2s} - \dots - \Phi_P B^{Ps} \quad (6)$$

$$\phi_p(B) = 1 - \Phi_1 B - \Phi_2 B^2 - \dots - \Phi_p B^p \quad (7)$$

where $\phi_p \neq 0$,

$$\theta_q(B) = 1 - \theta_1 B - \theta_2 B^2 - \dots - \theta_q B^q, \quad (8)$$

where $\theta_p \neq 0$,

$$\Theta_Q(B^s) = 1 - \Theta_1 B^s - \Theta_2 B^{2s} - \dots - \Theta_Q B^{Qs} \quad (9)$$

where:

- P is order of seasonal autoregressive,
- D is order of seasonal difference,
- Q is order of seasonal moving average,
- s is an integer strictly larger than one (the period), $d \geq 0$, and $D \geq 0$.

Note that $\mu = 0$ if $d > 0$ or $D > 0$.

Facebook Prophet

Facebook prophet forecasting model is designed to handle common features of business time series: multiple strong seasonality, trend changes, outliers and holiday effect (Taylor & Letham, 2017). It is also designed to have intuitive parameters that is adjustable without knowing the specifics of the underlying model. The Facebook prophet combined three main model components: trend, seasonality, and holidays that can be seen in Equation (10)

$$y(t) = g(t) + s(t) + h(t) + \epsilon_t, \quad (10)$$

where:

- $g(t)$ is the trend function which models non-periodic changes in the value of time series,
- $s(t)$ represents periodic changes (e.g. weekly and yearly seasonality),
- and $h(t)$ represents the effect of holidays which occur on potentially irregular schedules over one or more days.
- The error term ϵ_t represents any idiosyncratic changes which are not accommodated by the model.

NeuralProphet

NeuralProphet is a successor to Facebook Prophet that adds the ability to include local context, which is essential for forecasting near-term future value. NeuralProphet is a hybrid forecasting framework based on PyTorch and trained with standard deep learning methods. Local context is introduced with autoregression and covariate modules, which can be configured as classical linear regression or as Neural Networks. The authors (Triebe et al., 2021) claim the forecast performance of NeuralProphet can match or even be superior to the original Prophet on a set of generated time series and real-world datasets, especially in short- and medium-term forecasts. The NeuralProphet model is represented in Equation (11).

$$y_t = T(t) + S(t) + E(t) + F(t) + A(t) + L(t) \quad (11)$$

where:

- $T(t)$ is the trend at time t ,
- $S(t)$ is seasonal effects at time t ,
- $E(t)$ is event and holiday effects at time t ,
- $F(t)$ is regression effects at time t for future-known exogenous variables,
- $A(t)$ is auto-regression effects at time t based on past observations, and
- $L(t)$ is regression effects at time t for lagged observations of exogenous variables.

Methodology

Sample Selection

The research data were collected from the UNAI database, which recorded the number of visitors to cafeteria between 2014 and 2019. The years chosen were because in early 2020, COVID-19 forced UNAI to send its students home due to the COVID-19 pandemic, and thus the only complete yearly data is only available until 2019. Table 1 shows an excerpt of the data used in this research, and Figure 1 shows the visualization of the data used in this research.

To understand the collected data, it is necessary to understand why the dates in the data do not start with the first date of the year (Jan. 1st) and end with the last date of the year (Dec. 31st). This is because the UNAI cafeteria only opens during the active semester schedules, starting from the date of semester registration in January until the last day of final defense in December. Thus, the start and end dates can be different for each year. Moreover, there are some dates where there are visitors recorded; those are the dates when the cafeteria does not open.

Table 1. Record of UNAI Cafeteria visitors from 2014 - 2018.

Date	Breakfast	Lunch	Supper	Total
1/7/2014	86	752	657	1495
1/8/2014	143	670	608	1421
1/9/2014	282	51	549	882
1/10/2014	398	587	524	1509
1/11/2014	532	597	637	1766
1/12/2014	319	695	489	1503
1/13/2014	337	464	543	1344
1/14/2014	397	656	610	1663
1/15/2014	503	677	567	1747
1/16/2014	479	686	569	1734
...
12/5/2018	489	554	526	1569

12/6/2018	413	633	274	1320
12/7/2018	372	622	22	1016
12/8/2018	572	662	382	1616
12/9/2018	329	504	601	1434
12/10/2018	462	634	520	1616
12/11/2018	433	59	580	1072
12/12/2018	445	637	644	1726
12/13/2018	352	454	402	1208
12/14/2018	240	633	546	1419

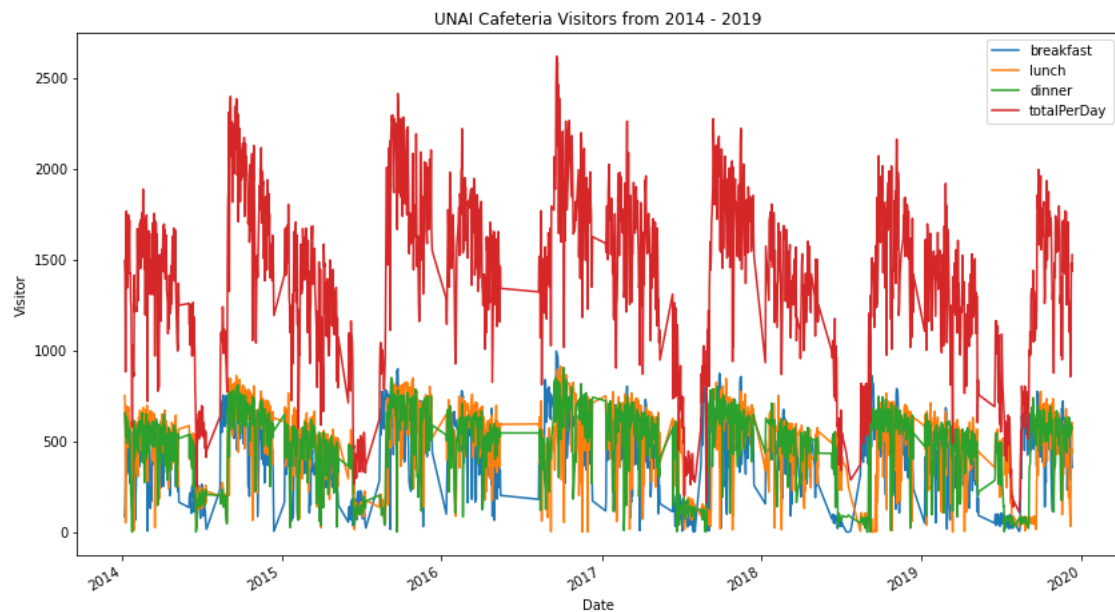


Figure 1. Visualization of UNAI Cafeteria visitors data from 2014 - 2019

Prediction Models

In order to predict the cafeteria visitors, the author used SARIMA, Facebook Prophet, and NeuralProphet as the models. The analysis and prediction used several Python libraries, such as: numpy, Pandas, Matplotlib, Datetime, sklearn.metrics, prophet, and NeuralProphet. Furthermore, the author used Jupyter Notebook as a tool for writing and running the Python code used in this research. Figure 2 depicts the steps taken to perform the prediction using the SARIMA model. First, the cafeteria visitors' data was collected from the database and then transformed to be analyzed in Jupyter Notebook. After the data had been analyzed, the data was cleaned by completing the time-series sequence by filling the empty dates (the dates when there was no visitor) with a zero value. In doing this, the author acknowledged that there are several ways of filling missing or empty values in time-series data, such as mean imputation, median imputation, last observation carried forward, next observation carried backward, linear interpolation, spline interpolation, etc. However, the empty data in the time-series sequence in this research was not because of missing data but because the cafeteria did not have any visitors on the date, which is why a zero value was added to these dates. After the data was cleaned, the most fit combinations of order (p, d, q) and seasonal order (p, d, q, s) were tried and found. Then, the fitted model was used to run the prediction, and the result was obtained.

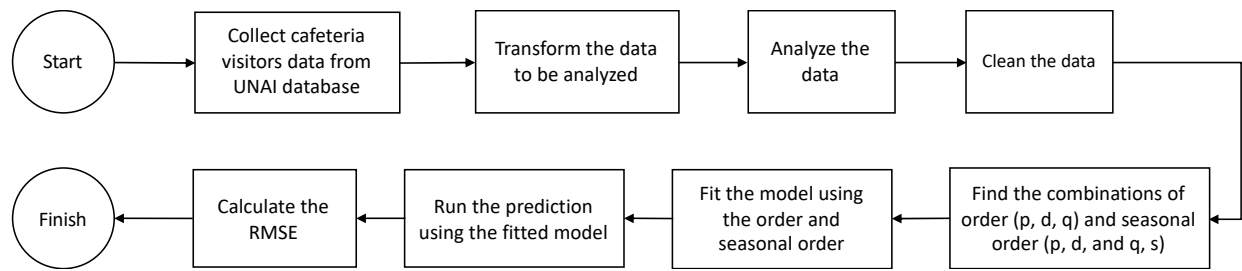


Figure 2. Prediction process diagram using SARIMA model

Figure 3 shows the process done in order to do the prediction using Facebook Prophet or NeuralProphet model. The last two models' processes were combined because they followed the same procedure with the exception of the model used. The collection, transformation, analysis, and cleaning followed the same procedure as in SARIMA. The model was then created by running the data through the Prophet/NeuralProphet, and once the model was fitted, the prediction could be made.

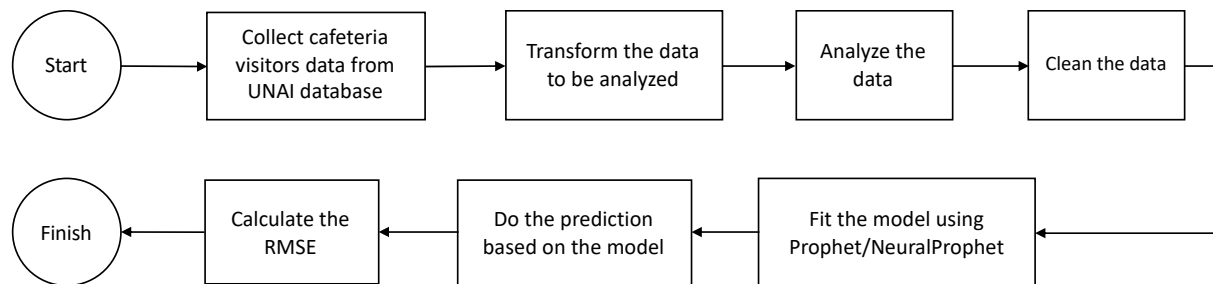


Figure 3. Prediction process diagram using Prophet/NeuralProphet models

The model performance was evaluated using RMSE (root mean squared error) that shows each model prediction performance based on the average of how far apart the predicted values are from the observed values. The calculation of RMSE, can be seen on Equation (12).

$$RMSE = \sqrt{\frac{\sum_{t=1}^n (O_t - P_t)^2}{n}} \quad (12)$$

where:

- P_t is the predicted value,
- O_t is the observed value and
- n is the sample size.

Findings

Table 1 summarizes the RMSE accuracy of all prediction models. The SARIMA model has the lowest performance of all models in predicting the cafeteria visitors for breakfast, lunch, and supper. Moreover, the SARIMA model performs worst when predicting the total number of visitors per day. In all cases, Prophet and NeuralProphet perform similarly, with the NeuralProphet performing slightly better than Prophet at lunch and supper, while the Prophet performs slightly better at supper. In certain cases, the Prophet and NeuralProphet can have more than 20% accuracy compared to the SARIMA model.

Table 2. Results of RMSE of different time-series predictions of cafeteria visitors.

Method	Breakfast	Lunch	Supper	Total
SARIMA	159	202	178	453
Prophet	110	173	135	259
NeuralProphet	110	172	137	258

Discussion

This research contributes to showing the performance of three time-series prediction models in predicting cafeteria visitors. However, in completing this manuscript, the author has limitations in exploring different ways of optimizing the preparation before the data can be fitted into the models. The author notes that the data was not separated into training, validation, and testing for validation. Compared to other research (Aditya Satrio et al., 2021); (Andariesta & Wasesa, 2022), the results only show the RMSE, while other metrics to evaluate the forecasting performance such as MAE (Mean Absolute Error), MAPE (Mean Absolute Percentage Error), MASE (Mean Absolute Scaled Error) were not presented in this research. Moreover, the Facebook Prophet capability to incorporate holidays and special events was not included in the prediction. Thus, the author plans to complete them in future research.

Conclusion

In this research, time-series forecasting of UNAI cafeteria visitors was done. The data was analyzed using Seasonal Autoregressive Integrated Moving Average (SARIMA), Facebook Prophet, and NeuralProphet. The research findings show that the predictions obtained from the two latter schemes provided better results in predicting the number of visitors. Future work involves more complete preparation and analysis while incorporating special features available for different prediction models to obtain better prediction accuracy.

References

- [1] Aditya Satrio, C. B., Darmawan, W., Nadia, B. U., & Hanafiah, N. (2021). Time series analysis and forecasting of coronavirus disease in Indonesia using ARIMA model and PROPHET. *Procedia Computer Science*, 179, 524–532. <https://doi.org/10.1016/j.procs.2021.01.036>
- [2] Alghamdi, T., Elgazzar, K., Bayoumi, M., Sharaf, T., & Shah, S. (2019). Forecasting Traffic Congestion Using ARIMA Modeling. *2019 15th International Wireless Communications & Mobile Computing Conference (IWCMC)*, 1227–1232. <https://doi.org/10.1109/IWCMC.2019.8766698>
- [3] Andariesta, D. T., & Wasesa, M. (2022). Machine learning models for predicting international tourist arrivals in Indonesia during the COVID-19 pandemic: A multisource Internet data approach. *Journal of Tourism Futures, ahead-of-print*(ahead-of-print). <https://doi.org/10.1108/JTF-10-2021-0239>
- [4] Ariyo, A. A., Adewumi, A. O., & Ayo, C. K. (2014). Stock Price Prediction Using the ARIMA Model. *2014 UKSim-AMSS 16th International Conference on Computer Modelling and Simulation*, 106–112. <https://doi.org/10.1109/UKSim.2014.67>
- [5] Box, G. E. P., Jenkins, G. M., Reinsel, G. C., & Ljung, G. M. (2016). *Time Series Analysis*. Wiley.
- [6] Calheiros, R. N., Masoumi, E., Ranjan, R., & Buyya, R. (2015). Workload Prediction Using ARIMA Model and Its Impact on Cloud Applications' QoS. *IEEE Transactions on Cloud Computing*, 3(4), 449–458. <https://doi.org/10.1109/TCC.2014.2350475>
- [7] Chikkakrishna, N. K., Hardik, C., Deepika, K., & Sparsha, N. (2019). Short-Term Traffic Prediction Using Sarima and FbPROPHET. *2019 IEEE 16th India Council International Conference (INDICON)*, 1–4. <https://doi.org/10.1109/INDICON47234.2019.9028937>
- [8] De Gooijer, J. G., & Hyndman, R. J. (2006). 25 years of time series forecasting. *International Journal of Forecasting*, 22(3), 443–473. <https://doi.org/10.1016/j.ijforecast.2006.01.001>
- [9] E, A.-Y., Saeed, B. I. I., & Karim, A. (2016). Sarima Modelling and Forecasting of Monthly Rainfall in the Brong Ahafo Region of Ghana. *World Environment*, 6(1), 1–9.

- [10] Fu, T. (2011). A review on time series data mining. *Engineering Applications of Artificial Intelligence*, 24(1), 164–181. <https://doi.org/10.1016/j.engappai.2010.09.007>
- [11] Mislan, Haviluddin, Hardwinarto, S., Sumaryono, & Aipassa, M. (2015). Rainfall Monthly Prediction Based on Artificial Neural Network: A Case Study in Tenggarong Station, East Kalimantan - Indonesia. *Procedia Computer Science*, 59, 142–151. <https://doi.org/10.1016/j.procs.2015.07.528>
- [12] Pakpahan, A. F. (2019). Design and Implementation of RFID Card Based Authentication Software in Universitas Advent Indonesia's Dining Room. *Abstract Proceedings International Scholars Conference*, 7(1), 1794–1800. <https://doi.org/10.35974/isc.v7i1.1975>
- [13] Sezer, O. B., Gudelek, M. U., & Ozbayoglu, A. M. (2020). Financial time series forecasting with deep learning: A systematic literature review: 2005–2019. *Applied Soft Computing*, 90, 106181. <https://doi.org/10.1016/j.asoc.2020.106181>
- [14] Sihotang, V. E., & Pakpahan, A. F. (2020). Design and Implementation of Web based application for Food Materials Selection for Meals Menu in Universitas Advent Indonesia Cafeteria. *TeKa*, 10(2), 81–95. <https://doi.org/10.36342/teika.v10i2.2375>
- [15] Song, H., & Li, G. (2008). Tourism demand modelling and forecasting—A review of recent research. *Tourism Management*, 29(2), 203–220. <https://doi.org/10.1016/j.tourman.2007.07.016>
- [16] Taylor, S. J., & Letham, B. (2017). *Forecasting at scale* (e3190v2). PeerJ Inc. <https://doi.org/10.7287/peerj.preprints.3190v2>
- [17] Triebe, O., Hewamalage, H., Pilyugina, P., Laptev, N., Bergmeir, C., & Rajagopal, R. (2021). *NeuralProphet: Explainable Forecasting at Scale* (arXiv:2111.15397). arXiv. <https://doi.org/10.48550/arXiv.2111.15397>
- [18] Wirawan, I. M., Widiyaningtyas, T., & Hasan, M. M. (2019). Short Term Prediction on Bitcoin Price Using ARIMA Method. *2019 International Seminar on Application for Technology of Information and Communication (ISEMANTIC)*, 260–265. <https://doi.org/10.1109/ISEMANTIC.2019.8884257>

Automated Attendance System Using Face-Recognition for the Students of Universitas Klabat

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Abstract: Attendance is something that is needed by every institution, including the presence of Universitas Klabat students. However, the present attendance retrieval system is only conventional. This conventional system has many problems and obstacles. Therefore, in this study, a system for taking student attendance at Universitas Klabat was created by utilizing face recognition technology. Researchers used cameras, dedicated servers, and OpenCV with Python programming. The method used in this research is the waterfall model because the researcher will ensure that the system can be completed 100% in the final stages with this model. The results of this study are in the form of a web-based system that can be used by operators or lecturers to take student absenteeism by detecting student faces through cameras, conducting training datasets, creating viewing lists, and generating student attendance reports. The findings of this study are expected to be used to track student attendance at Universitas Klabat in real time. The researcher also hopes that this research will make it easier for users to automatically submit absences.

Keywords: *attendance system, OpenCV, face-recognition, real-time*

Introduction

Attendance is a data collection process to find out the number of attendees at an activity. According to Suanda (2019), every activity that requires information about members will definitely collect data on attendance. The same is true at the University of Klabat, especially at the Faculty of Computer Science. where each student is required to fill out an attendance list as a sign that they are present in class. However, the system that has been implemented so far is still conventional because, in its current implementation, the lecturer will take student attendance records manually (Rotikan et al., 2021), namely by using a piece of paper that is run to each student or calling the names of students one by one. The conventional attendance system has the possibility of being manipulated and causing violations and fraud due to an absentee deposit system (Arifin and Widiyarta, 2021), and will take time and cause errors in recapitulation due to human error (Julius and Setyawan, 2021), such as errors in filling out names, times, and dates. In the end, the person will suffer the consequences.

Therefore, based on this problem, the author tries to create a face recognition-based attendance system, which is expected to make it easier for students and lecturers to take attendance. Students can fill in absences quickly because they only have to face the camera to be identified without cheating, as can lecturers, who will have no trouble calling students one by one to ensure their attendance because the system will immediately register all data from students, starting from attendance hours, full names, NIMs, and numbers, to the SIU database.

Cahya (2021) stated that face recognition is a recognition process that involves identifying special features on a person's face. The workings of this system are to study the data contained in a dataset, then have the algorithm trace it and identify patterns in it such as the ratio of the height to the width of the face, the colour of the facial skin, and other parts of the face such as the eyes, nose, and lips. The limitation of a problem is used to prevent deviations or widening of the subject matter so that the discussion will be more focused on one research objective. In this case, the limitation of the problem carried out by face recognition is only for students of the Faculty of Computer Science, University of Klabat, The data taken is only the position of the face facing forward with a face and camera distance of 30 to 150 meters.

In building a presence system with face-recognition technology, the researcher uses the Convolutional Neural Network (CNN) algorithm. Putra et al. (2016) stated that the use of the CNN algorithm is supported by previous studies and that the efficiency of this algorithm is no doubt in real-time face classification and is superior to other algorithms (Zufar and Setiyono, 2016). In addition to the CNN algorithm, researchers also use the OpenCV library for facial image processing by utilizing the API (Tryatmojo and Maryati, 2019). OpenCV was chosen because, in addition to being open source, it can run on several operating systems, such as Windows, Linux, Android, iOS, and so on (Lazaro, 2017). Utomo et al. (2021) said that OpenCV also supports various programming languages, such as C, C++, Java, PHP, and Python.

Research Method

In this study, researchers use software engineering because in this study, researchers will develop an attendance system with web-based face-recognition technology. There are various software development methods, but researchers choose to use the Waterfall Model.

The waterfall method is one type of application development model and is included in the classic life cycle, which emphasizes sequential and systematic phases. There are many types of software development models, or what is often referred to as the SDLC (Software Development Life Cycle). The waterfall method is one of the development models that is currently quite popular and widely used by software developers.

The waterfall method is one type of application development model and is included in the classic life cycle, which emphasizes sequential and systematic phases. For the development model, it can be analogous to a waterfall, where each stage is carried out sequentially from top to bottom.

So, each stage should not be done simultaneously. Thus, the difference between the waterfall method and the agile method lies in the SDLC stage. This model is also included in software development, which is somewhat less iterative and flexible. Because a process that leads in one direction is like a waterfall.

So, in essence, this waterfall model and the process of using it follow the principle of a waterfall. where each job will be done sequentially from top to bottom. This is the characteristic of this SDLC.

Understanding what is often called the "Waterfall Model," this method is a classic, systematic, and sequential cycle in software development, starting from the specification of user requirements, planning, modelling, construction, and deployment of the system to customers and users, and ending with complete software (Sasmito, 2017). So, the researcher will ensure that the system can be completed 100% in the final stage with this model. The processes commonly used in Waterfall, namely requirements, design, implementation, verification, and maintenance, can be seen in Figure 1.

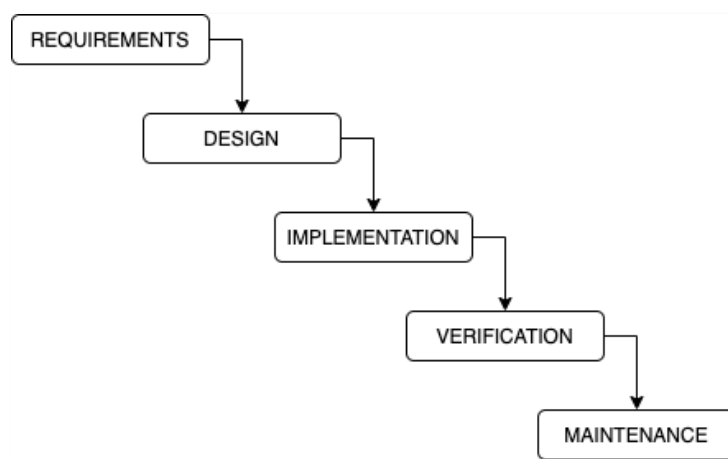


Figure 1. *Waterfall Model*

In the early stages of the waterfall method, namely the requirements phase, researchers will collect information using the interview data collection method. Interviews were used in this study to determine the problems of using conventional attendance and the information needed in an absent system for lecturers and students at the University of Klabat. In addition to seeing the problems experienced when using attendance conventionally, researchers also conducted interviews with lecturers at the Faculty of Computer Science who are responsible for student attendance in order to find out the needs (features and information) that can be implemented in the attendance system. From the results of the interviews, researchers will determine the features and information that will be implemented in the attendance system with web-based face recognition technology.

After the requirements are obtained from stage 1, the researcher conducts planning and modelling to determine the components (system architecture, interface design, hardware, and software) that will be used for the development of an appropriate attendance system. Then, after all of the planning and modelling have been completed, the next process is implementation. By using a pre-defined programming language, the researcher will enter the implementation in accordance with the design and modelling from the previous stage. In the next stage, after the system has been programmed and completed, the researcher will conduct a trial on the system, which aims to find out whether the system is running according to design and whether it is functioning and running well.

The final stage of research using the waterfall method is the step where the verified system is ready to be marketed to or used by the user. After publication, the monitoring process begins. When there is a problem in using the system or a request arises, the developer will be assigned to update and release the system with a new version. In essence, at this stage, the focus is on maintaining the system. Maintenance includes controlling processes, evaluating systems, and correcting errors that occur. At this stage, the performance of the system must be maintained so that it runs well.

Results and Discussion

System Conceptual Framework

The system concept framework can be seen in Figure 2. The conceptual framework of the system in shows how the student attendance recording system works

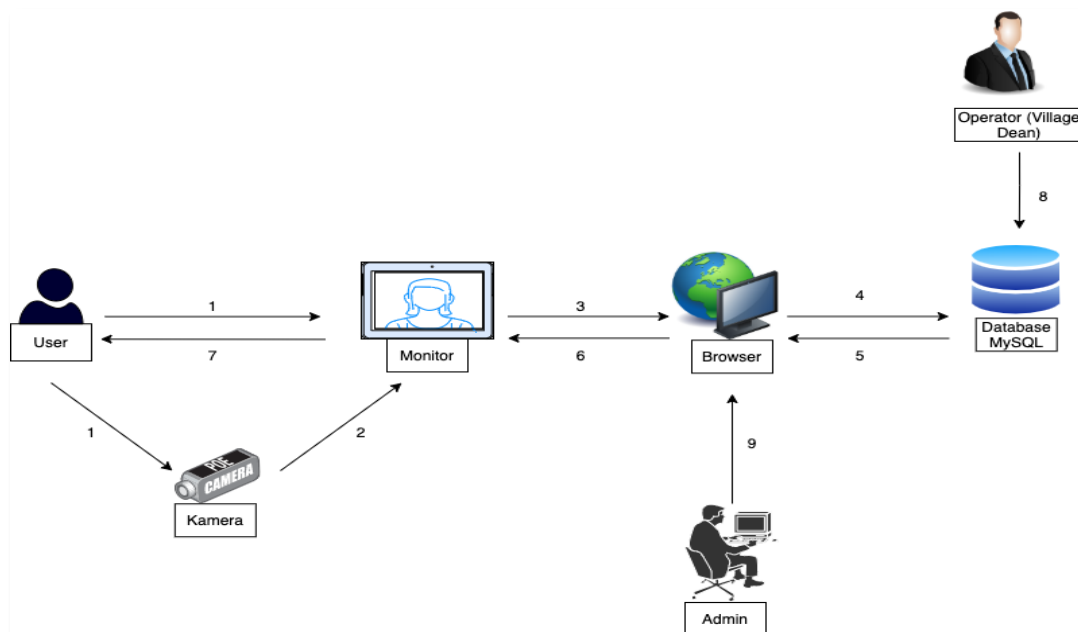


Figure 2. *System Conceptual Framework*

The conceptual framework of the system in Figure 2 shows how the student attendance recording system works. For this system, a camera will be placed at the door of each classroom, and a screen will be placed next to the camera, to display system content. The user in this case is a student who will stand in front of the camera facing the screen that is already available.

The camera will record the user's face and display it on the screen in real-time. After the user's face is detected, the detected face will be compared with the existing dataset in real-time. If recognized, data from the user will be sent directly to the database to store information such as time of entry, name, id, and date. Then it means that the user has made attendance. From the database, information on the status of the registered user will be returned to the system.

Then from the system, it is forwarded to the monitor screen so that there will be a colour change in the face box. Since the system continuously scans and compares with the database in real-time, If a face cannot be recognized, the system will ignore and continue scanning until a face is detected, which will be compared again with the system in real-time. More details can be seen in Figure 3.

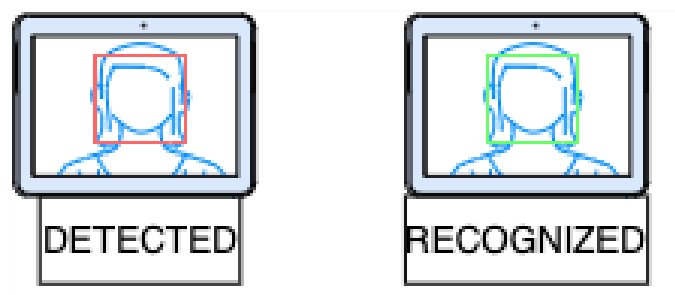
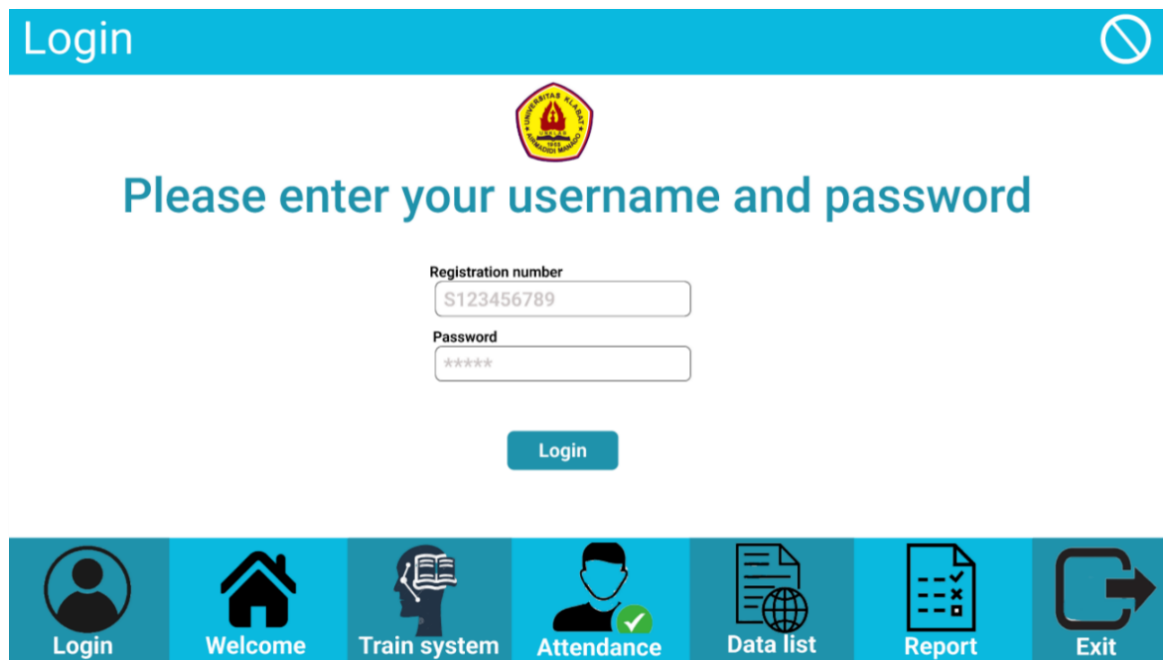


Figure 3. *Display before and after the introduction*

The user also knows that his presence has been recorded. The operator here is a lecturer or corrector whose job it is to add and edit information about student attendance data, access attendance data, perform data searches, and see the number of points earned by each student. While the administrator is responsible for adding new outsider students to the dataset and managing the attendance system.

User Interface Design

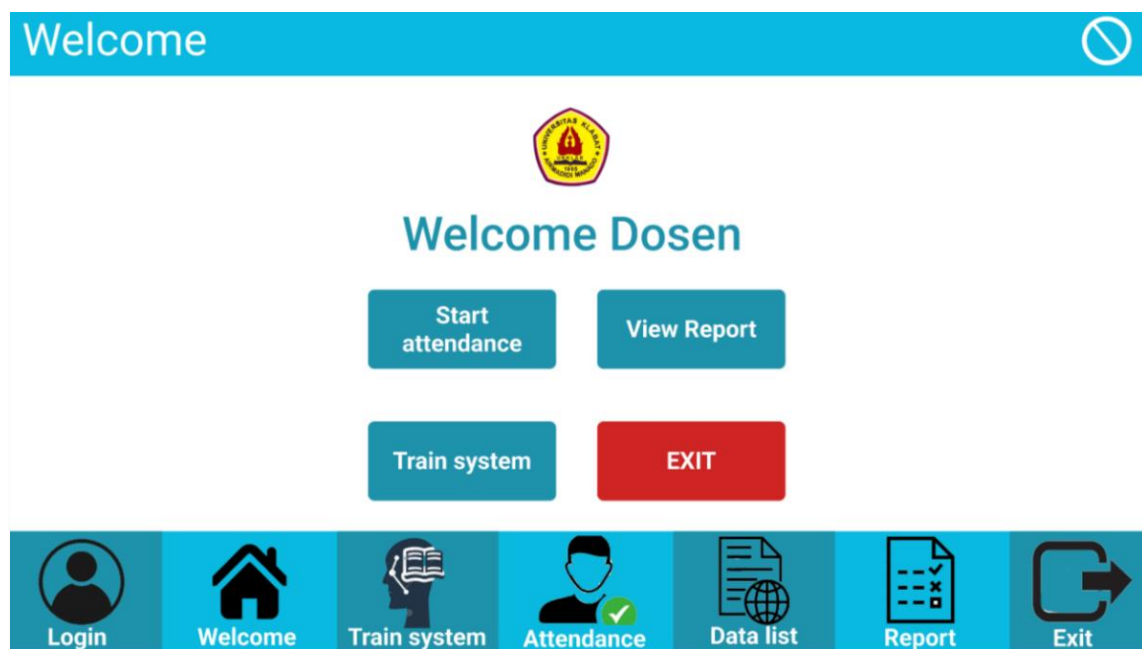
The attendance system can be accessed by operators or lecturers when they want to take attendance for certain classes based on student faces or face-recognition in real-time.



The login screen features a blue header with the word "Login" and a close button. Below the header is a yellow circular logo. The main text reads "Please enter your username and password". There are two input fields: "Registration number" with the value "S123456789" and "Password" with masked characters "*****". A blue "Login" button is positioned below the password field. At the bottom, a horizontal menu contains seven icons with labels: "Login", "Welcome", "Train system", "Attendance", "Data list", "Report", and "Exit".

Figure 4. *User Interface Design*

In Figure 4 is the display for the login. So the operator can login by entering the registration number and password.



The welcome screen has a blue header with the word "Welcome" and a close button. Below the header is the same yellow circular logo. The main text reads "Welcome Dosen". There are four buttons arranged in two rows: "Start attendance" and "View Report" in the top row, and "Train system" and "EXIT" in the bottom row. At the bottom, a horizontal menu contains seven icons with labels: "Login", "Welcome", "Train system", "Attendance", "Data list", "Report", and "Exit".

Figure 5. *Display the initial page after the user has successfully logged in*

Figure 5 is the initial page display or Welcome Page for operators and lecturers. There are several menus that can be selected by the operator or lecturer, namely Start Attendance, View Report, Train System, and Exit.



Figure 6. Display for training datasets by operators or lecturers on student faces

Figure 6 is the user interface display when the operator or lecturer wants to do training on the student's face, and there are several menus that can be selected. On the menu, namely, "Start Detection and Recognition," faces that have been scanned will be recognized by the system. The next step is that faces that have been detected and recognized can be added by clicking the "Add Face" menu. After the train process is complete and the student data added is appropriate, either the operator or the lecturer can choose another desired menu for the next process, in this case "Save" to save the data into the dataset so that the system can find out the identity of the student when it is taken. absent based on facial recognition, or "face recognition." After the whole process has been completed, the operator or lecturer can click the "Close" menu.

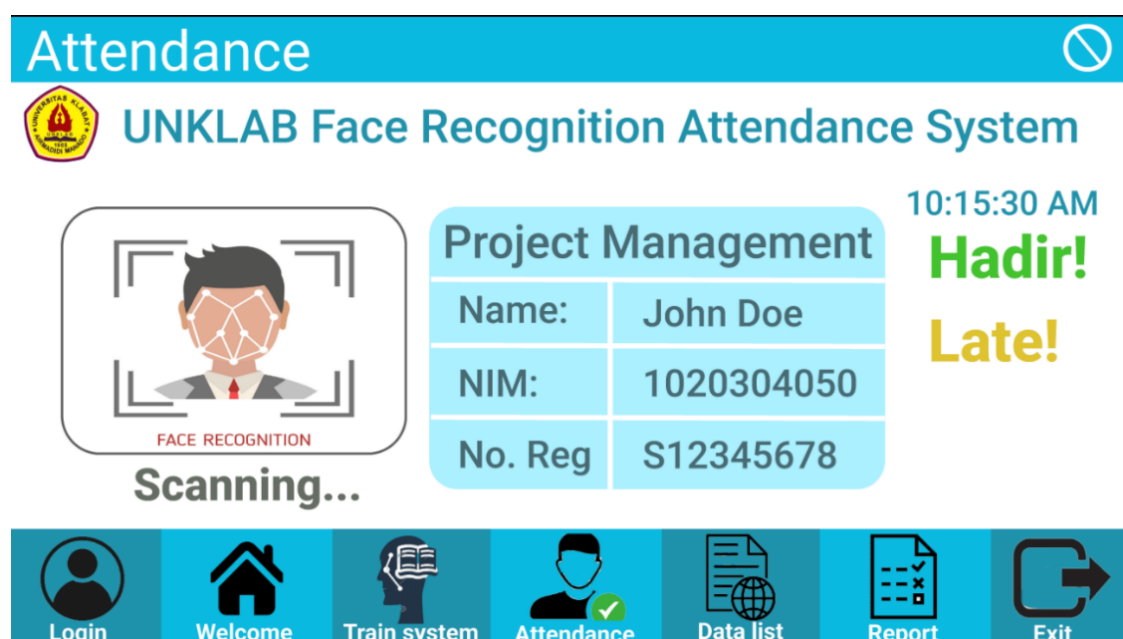


Figure 7. Display for student attendance system based on face

Figure 7 is the user interface display when students take attendance through the system. Through the camera, a student's face is detected or scanned to identify his identity. When the system successfully recognizes the face, it will automatically display the student's identity. As can be seen in Figure 6, students take absences in the project management class, and at the bottom there are displayed the name, NIM, and Reg No. of the student. Apart from that, the system can also automatically detect whether the student was present before or after being declared late, based on the time of taking the absence. So, in the absence taking system at UNKLAB, there is a predetermined time limit so that students are declared late or late for class. After the student takes the absence, the data will automatically enter the data list that can be accessed by the operator or lecturer.

Data List
⊘

UNKLAB Face Recognition Attendance System

Connect to SIU

Search

Name

↓

Reset

Close

John Mark	S123456	10502183001	842049	Laki-Laki	19	Dec-02-98
Jessica Love	S123457	10502183002	23904	Perempuan	18	Oct-14-02
Snow White	S123458	10502183003	29392	Perempuan	20	Nov-12-95
Smith Twain	S123459	10502183004	29093	Laki-Laki	22	Jan-12-99
Peter Parker	S123460	10502183005	9230923	Laki-Laki	21	Feb-11-02
Britanny Smith	S123461	10502183006	29024	Perempuan	20	Mar-13-01

Login

Welcome

Train system

Attendance

Data list

Report

Exit

Figure 8. *Display for student attendance list*

Figure 8 is a display to see the attendance list for students. To view the list, either the lecturer or the operator can search for the student's name by filling in or writing it in the available search field as a quick way to view the attendance list for a particular student.

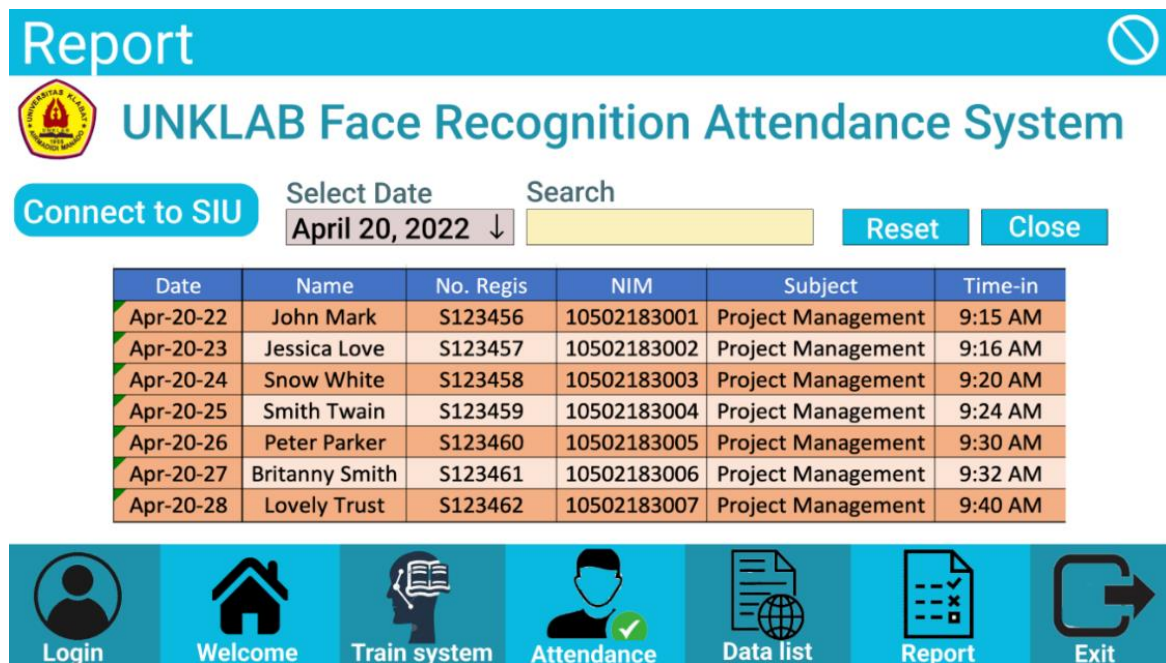


Figure 9. Display to view student attendance list reports

Figure 9 is a display to view the student attendance list report. To view the list, both lecturers or operators can look by date or search for student names by filling in or writing them in the available search fields as a quick way to view attendance lists for certain students. When you want to view a specific date, all data whose date matches the date entered will be displayed in the attendance list, so it will be easier to view the report.

Conclusion

From the results of developing an automatic attendance system with face-recognition technology for Klabat University students, the following conclusions are obtained:

1. Produce a web-based system that can be used for the processes of taking attendance for certain classes, training student facial data, viewing attendance lists, and viewing the entire list of attendance reports.
2. With this new system, the conventional process of taking timesheets on paper will change to a more modern one using the system that has been developed. The process of taking absenteeism will also be more efficient, reducing errors due to human error and not allowing cheating by students in the process of taking attendance.

Suggestions

Based on the research conducted, there are several suggestions for the development of the next attendance system. The first is:

1. To improve recognition, researchers can add fingerprint recognition and iris recognition options to speed up the attendance process.
2. Future researchers may add additional features to this system to increase productivity and attendance.
3. If the student attendance facial recognition system is successful, a lecturer attendance facial recognition system for lecturers could be developed in the future.

References

- [1] Arifin, M., & Widiyarta, A. (2021). EFEKTIFITAS ABSENSI ONLINE DALAM DISIPLIN KERJA DI KANTOR IMIGRASI KELAS I KHUSUS TPI SURABAYA SAAT PANDEMI COVID-19. *Administrasi Negara*, 9(1), 35-57.
- [2] Cahya, F. (2021). Perbandingan Identifikasi Wajah Dengan Ekstraksi Fitur Haralick Dan CNN. *Informatics and Digital Expert*, 2(2), 60-66.
- [3] Eka Putra, I., Wijaya, A. Y., & Soelaiman, R. (2016). Klasifikasi Citra Menggunakan Convolutional Neural Network (CNN) pada Caltech 101. *Jurnal Teknik ITS*, 5(1).
- [4] Julius, M., & Setyawan, R. (2013). *Aplikasi RFIF untuk Sistem Presensi Mahasiswa di Universitas Brawijaya Berbasis Protokol Internet*. Malang: Jurusan Teknik Elektro.
- [5] Lazaro, A., Buliali, J., & Amaliah, B. (2017). DETEKSI JENIS KENDARAAN di JALAN MENGGUNAKAN OPENCV. *Jurnal Teknik ITS*, 6(2).
- [6] Rotikan, R., Lalagiroth, L., & Sinambela, D. (2021). Sistem Pencatatan Kehadiran Dosen Secara Real-Time Menggunakan QR-Code di Universitas Klabat. *Cogito Smart Journal*, 7(2), 278-289.
- [7] Suanda. (2019, April). SISTEM INFORMASI ABSENSI PEGAWAI BERBASIS WEB PADA KANTOR KELURAHAN SAKO PALEMBANG. *Jurnal Sigmata*, 7, 9-10.
- [8] Tryantmojo, B., & Maryati, R. (n.d.). Akurasi Sistem Face Recognition OpenCV Menggunakan Raspberry Pi Dengan Metode Haar Cascade. *Jurnal Ilmiah Informatika*, 7(2), 92-98.
- [9] Utomo, B., & Fitri, I. M. (2021). Penerapan Face Recognition pada Aplikasi Akademik Online. *Jurnal JTIK (Jurnal Teknologi Informasi dan Komunikasi)*, 5(4), 420.
- [10] Wiro Sasmito, G. (2017). Penerapan Metode Waterfall Pada Desain Sistem Informasi Geografis Industri Kabupaten Tegal. *Jurnal Informatika :Jurnal Pengembangan IT (JPIT)*, 2(1), 6-12.
- [11] Zufar, M., & Setiyono, B. (2016). Convolutional Neural Networks Untuk Pengenalan Wajah Secara Real-Time. *Jurnal Sains dan Seni ITA*, 5(2), 2337-3520.

RSSI-based Indoor Localization Using Machine Learning Techniques

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Abstract: Indoor localization is a significant Internet of Things (IoT) topic that has become the focus of research in recent years. To address localization problems and enhance performance accuracy in wireless technology devices, various artificial intelligence-based approaches are used. In this paper, we examine machine learning techniques, K-Nearest Neighbor (KNN), Random Forest, and Support Vector Machine and compare them with simple trilateration in terms of accuracy. We present a comprehensive analysis of the given machine learning techniques using three technology devices: ZigBee, Bluetooth, and Wi-Fi, along with three experimental scenarios. The results show that, among all machine learning techniques, Random Forest has the least localization error (1.522363688 meters), making it the best localization technique. With an average MSE of 2.006680519 meters, Wi-Fi had the lowest localization error of the three technologies. The RSSI dataset is available online.

Keywords: *received signal strength (RSSI), trilateration, K-nearest neighbor (KNN), random forest, support vector machine (SVM), zigbee, bluetooth low energy, Wi-Fi*

Introduction

The Internet of things has attracted much attention in recent years, and one of the essential technological advancements is indoor localization using Received Signal Strength Indicator (RSSI) measurements. RSSI measures the power level that a radio frequency device receives from an access point. When the signal becomes less strong, the wireless data rates get slower as the distance between the devices increases, which results in reduced overall data throughput. Localization is the process of making something local or known to an area. In indoor localization, wireless technologies are used to collect and transmit data to obtain the location information of various objects. Model-based and survey-based systems are the popular types of systems used today in the design of an indoor localization system. For a Model-based system, locations are determined mathematically through calculations utilizing the distance or angles between transmitters and receivers. On the other hand, in a survey-based system, the environments are analyzed in detail before the system is deployed by creating a database containing the area of interest. This study will only focus on the most used technique in the model-based system, the fingerprinting method. It is utilized due to its excellent accuracy and independence from line-of-sight measurements. It comprises two parts; the first is the offline phase, in which RSSIs and their position coordinates are collected and stored in a database. During the online phase, RSSIs from beacons are measured and compared to those in the database. The performance of this fingerprinting technology is then enhanced by machine learning methods.

Literature Review

When creating a localization system, the method utilized to calculate the estimated position is an essential component. While most approaches rely on trilateration for its simplicity and scalability, others favor fingerprinting due to its capacity to give substantially higher accuracy at the expense of a more extended system setup time. Several designs are compared to discover which would be ideal for the desired application. The proposed systems must be able to work based on the specified parameters, as applications and their intended deployment locations can vary substantially. It is essential that the different parameters of a system are chosen appropriately.

T.N. Lin and P.C. Lin (2005) conducted a comparison of three fingerprinting techniques: 1) Bayesian, 2) KNN, and 3) neural networks. KNN produced the highest accuracy but required the most time to compute a position, according to the results. Grossmann et al. (2007) gave a comparison of the Bayesian, Euclidean, and isoline fingerprinting techniques and according to the findings, isoline produced the best degree of precision. In recent years, technological advancements have mandated more exploration with advanced techniques. There is a requirement for an up-to-date comparison of methodologies and wireless technologies to identify which would be optimal for a fingerprinting-based indoor localization system. Lemic et al. (2014) compared the RSSI fingerprinting techniques Euclidean distance, Pompeiu–Hausdorff distance, and Kullback–Leibler distance, utilizing both weighted and unweighted KNN processing, using current WiFi access points. Using various configurations in conjunction with the experimental situations, the proposed methodology produced a huge number of outcomes. Results revealed that algorithms with a lower level of complexity delivered more accurate results than those with a higher level of complexity.

In addition, the outcomes revealed that KNN gave a negligible gain in accuracy across small and large environments. Boonsriwai and Apavatirut (2013) compared two techniques: 1) multilateration and 2) nearest neighbor, utilizing WiFi access points on a mobile device. Compared to multilateration, the accuracy of the nearest neighbor was significantly outstanding, as demonstrated by the results. However, experiments indicated that fingerprinting required more incredible computational resources than multilateration, resulting in faster calculations. In a real-time localization system, a reduced latency would not be acceptable because a delay in computing the results would not be optimal for the tracking of objects. The results also demonstrated that the accuracy dropped as the number of reference points increased. The system's overall accuracy could be improved by picking only the reference points with the lowest measured RSSI values among all the available points.

In addition to the localization algorithm, the choice of wireless technology is a significant component that must be considered in a localization system. WiFi is the most prevalent wireless technology among localization systems, on (Ge and Qu, 2016; Xue et al., 2017; Wu et al., 2013; Mustaqim et al., 2017)'s popularity estimates. With the recent advancement of Bluetooth Low Energy (BLE), many systems are now focusing on utilizing BLE beacons for indoor localization (Spachos and Plataniotis, 2020). While not as prevalent as WiFi or Bluetooth, ZigBee has seen a surge in localization applications because of its low power consumption and prominence in the Internet of Things applications (Konings et al., 2017; Ou et al., 2017; Ahmad et al., 2016). Each technology has advantages and downsides when it comes to being utilized for localization. Currently, there is a shortage of research comparing the various technologies to decide which would be optimal and most precise for a localization system.

This paper expands on the works of Sadowski et al. (2020), comparing two memoryless approaches, K-nearest neighbor (KNN) and Naive Bayes, and compares them with simple trilateration, in terms of accuracy, precision, and complexity. The results demonstrated and verified that KNN with $k = 4$ was the most accurate and precise localization technique, followed by Naive Bayes. Both KNN and Naive Bayes were found to have high run times requiring some time to perform calculations using a database, executing with complexity $O(mn)$. Trilateration being the worst algorithm overall, had the best complexity of $O(1)$, requiring very little running time to calculate a location. This study primarily compares the three most prevalent machine learning techniques: K-Nearest Neighbor (KNN), Random Forest, and Support Vector Machine, as well as simple trilateration and three experimental scenarios demonstrating the functionality of the systems at different locations.

Methods

Data. The RSSI Dataset is a comprehensive set of Received Signal Strength Indicator (RSSI) readings gathered from three different types of scenarios and three wireless technologies.

A. Scenarios

The RSSI dataset was collected in three environments with different sizes and interference levels, low, average, and high.

1. Scenario 1

Scenario 1 is a 6.0 x 5.5 m wide meeting room. It is focused on an environment cleared of all transmitting gadgets. The room only contained tables and chairs, interfering with a low level. The layout room can be seen in Fig. 1, with the fingerprint locations in Fig. 1a and testing points in Fig. 1b. Transmitters were placed 4 m apart from one another, and Fingerprint points were taken with a 0.5 m spacing in the center between the transmitters making 49 fingerprints for the fingerprint locations. For testing point locations, 10 points were randomly selected.

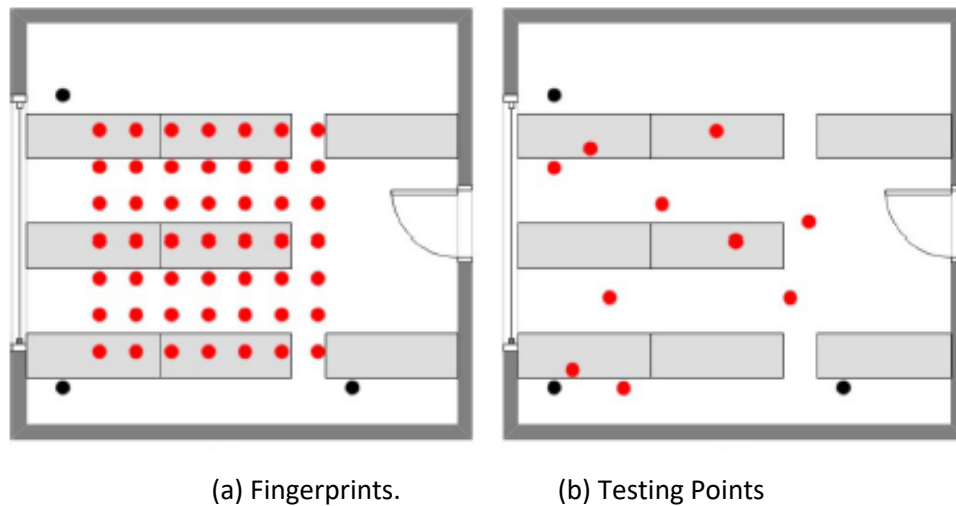


Figure 1. Scenario 1 – Small room with low interference.

2. Scenario 2

Scenario 2 is a 5.8 x 5.3 m meeting room. Additional four transmitting devices were placed at a random point inside the environment to create a high interference level environment purposely. The layout room can be seen in Fig. 2, with the fingerprint locations in Fig. 2a and testing points in Fig. 2b. There were 16 fingerprints gathered with a more considerable distance selected between the points. For testing point locations, 6 points were randomly selected.

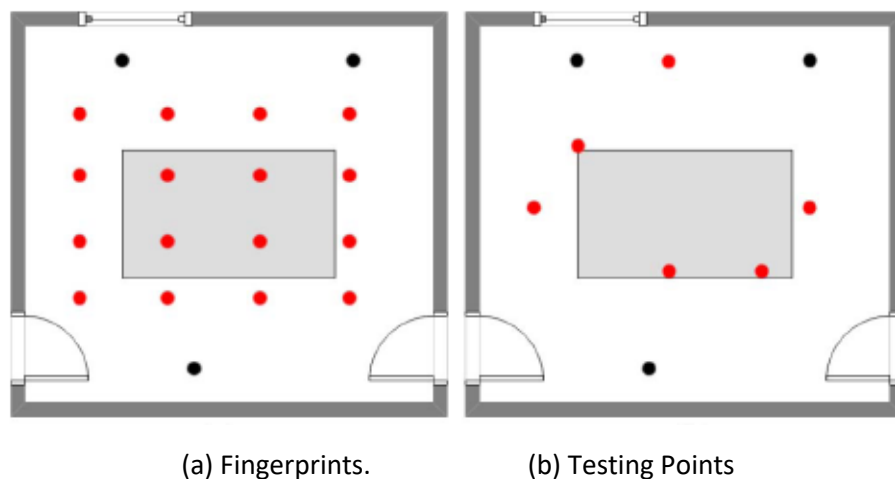


Figure 2. Scenario 2 – Small room with high interference.

3. Scenario 3

Scenario 3 is a 10.8 x 7.3 m computer lab. This lab is a large area with an average interference due to the Wi-Fi and BLE transmission and people present in the room. The ample space also allowed signals to experience obstructions, reflections, and interference. The layout room can be seen in Fig. 3, with the fingerprint locations in Fig. 3a and testing points in Fig. 3b. Only a portion of the room was utilized for fingerprinting, making Line-of-Sight (LoS) available between the transmitters to the receiver. For this scenario, a total of 40 uniformly distributed fingerprints were collected. For the testing points, 16 points were randomly selected.

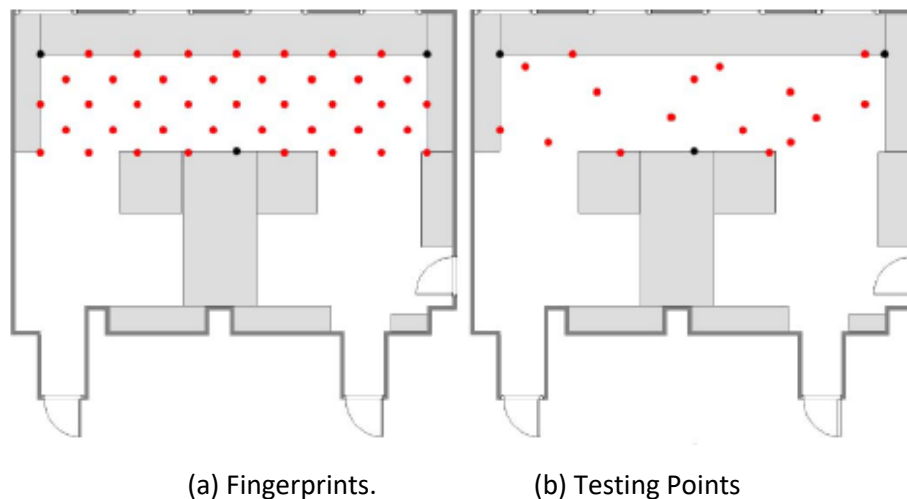


Figure 3. Scenario 3 – Large room with average interference.

B. Wireless Technologies

The experimental scenarios were placed with three different wireless technologies with the same height orientation.

1. Bluetooth Low Energy (BLE)

For BLE experimentation, Gimbal Series 10 Beacons were utilized as transmitting devices. This proximity beacon is a small, battery-powered device that sends a Bluetooth™ Smart / low-energy (BLE) signal that other devices can detect. This signal enables identifying the Beacon as well as additional telemetry information to the receiving device (Gimbal, n.d). To receive signals and measure the RSSI values, a Raspberry Pi 3 Model B was utilized.

2. ZigBee – IEEE 802.15.4

For ZigBee experimentation, Series 2 Xbees communication devices were used. The Xbees are small, easy-to-use antennas that can create complex mesh networks based on the XBee ZB ZigBee mesh firmware. These modules allow a very reliable and simple communication between microcontrollers, computers, and systems with a serial port (Sparkfun, n.d.). For the experimentation, an Arduino was used to receive the signals.

3. Wi-Fi (2.4GHz) – IEEE 802.11N

A Raspberry Pi 3 Model B was utilized to create a Wireless Local Area Network (WLAN) using Wi-Fi. The Raspberry Pi contains a Wi-Fi antenna that makes it capable of creating a WLAN.

C. Data Set Preprocessing

For experimentation, the fingerprinting points and testing points were combined into one database per scenario and wireless technology.

Localization Techniques

A. Trilateration

Trilateration is utilized to establish the location of an object of interest by employing geometry to measure distances. This method determines the precise position by using the intersection of three rings of wireless technology access points (Rusli et. al, 2016). Using Received Signal Strength, readily available to wireless devices, is a popular method for estimating the distance. Consequently, it is a cost-effective and inexpensive solution for indoor localization.

B. Fingerprinting

Fingerprinting is the most popular method of localization because of its high accuracy compared to other methods. Due to the fact that measurement of Line of sight (LOS) is not required, this method is effective. Fingerprinting-based localization usually consists of two main phases: offline (training) and online (test). The offline phase is designed for learning the RSSI at each reference point. RSSIs from wireless devices are collected and stored in a database along with their respective coordinates. In the online phase, RSSIs from beacons are measured and compared with the stored ones in the database. Then, the location of the tag device is estimated using the fingerprinting procedure (Subedi and Pyun, 2017). For the fingerprinting machine learning methods, we utilized the scikitlearn library for regression to calculate continuous values.

1. K-Nearest Neighbor: KNN fingerprinting algorithm is a non-parametric method used for classification and regression. It uses Euclidean Distance to measure RSSI values from access points at an unknown location compared to the actual position stored in the database. In KNN regression, the output is the property value for the object. This value is the average of the values of its k nearest neighbors.

2. Support Vector Machine – SVM is a supervised learning method for classification, regression, and outliers detection. It is effective in high-dimensional spaces and cases where the number of dimensions exceeds the number of samples. It is also memory efficient since it utilizes a subset of training points in the decision function called the support vectors.

3. Random Forest - Random decision forests are an ensemble learning method for classification, regression, and other tasks that operate by constructing a multitude of decision trees at training time and outputting the class that is the mode of the classes or mean prediction of the individual trees (Wikiwand, n.d.). In random forests, each tree in the ensemble is built from a sample drawn with replacement from the training set. In addition, when splitting a node during the construction of the tree, the split that is chosen is no longer the best split among all features. Instead, the split that is picked is the best split among a random subset of the features. Because of this randomness, the bias of the forest usually slightly increases (with respect to the bias of a single non-random tree), but due

to averaging, its variance also decreases, usually more than compensating for the increase in bias, hence yielding an overall better model (Saini, n.d).

Evaluation

To compare the performances of the fingerprinting machine learning methods, the Mean Squared Error (MSE) between the predicted position and the actual position of points was determined. The average was calculated for comparison with other machine learning techniques. To get the best parameters for the fingerprinting machine learning methods, hyper-parameter tuning was used, and the parameter with the lowest MSE gets the highest accuracy.

Results and Discussion

A. Experimental Results

The Root Mean Square Error values are shown in Table 1. According to the results, the Random Forest algorithm gave the best localization accuracy. Random Forest with 10 as the n estimator gave the lowest average error of 1.4994 m. In Scenario 1, the average error was 1.3642 m. In Scenario 2, the average error was 1.5384 m. In Scenario 3, the average error was 1.664 m. Overall, the estimates computed using Random Forest deviated from the actual receiver by 1.52236 m.

The Algorithm with the next lowest localization error was K Nearest Neighbor, with an estimated 1.6651 m deviations from the actual receiver position. The KNN with $k = 5$, gave the lowest average error of 1.505 m. In Scenario 1, the average error was 1.51 m. In Scenario 2, the calculated average error is 1.6182 m; in Scenario 3, the calculated average error is 1.8671 m.

The Algorithm that gave the lowest localization error next to K-Nearest Neighbor was Support Vector Machine (SVM). The results deviated off the actual receiver position by 2.200 m. The C parameter that produced the lowest localization error for SVM is 1, with an average error of 1.5782 m. In Scenario 1, an average error for all technologies of 1.7646 m was computed. In Scenario 2, the average error was 2.577 m. In Scenario 3, the average error was 2.2586 m. Finally, the algorithm that gave the worst overall accuracy was trilateration. The calculated deviation from the actual receiver position was 3.6482 m. In Scenario 1, the average error was 4.4057 m. In Scenario 2, the average error was 3.3895 m. In Scenario 3, the average error was 3.1496 m.

Comparing the overall results by wireless technologies, Wi-Fi technology produced the lowest localization error of 2.0067 m. Followed by ZigBee technology with 2.3157 m and Bluetooth low energy technology with 2.4844 m.

Table 1. Summary of errors for localization techniques and wireless technologies (meters)

	Trilateration	KNN	SVM	Random Forest	Average
Scenario 1					
BLE	2.180001	1.550533125	2.018055	1.293610327	1.760549863
Zigbee	2.329276	1.537098871	1.7582086	1.45185794	1.769110353
WiFi	2.004132	1.442467377	1.5176625	1.34716407	1.577856487
Average	2.004132	1.510033124	1.764642033	1.364210779	
Scenario 2					
BLE	3.587196701	1.1774527	2.9762139	1.388487597	2.282337317
Zigbee	3.655755712	1.985285325	2.3136401	1.77411824	2.432199844
WiFi	2.601401388	1.691721706	2.4404153	1.452708983	2.046561844
Average	3.281451267	1.6181531	2.576756433	1.538438273	
Scenario 3					
BLE	7.449834	1.90315544	2.3709395	1.55736709	3.320324008
Zigbee	4.183342	2.392349336	2.4174975	1.989792417	2.745745313
WiFi	4.843117	1.305764274	1.9874451	1.44616653	2.395623226
Average	5.492097667	1.867089693	2.258627367	1.664442012	
Overall	3.648228422	1.665091969	2.200008611	1.522363688	

B. Discussion and Conclusion

In this paper, we compared the results of the three machine learning techniques K-Nearest Neighbor (KNN), Random Forest, and Support Vector Machine. Then we compare them to simple trilateration results on an error basis. According to the experimental results, Random Forest gave the best overall results, proving to be the most accurate method.

KNN came in second, followed by SVM and simple trilateration. Random Forest with n estimator 10 produced the best accuracy with an average error of 1.4994 m.

Comparing the results by scenarios, as expected, Scenario 1 and Scenario 2 produced almost similar results with the lowest localization error. These two scenarios were small meeting rooms with fewer interferences. Scenario 3 gave the highest localization error due to interferences and reflections. The result can be used as a selection model for indoor localization in smart buildings. The RSSI dataset is available online (Spachos,2020).

Recommendation

Further study on deep learning techniques is needed to improve localization accuracy and to locate objects of interest in changing environments.

References

- [1] Tsung-Nan Lin & Po-Chiang Lin (2005). "Performance comparison of indoor positioning techniques based on location fingerprinting in wireless networks," *International Conference on Wireless Networks, Communications and Mobile Computing vol 2*, pp. 1569-157, doi: 10.1109/WIRLES.2005.1549647.
- [2] U. Grossmann, M. Schauch, & S. Hakobyan (2007, September). "RSSI based WLAN indoor positioning with personal digital assistants" *4th IEEE Workshop Intell. Data Acquisition Adv. Comput. Syst. Technol. Appl.*, pp. 653–656.

- [3] F. Lemic, A. Behboodi, V. Handziski, & A. Wolisz (2014, October). "Experimental decomposition of the performance of fingerprinting-based localization algorithms," *Int. Conf. Indoor Position. Indoor Navig. (IPIN)*, pp. 355–364.
- [4] Boonsriwai & A. Apavatjirut (2013, May). "Indoor WiFi localization on mobile devices," *10th Int. Conf. Elect. Eng. Electron. Comput. Telecommun. Inf. Technol*, pp. 1–5.
- [5] X. Ge & Z. Qu (2016, August). "Optimization WiFi indoor positioning KNN algorithm location-based fingerprint," *7th IEEE Int. Conf. Softw. Eng. Service Sci. (ICSESS)*, pp. 135–137.
- [6] W. Xue, W. Qiu, X. Hua, & K. Yu (2017, April) "Improved Wi-Fi RSSI measurement for indoor localization," *IEEE Sens. J.*, vol. 17, no. 7, pp. 2224–2230.
- [7] C. Wu, Z. Yang, Y. Liu, & W. Xi (2013, April) "WILL: Wireless indoor localization without site survey," *IEEE Trans. Parallel Distrib. Syst.*, vol. 24, no. 4, pp. 839–848.
- [8] S. M. S. Mustaquim, A. Biswas, R. Hasan, and A. Chakrabarty (2017, September) "A resource utilizing approach towards implementing indoor localization using Wi-Fi network," *4th Int. Conf. Adv. Elect. Eng. (ICAEE)*, pp. 308–313.
- [9] P. Spachos & K. Plataniotis (2020, March) "BLE beacons in the smart city: Applications, challenges, and research opportunities," *IEEE Internet Things Mag.*, vol. 3, no. 1, pp. 14–18
- [10] D. Konings, N. Faulkner, F. Alam, F. Noble, & E. M. K. Lai (2017, November) "The effects of interference on the RSSI values of a ZigBee based indoor localization system," *24th Int. Conf. Mechatron. Mach. Vis. Practice (M2VIP)*, pp. 1–5.
- [11] C. W. Ou et al (2017, August). "A ZigBee position technique for indoor localization based on proximity learning," *IEEE Int. Conf. Mechatron. Autom. (ICMA)*, pp. 875–880.
- [12] T. Ahmad, X. J. Li, & B. C. Seet (2016, June) "A self-calibrated centroid localization algorithm for indoor ZigBee WSNs," *8th IEEE Int. Conf. Commun. Softw. Netw. (ICCSN)*, pp. 455–461.
- S. Sadowski, P. Spachos & K. N. Plataniotis (2020, November) "Memoryless Techniques and Wireless Technologies for Indoor Localization With the Internet of Things," *IEEE Internet of Things Journal*, vol. 7, no. 11, pp. 10996–11005, doi: 10.1109/JIOT.2020.2992651.
- [13] Gimbal (n.d) "Gimbal™ Series 10 Proximity Beacon: User Manual" Retrieved April 22, 2021, <https://docs.gimbal.com/manuals/s10.html>
- [14] Sparkfun (n.d) "XBee 2mW Wire Antenna - Series 2 (ZigBee Mesh)" Retrieved May 2, 2021 <https://www.sparkfun.com/products/retired/10414>
- [15] M. Rusli, M. Ali, N. Jamli & M. Din (2016). "An Improved Indoor Positioning Algorithm Based on RSSI-Trilateration Technique for Internet of Things (IOT)", *2016 International Conference on Computer and Communication Engineering (ICCCE)*, pp. 72-77
- [16] Santosh Subedi, Jae-Young Pyun, (2017). "Practical Fingerprinting Localization for Indoor Positioning System by Using Beacons", *Journal of Sensors*, vol. 2017, Article ID 9742170, 16 pages. <https://doi.org/10.1155/2017/9742170>
- [17] Wikiwand (2018, May). "Random Forest | Wikiwand", Retrieved May 1, 2021, https://www.wikiwand.com/en/Random_forest
- [18] Deepanshu Saini (n.d.), "BLE RSSI Dataset for Indoor localization and Navigation" Retrieved April 26, 2021 <https://github.com/sainide/indoor-localization-andnavigation/blob/master/Project%20Report.pdf>
- [19] (Spachos, 2020). RSSI-Dataset-for-Indoor-Localization-Fingerprinting [Online] Available: <https://github.com/pspachos/RSSI-Dataset-for-Indoor-Localization-Fingerprinting>

Empowered Like the Apostles and Prophets?

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Abstract: The cultural features shown by apostles and prophets are not remarkably different except in emphasis. A more detailed reading of the text indicates that prophets were specially chosen by God to carry out specific tasks at nominated historical times. Their tasks focussed on rebuke and urgings to individuals or nations to reform and return to the Lord in order to experience His salvation and blessings. On the other hand, apostles were chosen as messengers of the gospel to various people groups and individuals at all levels of society. All the founding apostles had witnessed Jesus' ways, deeds, and resurrection. Their specific brief was to point listeners to Jesus and to enthusiastically indicate the life changes that are possible if His righteous principles were accepted.

Both groups possessed a clear view of who God is, their sinful state, their identity and value in God's sight, and their need to respond to these revelations/understandings. God's redemptive initiatives and their experience of salvation represent the fundamental reasons for dedication. This type of inspiration is available to trusted, loyal, knowledgeable representatives of God's kingdom (ambassadors) who have experienced the amazing transformation that occurs in people touched by the gospel. As ambassadors, we can respond as fervently in our sphere of influence and be as effective in the ministry God has given to us as the apostles and prophets were in theirs.

Keywords: *apostles, prophets, ambassadors*

Introduction

Throughout the centuries, a certain fascination has gripped humans concerning prophecy and prophets. Today, there are those who claim that they are modern day apostles and prophets (Goldstein, 2013; Raboteau, 2016), but can this be substantiated? Here extreme caution is required. Fortunately, the Bible provides reasonable guidelines (Ferwerda, 2008).

In the popular mind, interest is more intense in prophets than apostles, for they are thought to be given to foretelling future events. However, a survey of the biblical record indicates that prophecy may not be uppermost in the activities undertaken by a prophet. If we assume that these accounts contain sufficient information relating to the gift of foretelling the future, then we might become puzzled to find that some of the apostles were known to have prophesied.

One approach to simplifying the distinction between apostles and prophets might be to look at the cultural characteristics supposedly associated with the prophetic role and contrast them with what is known about the apostles in the early church. By referring to the prophetic culture is meant the ideas promoted and defended, the origin of these ideas, the values they represent, the manner in which they are defended and the associated feelings, conviction and temperament displayed. Culture also has something to do with the use of symbols and the style adopted in a discourse (O'Malley, 2004, pp. 4–6).

In the Judeo-Christian tradition, those considered prophets are thought of as specially chosen individuals to be spokes-persons for God. They were used by God to direct and guide designated peoples to a way of thinking and behavior leading to salvation. This often required pointed rebuke and calls for reformation and a return to righteous ways. The uncompromising stance of a prophet concerning the ideals delivered by God (Isa 8:20), their call for justice and an end to corruption, often led to their alienation (O'Malley, 2004, pp. 6–8).

At the conclusion of the analysis, there is one question that might be posed. Is the empowerment seen with the apostles and prophets more generally available to ordinary followers of God and how would such empowerment be manifested?

The Prophetic and Apostolic Cultures Contrasted

In an attempt to distinguish between these two cultures, prophetic and apostolic, a number of features are examined. Several categories in O'Malley's account have been combined under spirituality (speaks out/protests, appeals high standards, teaching/instruction role), the aspect of social justice is highlighted specifically (Houston, 2020), and under prophetic utterances only those relating to eschatology are mentioned. In such an analysis, one inhibiting factor is that there is no complete record of the skills one would expect to be displayed by either prophets or apostles assuming they possessed one spiritual gift alone. This, together with the limited record of individual details in both groups, makes conclusions tentative. A limited contrast is given in Table 1.

Table 1. *Cultural Comparison across a Number of Criteria of Selected Apostles and Prophets (indicative references only are noted)*

Identity	Spirituality	Social Justice	Morality	Eschatology
Prophets				
Amos	Amos 5:4–6, 14–15, 21–24	Amos 2:6–8; 4:1; 5:7, 11–12; 6:12	Amos 2:7–8; 8:5–6	Amos 5:18–20
Elijah	1 Kings 18:18–39; 21:19	1 Kings 17:8–16	1 Kings 18:18; 19:10	—
Haggai	Hag. 1:4–9; 2:10–19	—	Hag. 2:10–14	Hag. 2:6–7
Isaiah	Isa. 6:4–10; 26:1–15; 28:14–15; 31:6–7; chap. 40–66	Isa. 3:14–15; 5:7; 10:1–3; 28:17; 32:5–8	Isa. 8:19, 20; 59:3–15	Isa. 8:13–15; 11:1–2; 42:1–4; 52:13–15 to 53:1–12; 61:1–3
Jeremiah	Jer. 2:1–37; 3:6–25; 29:1–32; 36:1–10	Jer. 5:27–28; 7:5–7; 22:1–4, 13–17; 34:13–17	Jer. 3:1–2; 11:1–5; 17:19–22	Jer. 23:5–6; 31:15; 33:14–16
John the Baptist	Matt. 3:2–11; Luke 3:3–18	Luke 3:9–14	Matt. 4:3–4; Luke 3:8–9	Matt. 3:3, 11; Luke 3:4, 16
Moses	Exod. 32:19–20, 26–28; 10:3; Lev. 4:1–3; 9:1–7	Exod. 22:1–31; 23:1–10; Num. 27:1–11	Exod. 20:2–17; Lev. 18, 19	Gen. 3:15; 22:18; 49:10; Deut. 18:18
Samuel	1 Sam. 3:11–18; 7:3; 8:10–18; 12:7–15	1 Sam. 12:3–5; cf. 8:1–5	1 Sam. 12:6–15; 13:13; 15:19, 22–23	—
Apostles				
John	Acts 4:19–21; 1 John 2:15–17; 4:1–11	1 John 3:17–19	1 John 2:3–11; 3:15–23; 3 John 1:11	Rev. 6:12–17; 19:11–16
Paul	Acts 9:27–29; 13:38–47; 1 Cor. 11:27–34; 14:6–19; 2 Tim. 2:22–26	Rom. 13:6–8; Gal. 6:10; 2 Thess. 3:10	1 Cor. 10:6–33; 2 Cor. 7:1; 2 Thess. 3:6	2 Thess. 2:3–12
Peter	Acts 2:14–40; 3:12–23; 5:19–20; 8:25	1 Pet. 2:17; 3:8–12	1 Pet. 1:13–16; 4:3–5; 2 Pet. 1:5–10; 2:9–20	2 Pet. 3:3–13

A reading of the scriptural accounts of those referred to as apostles and prophets conveys the almost uniform impression that they were dedicated men and women. Notable exceptions could raise the question about the distinction between the true and the false. The outstanding first impression is that with the criteria selected, the differences are minimal. Prophets spoke out and protested, called for reform and appealed to high standards. Apostles could also become involved in such activities and they sometimes could give prophetic utterances. Both groups were involved in teaching/preaching/instruction roles for the purpose of spiritual advancement and each could be martyred for their efforts. One of the problems with such comparisons is that the life records of the individuals involved is incomplete. The most detailed record of a prophet is that of Jesus. When we consider His life, the additional roles spoken of by the apostle Paul (1 Cor 14:3), namely, encouragement and comfort, are illustrated in abundant fashion. Then again, we could also suggest that the balance of activities among the roles could differ for prophets and apostles. And for selected individual prophets, certain roles perhaps were never seen in their ministry. This appears to be the case with the role of judging (mentioned for Moses and Samuel—Exod 18:13–16; 1 Sam 7:6). Miracles are recorded occasionally for both selected prophets and apostles, but this gift does not appear to be limited to either prophets or apostles, as the experience recorded for Stephen illustrates (Acts 6:8; 1 Cor 12:7–11).

Certainly, prophets differed in the emphasis of messages given. Isaiah gave many prophecies relating to Christ's first coming and some prophecies about other events. Daniel specialized in apocalyptic utterances. This means his prophecies were unconditional statements, given using unusual symbols, of events that would happen until the end of time. This contrasted with the usual classical prophetic statements of the majority of Old Testament prophets. Such prophecies were conditional, their fulfilment depending on the response of humans to the message given. The message carried by Jonah to Nineveh is a good illustration of the classical prophetic type. Indeed, Jonah's reluctance to go to Nineveh included the fear that God would not destroy the city on account of their response (Jonah 3:10; 4:1–2; de Souza, 2020, p. 9).

A more detailed reading of scripture indicates that prophets were specially chosen by God to carry out specific tasks at nominated historical times (Amos 3:7; Num 12:6). The tasks mainly involved rebuke and urgings to individuals or nations to reform and return to the Lord in order to experience His salvation and blessings. Amos' efforts focused on aspects of social justice (Table 2). The experiences of the children of Israel under Moses represented a special case of deliverance from physical slavery to freedom, which was meant to point to God's ability to deliver from spiritual bondage to freedom and rejoicing in the Lord. During the process, He taught them through Moses the nature of His character, the righteousness of His ways, and how these features could be reflected in the human sphere, when faith was shown in God's promises (Rom 4:1–2). The overarching mission of prophets was to give voice to the salvation God was offering humanity and urge their listeners to accept the offer made with a wholehearted response. They also diligently searched for clues in the messages given to them by the Holy Spirit concerning the time when Christ was expected to appear and suffer to save humanity (1 Pet 1:10–12).

On the other hand, the founding group of apostles (*apostolos*—one sent forth) were chosen as messengers of the gospel to various people groups and to individuals at all levels of society. All had witnessed Jesus' ways, deeds, and resurrection. Their specific brief was to point listeners to Jesus and to enthusiastically indicate the life changes that are possible if His righteous principles were accepted. Apostles were called to dedicate themselves as fishers of men and women, to witness to Christ's life and works (Matt 10:18; 1 John 1:1–4).

Repentance, reform and whole-hearted devotion to His will and ways represent the keynote emphases of the apostolic messages (Rev 22:16–17). It has been proposed that in succeeding ages (cf. Eph 6:11–13) apostles are those "especially sent out of God ... to proclaim his truth" (James White, 1861). Would this allow individuals such as Luther, Wesley, and William Miller to be placed in that category?

The Call

Nothing is unknown to God and His forward planning is beyond that of human performance and ability. Jeremiah was set apart (sanctified) for the office of prophet before he was born (Jer 1:5), as was John the Baptist (Luke 1:13–15). John was filled with God's Spirit from birth whereas Jeremiah was especially empowered for his task in his youth (Jer 1:6–10). Others, such as Moses, were called at the age of experience (Exod 2:11; 3:4–10). Samuel was called at such an early age that he did not immediately recognize God's call (1 Sam 3:3–4). He was immediately willing to act as God's agent when the realization dawned (1 Sam 3:10–19). This means that the call to fill specific tasks for God became evident to those selected at vastly different ages and in different ways. Various levels of willingness were shown by those called (Exod 3:9–11; 4:1–17; Isa 6:5–8; Ezek 3:22–23) and, we might observe in the example of Jonah, even active resistance was evident for a time (Jonah 1:1–3; 2:1–3).

Table 2. *God's Call Made to a Selection of Apostles and Prophets and the Nature of the Assignment Given*

Identity	People group addressed	Scripture details of call	General nature of assignment
Amos	Children of Israel primarily	Amos 1:1	Urge social justice and repentance
Elijah	Judah's king	1 Kings 19:1–5, 19, 21	Speak against wickedness and advise to choose right ways
Haggai	Judah	Hag. 1:1–3	Encourage to build God's house
Isaiah	Assyria, Babylon, Israel, Judah	Isa. 6:4–10; 7:4; 9:8; 10:12, 20–22; 11:21–29; 16:6; 29:9–14; 40:1–2; 43:1	Warn about pride, arrogance, evil, haughtiness and disregard for God's words. Encourage, comfort and highlight the promise of redemption
Jeremiah	Judah	Jer. 1:1–2, 5; 2:21–37; 3:1 to 4:4	Denounce evil, call for repentance
John the Baptist	Jews, Romans	Luke 1:13–17; John 1:6–8	Rebuke insincerity, urge fairness and love for others, uphold righteous standards
Moses	Egyptians, Israelites	Exod. 3:2–7; 6:26–27; 19:5–8; Deut. chap. 4 to 30	Deliver Israelites from Egypt, introduce the everlasting covenant, teach God's ways
Samuel	Israel and their king	1 Sam. 3:10–11	Rebuke Eli the high priest for neglect of duties, warn about issues surrounding appointment of a king, rebuke disobedience, and urge to serve the Lord
John	Gentiles, governors, kings, Jews	Matt. 10:18; Mark 6:7–13; Luke 5:4–11; Acts 1:8, 13	Preach repentance, cast out spirits, act as fishers of men appealing to many people
Paul	Gentiles, kings, Israelites	Acts 9:4–6, 15	Witness to Me (Jesus' life and works) before many people
Peter	Gentiles, governors, kings, Jews	Matt. 10:18; Mark 6:7–13; Luke 5:4–11; John 21:15–17	Preach repentance, cast out spirits, act as fishers of men appealing to many people, feed Christ's flock

The disciples who later became the apostles (Matt 10:1–4; Mark 1:16–20) were called at the age of experience. For the apostles, the call was made more specific following Jesus' resurrection (Matt 28:19–20; Acts 1:8). However, the call came to Matthias, Judas Iscariot's replacement, occurred

at a special meeting of the 120 followers of Jesus (Acts 1:15–26). On the other hand, Paul was called in a spectacular fashion on the road to Damascus by the Lord Himself (Acts 9:1–6). Of the others who were called to apostleship, nothing much is recorded (Acts 14:4; 1 Cor 9:1–2; Gal 2:8–9; 1 Thess 1:1; 2:6) leaving us to assume that their call may have been after the style experienced by Matthias. He was selected and sent out by the church at Jerusalem to evangelize in the environs of Antioch and to work with Paul (Acts 11:19–26; cf. 14:14). No doubt he was chosen for his strong faith, talents displayed, and his eagerness to share the gospel, which had transformed his life already. The initial eleven, plus Judas' replacement, were witnesses to Jesus' ways, deeds and resurrection (Acts 1:21–22). They were termed apostles before the special outpouring of the Spirit (Acts 1:25–26). A significant observation is that the gift of the Spirit was not restricted to the apostles at Pentecost (Acts 1:15, 24–26; 2:1–4).

The call to become a special spokesperson for God (prophet), to act for and be His authoritative mouthpiece seems to have involved a specific call made evident through a dream, vision, a supernatural event accompanied by unmistakable instructions conveyed by a heavenly being or voice (Isa 6:6–9; Jer 1:4–14; Ezek 1:1–28; 2:1–3; Nah 1:1; Obad 1:1; Mic 1:1), or through instructions received in largely undefined but an unmistakably supernatural fashion (Hag 1:1–2; Amos 1:1; Joel 1:1; Hos 1:1; Jonah 1:1). A heavy responsibility rested on the individual chosen as is evident by the instruction given to Ezekiel (2:7–8, NKJV) making the person strictly accountable to God—"You shall speak My words to them, whether they hear or whether they refuse, for they *are* rebellious. But you, son of man, hear what I say to you. Do not be rebellious like that rebellious house; open your mouth and eat what I give you."

The prophet Joel assures us that the gift of prophecy would be revealed in the church until somewhat before the return of the Lord (Joel 2:28–31). This assurance should be balanced against the distinction that is sometimes made between the prophetic/nurturing ministry gift often spoken of in the New Testament, which is characterized by "edification and exhortation and comfort" (1 Cor 14:3) and the prophetic call that characterized the lives of Jeremiah, John the Baptist, Isaiah and others (La Rondelle, 2003; Naden, 1999).

However, the call to apostleship and the continuity of that office in the church seems to lack clarity. For example, we read that one of the special gifts of the Spirit involves prophecy in three of the accounts on spiritual gifts (Rom 12:6–8; 1 Cor 12:7–11; Eph 4:11–13), but apostleship is mentioned but once. There is a temptation to imagine that the latter is not a continuing phenomenon. Paul indicates that the true signs of an apostle were revealed "in signs and wonders and mighty deeds" by individuals showing great tenacity to the task of sharing the gospel (2 Cor 12:12), a view supported by Jesus' acts (Matt 10:1–2). And Peter was clearly of the opinion that individuals suitable to fill the position held by Judas would have accompanied Jesus throughout His ministry and witnessed His resurrection (Acts 1:21–22). It seems possible, then, that when those who had enjoyed personal experiences with Jesus had passed away, the fundamental elements of the gift were expressed primarily through evangelists in order to satisfy the need to bring the gospel in a special manner to those who had not heard or understood.

Sources of Motivation

If we look at the lives of the prophets and the disciples who became apostles several aspects become clear; they had a well-founded understanding of who God was, of the great gulf that existed between themselves and God, the necessity and reality of redemption, and the privilege to share their experiences with others. A heightened sense of urgency for a closer walk with God and of the high principles associated with His kingdom undoubtedly occurred.

Who is God?

The Scriptures speak of prophets of God, of Baal, and of false prophets (Matt 1:22; 1 Kgs 18:19; Matt 7:15; 24:11), indicating that it is of utmost significance to be in the service of the right master. The transcendence and power of God was impressed initially on Moses at the burning bush as he

herded sheep in the wilderness (Exod 3:1–3), and subsequently through many other events during the exodus (e.g., Deut 4:31–39). He was exposed to a most awesome display of God's grandeur, righteousness, power and otherness at Sinai (Exod 19:17–20; 20:18–20). Isaiah, a later prophet, was introduced to prophet-hood through a spectacular vision of God seated on His temple throne accompanied by seraphim (Isa 6:1–6). The setting of grandeur, glory, and incomprehensibility of the vision was such that Isaiah exclaimed: "Woe is me, for I am undone" (v. 5).

Subsequent prophets could relate to these records and be humbled by the utter separateness of God in relation to His servants and creation. Yet, on the other hand, they would be impressed by the devotion, patience and love shown by God to sinners. Their calls seemed to be quieter, but each had the impression of the involvement of the supernatural through their experiences and of the greatness and righteousness of the Lord they served. Even Jonah, the reluctant prophet, appears finally to have realized these things (Jonah 4).

If we turn our attention to the disciples, who later became apostles, the first four were impressed by Jesus' teaching, His miracles, demeanour and authority (Luke 5:1–26). However, it was not until after He set them apart as apostles and gave them special powers (Mark 3:13–15), and especially after His resurrection, ascension, and outpouring of the Spirit (Luke 24:34–53; Acts 2:1–6, 22–24) that they became filled with an unquenchable evangelistic spirit and a dedication to purpose stronger than the threat of death. The call to apostleship proceeded on a quieter level and over a longer time period than seen with the prophetic call, although some had unusual encounters with the divine.

John the apostle was one of three given an intense experience on the Mount of Transfiguration (Matt 17:1–8) that complemented his developing concept of who Jesus was. Later, as the writer of Revelation, his first vision was of the glorified Christ and His concern for the churches throughout history as High Priest in the heavenly sanctuary (Rev 1:10–18). John was then quickly shown Christ on His throne (4:1–11) reaffirming His position of power and grandeur. Those associated with the Lord worshipped Him as Creator and Redeemer (Rev 4:11; 5:9–10).

The linkage between the two concepts is vital. Adam was made from clay and life was then breathed into him. God created him in His image. Since the image was marred through sin, it could be restored solely by the Creator. Beginning with Moses, a special function of prophets has been to point hearers to the coming of their Redeemer (Luke 24: 25–27; Acts 3:22–26). The apostles, too, witnessed to the certainty of His life, deeds, and resurrection (2 Pet 1:16), and to the transformation He could effect in their lives.

The revelation of Jesus given to John has a number of close parallels with the information recorded by Moses, which is relevant to all believers. The contrast is shown in Table 3 and reminds readers that the Scriptures present a consistent picture concerning Jesus. From an informational viewpoint, believers are in a position to know God and by faith stand on similar grounds as the most privileged apostles and prophets. It is in the experiential domain that the substantive differences emerge.

Table 3. *Impressions and Information Concerning Our Lord Given to the Apostle John and to the Prophet Moses*

Feature	John's account	Moses' account
Place of ministry/ communication	Holy place initially (Rev 1:12–13); Most Holy place latterly (Rev 11:19); tabernacled among redeemed (Rev 7:9; 21:3)	Associated with two sanctuary apartments (Exod 14:19–20; 25:8; 40:33–35; Num 9:15–16) Symbolically present among people (Lev 23:33–43)
Appearance	Glorious, garmented, with golden girdle (Rev 1:13–16)	Glorious (Exod 24:10, 16–17) Representative high priest garmented in fine linen with

		coloured girdle (Exod 28:4, 39; 39:29)
Display of power	Judgment of wicked and elimination of Satan (Rev 19:11–21; 20:11–15) Redemption of saints (Rev 7:9–11) Creation of new heavens and earth (Rev 21:1–2)	Judgment on wicked (Exod 14:26–28) Giving of Law (Exod 19:16–19) Delivery and redemption (Exod 14:29–36; Deut 32:46–50; cf. Josh 3) Creation of a nation (2 Sam 7:23)
Basis of worship	Creator, Redeemer, and Deliverer of righteous judgments (Rev 4:11; 5:9–10)	Creator, Redeemer, Judge (Exod 20:8–11; Deut 5:15; cf. Heb 3:16 to 4:2; Exod 15:1–18; Num 16:20–33; 41–50)
Foundational aspects of government	Righteous, just, law of love basis of action (Rev 11:18; 15:3–4; 16:5–7; 19:1–4, 11; 22:14; cf. Ps 89:14)	Righteous, just, law of love basis of action (Exod 9:27; 20:1–17; Deut 4:7–8; 6:4–5; 10:12–15, 18–19; cf. Matt 22:36–40)

I Am a Sinner

Those whose significant encounters with and visions of God have been recorded in some detail displayed utmost respect for Him and His righteousness and expressed their unworthiness, inadequacy, or need of divine help as sinners.

When called as a prophet at the burning bush, Moses had long realized his sinful act of murder that caused him to flee Egypt (Exod 2:11–15; 3:2–3). Moses' final willingness to go back to Egypt and act as God's deliverer was on account of his total dedication to Him and his determination to be obedient to God's principles whatever the cost. Moses' instruction to the Israelite slaves was that God would reveal Himself as both Redeemer and Judge (Exod 6:6). This was to be their experience during the exodus, which was fastened in their memory by the institution of the Passover (Exod 12:1–28).

Isaiah's vision of the Lord raised the immediate, anguished response "Woe is me, for I am undone! Because I am a man of unclean lips, and dwell in the midst of a people of unclean lips; for my eyes have seen the King, the Lord of hosts" (Isa 6:5). After being assured that his iniquity had been removed (v. 6), Isaiah was ready to say: "Here am I! Send me" (v. 8). This response was similar to that of Peter when he was called with three others by Lake Gennesaret. They had witnessed Jesus teaching a great multitude and had reluctantly agreed to commence fishing again after a night of disappointment. Their surprise at a net-breaking catch led Peter to exclaim: "Depart from me, for I am a sinful man, O Lord!" (Luke 5:1–10).

The power displayed in the lives of the prophets and apostles rested upon the assurance that they were accepted by God. Hence, they could be effective ministers of salvation to others (e.g., Num 14:11–21; Jer 8:18–22; Rom 9:1–5).

I Realize My Identity and Value

Human identity and value is proclaimed by both creation and redemption. The creation account identifies humans as God's last and crowning work, for the parents of the race were made in God's image out of almost worthless material. The tasks given to Adam, and by implication to the race, indicates the oversight role of God's creation that they were designed to fulfil (Gen 1:26). It is clear that they had both value and responsibility.

The image given to humanity was soon marred by sin (Gen 3:10–13). Fortunately, a solution to this problem was provided by the Creator prior to the fall. In His redemptive role, He offers to remake and restore the broken image (Rom 12: 1–2). This offer indicates human value in a remarkable manner and places all individuals on an equal level (Acts 17:26).

How did the prophets and apostles respond to such understandings? Or more realistically, did they immediately realize their identity and their own value and that of all humans? A realization of the value God places on us and on others may take place some time to develop in its fullness.

If we take the experience of the disciples, who were selected as apostles (Luke 6:13), the group and James and John in particular expressed an early desire to be next to Christ in importance (they wished to sit at His left and right hand—Mark 9:33–34; 10:35–41) and this desire continued among the group until just before the crucifixion (Luke 22:24–26). They showed little faith at critical times (Mark 4:40; Matt. 16:8). The fact that all the apostles abandoned Him at His crucifixion (Matt. 26:56) reveals that they did not yet fully understand His mission and love for them. Peter, the disciple who abandoned and disavowed knowledge of being with Jesus in a spectacular manner at Jesus' trial was given the advice: "when thou art converted [returned to Me—NKJV], strengthen thy brethren" (Luke 22:32, KJV). This indicates that genuine conversion represents a significant step in identity seeking and its realization. Even after his conversion, Peter succumbed to social and partisan pressures (Gal 2:11). This means that rededication of the life is needed on a frequent basis. There was a continual need for the power and illumination of the Holy Spirit.

Similar development was shown in the life of Moses. When he was called, special moulding was needed for the job assigned. He was overwhelmed by God's assignment. God encouraged him in the form of miracles of creation (Exod 4:2–7). God's power over nature on many times thereafter must have impressed on him God's creatorship and ability to make something valuable out of nothing. The fourth commandment given at Sinai (Exod 20:8–11) highlighted the crowning act of creating humans in the image of God, which is reflected in the Sabbath rest. The very act of rescuing the Israelites from Egypt was subsequently memorialized in Moses' restatement of the fourth commandment (Deut 5:12–15). Hence, this commandment is seen to highlight God's salvation plan (Heb 4:2–4).

Responding to the Revelation

Arguably, apostles and prophets eventually gave a whole-hearted response to the impressions/visions/communications received. The occasional failures in their lives are noted for our instruction (e.g., Moses, Jonah, Peter). It has been observed already that the first response of some was a realization of their utter depravity and the need for divine help on a continuing basis. This experience, together with the realization that Christ risked all for the sinner, was the basis for the inspiration shown by apostles and prophets and equally must be the inspiration of every true believer.

The concept that the Prince of Peace, the Lord of heaven, would give up His security and suffer humiliation, cruel persecution and an excruciating death to rescue human beings caught in a hopeless situation would be overwhelmingly energizing if it happened in real life today. The mere fact that the event occurred two millennia ago should not diminish the sense of reality and our response—unquestioned devotion and obedience.

Ambassadors

Where do ordinary believer fit into the picture? In fulfilment of the gospel commission, all believers are urged to invite others to join Christ's kingdom (Matt 28:19–20). They are sent; they are to be ambassadors (trusted, loyal, knowledgeable representatives of God's kingdom—Helps Ministries, 2011), persuading others of the certainty and benefits of the Christian message (2 Cor 5:20). So, in this respect, ordinary believers have something in common with apostles and prophets—all are sent on missions of mercy. They are inspired to witness and work for the Lord.

Who is God. Recognizing God as Creator and Redeemer is the message of the Bible from its opening to its closing (Gen 1:1; 3:15; Rev 14:6–7; 22:17). Hence, this is the primary message given by all ambassadors.

The reality TV show "Undercover Boss" illustrates rather well how humans respond to different perceptions of authority and position. When the identity of the boss is hidden and they assume the status of a learner or new recruit, then the demeanour and communication style adopted by the trainer towards the individual is radically, sometimes embarrassingly, different to that assumed by the same individual towards the boss. The same pertains to our relationship with God. If our

concept is after the fashion: "Hello God, how has your day been?" Then the relationship will be entirely different to a responder who prays: "Our Father in heaven, hallowed be Your name. Your kingdom come. Your will be done on earth as *it is* in heaven. Give us this day our daily bread. And forgive us our debts, As we forgive our debtors. And do not lead us into temptation, but deliver us from the evil one. For Yours is the kingdom and the power and the glory forever. Amen" (Matt 6:9–13).

Failure to recognize the magnificence, power, creative, salvific, judicial attributes of God's person can lead to disastrous consequences. It is suggested that Balaam's dismal performance, Simon Magnus' scheming and unwarranted boldness, and Ananias and Sapphira's duplicity had their roots in a misunderstanding of God. The reaction of the Jewish nation towards Jesus at His first coming was flavoured by whom they thought He was (Matt. 12:24; 26:63). In order to have the dedication displayed by genuine prophets, all followers must have clear perceptions of who it is they worship.

I Am a Sinner. Jesus' words to Nicodemus assure all that they are sinners and need divine help. This realization is absolutely essential in one's spiritual journey (John 3:1–8). This was the apostle Peter's message to the multitude who gathered to hear him preach at Pentecost (Acts 2:36–39).

Being a sinner places us all on an equal footing with the prophets and apostles, we are all lost without divine encouragement and assistance.

I Realize My Identity and Value. Humans may seek to find identity in their achievements, position, prowess, wealth, dedication to a cause, or through other avenues. In the modern world, some even seek to discover who they are by speculating about their evolutionary origins. This exercise may not have a particularly elevating influence on either the individual or society (Bergman, 2017).

The stark reality is that God seeks sinners; the initiative comes from Him. *Agape* type love seeks the sinner. It does not, in fact, take notice of human values. God's love, expressed through salvation's rescue mission undertaken by Jesus, creates value—it declares the individual is so valuable that Jesus risked eternal oblivion in order to save humanity. Such love is not expressed in relation to anything good found in the individual (Nygren, 1982, pp. 75–80) or whether the person keeps the law or is zealous (Acts 21:20).

Losing sight of our Exemplar is a temptation. Jesus' instruction to the church at Ephesus (Rev 2:4) indicated that there would be an ever present danger of such a trend of losing our "first love" through history. The temptation is ever present to seek identity in position, group acceptance and acclaim, influence, possessions, etc. No wonder Ellen White advised that those wishing to be special instruments in God's hands seek to maintain their conversion daily (White, 1958, p. 157). Ambassadors, as well as prophets and apostles, were in danger of losing their "first love."

Responding to the Revelation. At some point in the life, impressions come to us urging on the conscience the need to change course and of the futility of human effort. The response given will determine the eternal destiny (Rom 2:14–16). The rich young ruler of Bible fame, rejected Jesus' invitation to experience a transformation in his life (Matt 19:21–22), as did Agrippa at Paul's urging (Acts 26:28). The response must be whole-hearted and continuous if the rewards promises are to be realized, as the parable of the ten virgins illustrates (Matt 25:1–13). Salvation rests secure in forming a relationship with Christ rather than participating in an event.

The reconciled experience with Christ results in a complete makeover—"Old things have passed away." The person is described as "a new creation" (2 Cor 5:17, NKJV). This is not business as usual. Individuals have been and continue to be transformed into fit representatives for Christ (Rom 12:1–2). This type of transformation is highlighted by the apostle John as characterizing the chosen, the remnant, throughout history (Rev 12:17; 14:12; 22:14–17). Such a transformation the angel to the church at Laodicea urges as the remedy for their lukewarm state (Rev 3:14–20). Inspiration of this type, which characterized the apostles and prophets, is not meant to be limited to them. It is promised to those who take the angel's advice to buy refined gold, white garments, and eye ointment (v. 18). The buying represents seeking for valuable items, which when found are offered as a gift (Isa 55:1). The seeing is the discernment of spiritual things facilitated by the gift of the Holy Spirit (John 16:8–11). The white robes represent the gift of Christ's righteousness (Gal 3:27; Rev 7:9–10), and the refined gold is none other than faith energized by love (Gal 5:6; James 2:5; White, 1890).

Ambassadors may make poor choices along the way and may lose their focus. They can be re-energized by returning to the Source of their salvation (Luke 22:31–32). When they have done this, they are in a position to call people enthusiastically to come out of confusion, to respond to the call “‘Come!’ And let him who hears say, ‘Come!’ And let him who thirsts come. And whoever desires, let him take of the water of life freely” (Rev 22:17). Here is highlighted the characteristic of God encompassed in the term *agape* (1 John 4:16). The strength and clarity of our perception of God’s love and our experience of receiving it will dictate the level of our dedication.

Great and Small Saved

Among the celebratory crowd on the sea of glass, all God’s servants “great and small” are included (Rev 19:5). They all have borne witness to Jesus in their lives and have made efforts to share the saving message with others (Rev 12:17).

This means that the prophets and those with lesser gifts (cf. 1 Cor 14:1) and those falling into other categories are all celebrating together there (Rev 19:6–7). They all have experienced and witnessed to Jesus saving grace and express their ecstatic joy at being in His presence. All the saved appear to be indistinguishable from each other, for a voice from heaven instructs all to “‘Praise our God, all you His servants and those who fear Him’” (vs. 6–7).

We notice carefully that the saved have conquered Satan “by the word of their testimony” (12:11), or hold “the faith of Jesus (14:12). Such designations arise from an experience of the salvation Jesus has purchased for them and us, as the apostle Paul affirms (2 Tim 1:12). He was not “ashamed of the testimony of our Lord” (v. 8). With the other faithful, he could say “For if we died with Him, we shall also live with Him. If we endure, we shall also reign with Him. If we deny Him, He also will deny us. If we are faithless, He remains faithful; He cannot deny Himself” (2 Tim 2:11–13).

Both the apostles and others (Acts 14:3; 18:26; 19:8) and all the prophets witnessed that “through His [Christ’s] name, whoever believes in Him will receive remission of sins” (Acts 10:43; Eph 3:2–6; cf. Rom 3:21). This affirmation made by the prophets was foundational to the additional special testimony given them to bear (Rev 1:2; 22:16).

In the period of history in which we dwell, we have the witness of the word of God and its fulfilment, evidence of God’s works of salvation, healing and creation (John 5:36, 39, 45–47; Rom 1:20; 2 Pet 1:19–21), and we have access to the gift of the Holy Spirit who will continually “testify of Me [Jesus]” (John 15:26; 16:14–15). Since all have access to the Spirit, our empowerment or testimony or witness is dependent on the closeness of our walk with God (Heb 11:5; cf. Gen 5:24). Indeed, we can, like the prophets give clear witness for Jesus by being faithful to His words (gospel—Acts 20:24), that came under the authoritative inspiration of the Holy Spirit. This is the clear understanding of those described as “those who keep the commandments of God and the faith of Jesus” (Rev 14:12; cf. 12:17; Luke 24:44–46).

Conclusions

A survey of the lives of the apostles and prophets against various cultural characteristics shows that there is broad similarity when selected elements are considered, such as presentation of the message carried, whether reform was urged, participation in a teaching/instruction role, the standards upheld for emulation, whether visions and prophecy were part of their experience and whether alienation or even martyrdom was experienced.

A more detailed analysis of the impressions and information given to the apostle John and to Moses the prophet indicates many close parallels. Dissimilarities relate to the specific nature of the assignment given. Prophets received more directed instructions than apostles. They were to address specific issues with designated groups of people. Apostles, on the other hand, were sent to groups with less targeted messages. Even though God’s method of communication with apostles and prophets could be the same, the apostles of the early church, for which biblical information exists, spoke of their personal experiences with Jesus while He was on earth.

Both groups possessed a clear view of who God was, their sinful state, their identity and value in God's sight, and their need to respond to these revelations/understandings. God's redemptive initiatives and their experience of salvation represents the fundamental reasons for their dedication. This type of inspiration is available to ambassadors in the church who have experienced the amazing transformation that occurs in people touched by the gospel. In certain parts of the world, these conversion experiences may be accompanied by miracles.

What is the answer to the question in the introduction? Is the empowerment seen with the apostles and prophets more generally available to ordinary followers of God and how would such empowerment be manifested?

The answer is, yes. We can respond as fervently in our sphere of influence and be as effective in the ministry God has given to us as the apostles and prophets were in theirs.

References

- [1] Bergman, J. (2017). Darwinism fosters moral decline. *Journal of Creation*, 31(2), 110–118.
- [2] Ferwerda, J. (2008, June 20). Do prophets still exist today? Retrieved from <https://www.crosswalk.com>
- [3] de Souza, E. B. (2020, January to March). *Daniel*. Adult Sabbath school Bible study guide. Silver Spring, MD: General Conference of Seventh-day Adventists.
- [4] Goldstein, C. (2013, July 8). Can we have modern day prophets? Retrieved from <https://www.adventist.org>
- [5] Helps Ministries, Inc. (2011). Helps Word-studies. 4243. Presbeuó. Retrieved from <https://biblehub.com/greek/4243.htm>
- [6] Houston, W. J. (2020). Social justice and the prophets. *Bible Odyssey*. Retrieved from <https://www.bibleodyssey.org/en/passages/related-articles/social-justice-and-the-prophets>
- [7] La Rondelle, H. K. (2003). The word of God and the testimony of Jesus. *Ministry Magazine*, 76(5), 13–16. Modern prophets and continuing revelation. *Newsroom Australia*. Retrieved from www.mormonnewsroom.org.au
- [8] Naden, R. (1999). Contemporary manifestations of the prophetic gift. *Ministry Magazine*, 72(6), 9–14.
- [9] Nygren, A. (1982). *Agape and Eros* (trans. P. S. Watson). Chicago: Chicago University Press.
- [10] O'Malley, J. (2004). *Four Cultures of the West*. Cambridge, MA: Harvard University Press.
- [11] Raboteau, A. J. (2016). *American prophets: Seven religious radicals and their struggle for social and political justice*. Princeton, NJ: Princeton University Press.
- [12] White, E. G. (1890). Repentance the gift of God. *Advent Review and Sabbath Herald*, 67(13), 193–194.
- [13] White, E. G. (1958). *The Faith I Live By*. Washington, DC: Review and Herald Publishing Association.
- [14] White, J. (1861). Conference address. *Advent Review and Sabbath Herald*, 18(20), 156–157.

Biblical Foundations of Online Worship: A Theological Analysis

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Abstract: Due of the global COVID-19 pandemic, the church is required to comply with many rules that restrict public gatherings. As a result, one answer to this dilemma is online worship. This study was created to answer the question of whether it is theologically permissible for the church to hold services online. It will also explore for Biblical foundations that can be used as a reference for online worship. This paper will also attempt to discuss the strengths and weaknesses of offline worship. Then, explain why internet worship is important during and after the Covid-19 pandemic. This paper was written using a library analysis with a descriptive technique as the research method. The conclusion is as time goes by, online worship which initially raises pros and cons must eventually be accepted, because there is a need that is very relevant. Technology is a gift given by God to humans, and God uses it for His work, and especially during the Covid-19 pandemic where technology has contributed tremendously to the development of online churches/worships.

Keywords: *online worship, spiritual growth, theology of worship*

Introduction and Literature Review

Online worship was one of the topics of conversation when the corona virus or better known as Covid-19 emerged. This is evident from the widespread usage of social media platforms such as YouTube and Facebook by churches for online worship. The Chinese authorities reported the first death caused by the corona virus on January 11, 2020. Since then, this virus has continued to spread to several countries around the world, eventually becoming a global pandemic that poses a threat to everyone (Kurlberg, 2020).

Since then, the news of the corona virus, also known as Covid-19, has shook the world. Eventually, the corona virus has become a common topic of discourse among many people, including Christians and church life. Nearly every day, print and internet media, report on the most recent events about covid-19, as do numerous television media outlets.

Various groups have called for that to tackle the spread of the corona virus, everyone should stay away from gatherings that involve large numbers of people. The church as a gathering place was even temporarily banned from being used as a place of worship because people are prohibited from gathering in one place or must avoid various forms of crowds. As a result, all worship activities in the church were cancelled. Some churches decided to hold services online, some even closed their congregations (Mhandu & Ojong, 2021).

Based on field research conducted by Alderson & Davie regarding online worship, it can be illustrated that online worship services do not have a very good impact, especially in terms of respect and fear or the sincerity of the congregation to God through worship. Worship carried out online, especially in terms of respect and fear or the sincerity of the congregation, is not the same as worshipping in church. Worship in the church does have elements of respect and fear or the sincerity of the congregation to God but in online worship this is not the case. This research is included in a limited scope because it only involves 25 respondents or responses (Alderson & Davie, 2021) thus it cannot describe broadly how this attitude is also experienced in other churches.

One of the literature studies that have discussed the issue of online worship was carried out by Moon. Moon's research is directed at exploring the basic theological concepts of online worship in the post-covid-19 pandemic. The results of his research stated that technology as a gift from God was given to humans to be used and God can use it in His work, including in online worship during the Covid-19 period. Worship online in the post-covid-19 pandemic does not conflict with God's word, the most important thing is the presence of God and the fellowship of believers (Moon, 2021). Even

though the theological foundations of online worship have been discussed, his research has not specifically discussed the weaknesses and strengths of online worship and offline worship.

This research in addition to outlining the basic biblical foundations for the implementation of online worship, also specifically describes what the advantages and disadvantages of online and offline worship are. So the writing of this article will specifically discuss whether the church can hold worship online and its relevance during the pandemic and post-covid-19 pandemic. There are those who agree, but there are also those who reject online worship, and some even think that online worship is not real worship, but a poison that enters the life of the church. Is there a biblical basis for reference for online worship organizers? Is there a biblical basis for rejecting it? What are the advantages and disadvantages of online worship? Is online worship still relevant when the COVID-19 pandemic is over? These various questions require a strong study so that they can become a reference for churches or Christians, as well as answers for those who doubt or oppose online worship services.

Methodology

The descriptive research method was utilized in this article. This study provides information in the form of notes and descriptive data from the text under consideration (Larsson et al., 2020). The descriptive technique is a means of assessing the facts of the current status of a group of people, an object, a condition, a system of ideas, or an event by accurately interpreting it (Gabor, 2010). While the analytical technique is employed in issue solving, the operational method involves analyzing, examining, and detailing all problems in each work activity, interpreting the problem, and delivering a conclusion. Journals on pertinent themes, and other key sources that can be accounted for were employed as data sources.

Findings

Theology of Worship

It is vital to explain the fundamentals of worship theology in general in order to give a solid foundation for replying to what is being questioned in online worship. If worship emerges from the human heart as a response to God's love, then theology occurs as a reflection of a logical examination or comprehension of one of theology's sources, namely the Bible. That is why theology and worship should not be separated, because in worshipping God, the heart and mind must be in sync so that the worship performed is truly good and right.

Worship has been practiced in the Old Testament since Adam and Eve. Cain and Abel, their sons, also worshiped God by giving offerings to Him (see Gen. 4:3-4). Prophets Noah and Abraham then worshiped by erecting numerous altars and offered sacrificial offerings (Gen. 20). Moses is regarded as a figure who set the groundwork for structured worship for the people and made God the ultimate purpose of worship. The people worshiped in the Tent of Meeting, and the ceremony was viewed as a solemn service on the part of the people to praise God (Henderikus Nayuf, 2021). With the building of the Tabernacle in the era of the prophets that followed, worship was directed towards one location. At this time, regulations governing sacrificial offerings were enacted, as were laws governing religious holidays (Ex. 23:14-17, Lev. 1:1-7, Deut. 12:1-32).

Furthermore, the center of worship began to be held in Jerusalem, namely in the Temple. During the exile, the Israelites who were taken into exile, both to Babylon and Assyria, built synagogues in place of the temple which had been destroyed. The development of this worship arose because of the people's awareness in understanding that worship was an important factor in Jewish national life. So, even though Jerusalem was destroyed, it actually led to the establishment of a synagogue, because the implementation of worship was felt as an important need (Dandelion & Grant, 2021). This was emphasized by Prabowo, that in worship the emphasis as a whole was not on the form of ceremonies and rites performed, but on how they had a personal relationship with God (Prabowo, 2021).

God informs people how to worship Him, not because they don't know how, but because they don't deserve it, which is why God gave them the law as God's way of providing people with means of purification, redemption, and other things. In this sense, God Himself provides a means of return for the people to re-join Him in fellowship (Cho, 2021). Worship in the Old Testament is thus a form of meeting between God and His people, with God taking the initiative.

Worship initially occurred in the temple, in addition to the synagogue, and then in the homes of believers as the New Testament period began (Acts 2:46-47). These domestic services, the bulk of which consist of praise (Eph. 5:19; Col. 3:16), prayer, Scripture reading, and explanation, are characterized by their modesty ("Ancient Christian Worship: Early Church Practices in Social, Historical, and Theological Perspective," 2015). Christian worship at the time of the New Testament was identical to synagogue worship ("Ancient Christian Worship: Early Church Practices in Social, Historical, and Theological Perspective," 2015). The central element of synagogue services is the reading of the Scriptures (Hunt, 2018). Nayuf argued that the worship performed in the synagogue was not oriented on an inherently successful sacrifice, but rather on how the human intellect was raised to God and His word, and how humans came to humble themselves before God in prayer and praise (Henderikus Nayuf, 2021). The author of Hebrews also adds that the congregation should not isolate themselves from worship gatherings (Hebrews 10:25). This indicates that congregational gatherings and worshipping together are essential for Christians.

Worship is a manifestation of God's love or service of God's love to the world, which includes people, and human responses to God's loving service. This is evident from the Old Testament and New Testament depictions of worship. The sovereign's willingness to offer Himself through the Holy Spirit to sinful, corrupt, and feeble humans is the greatest motivation for human adoration and gratitude to God. God has done and continues to do many things through the marriage of Christians. All of these are reasons to worship God.

Martin Luther believed that through worship, a loving God talks to humanity through His holy words, and then humans respond through prayer and praise (Barth, 2018). Furthermore, according to Schuller, worship refers to human religious practices where there is praise, the proclamation of the Word, the administration of the sacraments, and other services of worship (Schuller, 2010). In worship, therefore, Christians render service to God, which is evidence that they dedicate their entire life, including their hearts, minds, and everything that is in them, to God (Ge et al., 2021). In worship, the believer celebrates, lives, and encounters God's salvific act through Jesus Christ. So that God's work might be refreshed and reintroduced for the congregation to experience in their present-day concrete living conditions.

It is clear from these answers that worship involves a personal interaction between humans and God. This imparts the concept that worship should not be restricted by geography and time, and the relationship with God has ramifications for human concern for one another. However, the manner of performance will not alter the core of worship. The Holy Spirit influences the hearts and spirits of Christians, which is how everyone enjoys a personal encounter with God through His actual presence. The presence of God is not an atmosphere of ritualistic or ceremonial worship. When the spirit of a believer merges with the Spirit of God, God's magnificent presence occurs.

Faith and Use of Technology

When God created man in His image, it also means that there are attributes of God given to man, one of which is reason. Through reason, humans have the creative power and have the ability to develop science and technology, so that science and technology can be used to facilitate humans in achieving their goals, which in turn will prosper humans themselves. Advances in technology are still seen as important tools for the Church and for people, both personally and institutionally. For the Church, this technological media has always been seen as a tool for the proclamation of higher values, which advance the quality of human life and spiritual moral values that advance the dynamics of society as a whole. For the Church, the advancement of communication technology has always been seen as a gift from God, in line with the purpose of divine providence (Mcleister, 2019), that's why it

can be said that technology is a blessing from God for humans, so science and technology are not goals but only tools.

In the Bible there are several examples of how God encouraged humans to create technology, for example when God asked Moses to build a tabernacle (Ex. 25:9), where God was directly involved in planning and determining the materials and rooms of the tabernacle. Likewise, when God asked Solomon to build the temple and palace (1 Kings 7-8), God was directly involved in planning the construction and materials used to the dimensions of the ark (Gen. 6:14-15). From some of the Bible examples above, it can actually be seen that God encourages humans to develop technology and it can be concluded that God is the source of technology itself.

The Bible regards as permitted anything that does not violate God's laws. Paul explains in 1 Corinthians 6:12 that while everything is permissible for him, not everything is profitable. Thus, whatever that does not contradict God and is good to mankind may be utilized. God does not reject the use of technology, especially for His purposes. This does not imply, however, that God endorses the promiscuous use of technology. He encourages us to utilize technology for His glory and His good, rather than for the devastation of His creation and His people (Lizardo, 2020). God also opposes perverted technology in the Bible, as in the case of the creation of the Tower of Babel (Genesis 11:1–9), but it is not the construction itself that is incorrect, but rather their desire to seek a name in order to imitate God. The link between technology and science and the Christian religion has fluctuated throughout history and development. At the period of the prophets, secular science was rejected because it was deemed inappropriate for use inside Israelites culture (Jer. 8:8-9). During the church era, church leaders likewise eschewed secular knowledge, theology was regarded as a guide for Christian life, and science was viewed as a servant of religion (Ge et al., 2021). The struggle increased during the Renaissance and Rationalism as the church erroneously responded to the rise of science, and scientists challenged and even rejected the teachings of the Bible. This demonstrates the pros and cons of its everyday application. But despite the pros and cons of technology, it must be acknowledged as a gift from God to people since, as Paul stated in Colossians 1:16, everything in heaven and on earth was created by God; therefore, technology was also created by God. God and used for God's glory.

Use of Media Technology in Worship

The issue of online worship which is increasingly emerging during the Covid-19 pandemic has opened up a space for pros and cons, some have questioned why not worship in church; whether faith is defeated by the virus; whether the Holy Spirit is in worship via the internet (Village & Francis, 2020). Even though in general it was accepted, but the reason for acceptance was only because in difficult situations, permanent implementation still reaped the pros and cons. The contra claim that online worship cannot fulfill one of the elements of the church's vocation, namely *koinonia*, because even though the use of technology is very beneficial for church services, it still cannot meet the needs of the ministry as a whole. Regarding fellowship with God and fellowship with others, as well as the relationships that are built in them, nothing can be replaced, including live meetings through digital media technology (Village & Francis, 2020). Luchenko said that digital technology cannot replace all the direct physical relationships of fellowship and sacraments. Sacraments such as marriage, baptism, let alone worship. Relationships with God cannot be digitized (Luchenko, 2021).

Those who are pro, on the other hand, believe that intimate fellowship with others can also be carried out effectively through digital media technology; the limitations that occur are only because they are unfamiliar with the use of the technology; adaptation is required; and they must be willing to learn without stopping to master and familiarize themselves with technological usage. Alderson & Davie had a different viewpoint, stating that tele worship in one's own home should not become a trend or habit. According to him, God has prepared for personal and collective spiritual growth. Because it concerns our individual connection with God, it is personal. Each contributes to the growth of the other. That is, we develop within the context of Christ's body (1Cor. 12:12-31; Eph. 4:11-16) (Alderson & Davie, 2021). This contradicting opinion must be taken seriously by recognizing that the

communal aspect of the church must be regarded as a trait that transcends borders, the intersection of geography, culture, and time.

Consider how the first Christians lived in Jerusalem, and how they were encouraged to form a community of teaching, worship, and prayer with those who responded to the gospel (Acts 2:42). Also, when Paul proclaimed the gospel in unreachable regions, he moved swiftly to integrate new converts into a community with established leaders (cf. Acts 14:23; 16:40). When John was given a vision of heaven, he saw "the multitude that no one could number, from every nation, tribe, nation, and language, standing before the throne and before the Lamb" (Rev. 7:9). It is stated that the book of Revelation has no instances of loneliness.

Proponents of online worship assert that technology is capable of fostering community by ignoring culture, location, and time. The usage of technology has no negative impact on the community. Technology is capable of destroying barriers and connecting all believers in the network. Indeed, it can be demonstrated at this time that this online church or worship can encourage Christians to attend distant services and to interact and form relationships with other Christians from other locations. Another counterargument asserts that online worship can cause the congregation to become antisocial and indifferent to others because they do not gather in person. Proponents argue that ignorance is not generated by online worship, but that antisocial behavior has existed long before the development of technology. Antisocial behavior is significantly impacted by heredity, environment, and other non-technological variables (Luchenko, 2021). Although it must be acknowledged that the use of technology, particularly social media, can cause a person to become antisocial, it should not be the primary cause of antisocial behavior. The membership becomes antisocial.

Actually, if you consider the past few decades, there have been both advantages and cons, such as the advent of digital Bibles. Many churches opposed the use of electronic Bibles in worship in the past because they were thought inappropriate. However, digital Bibles are being increasingly accepted and utilized in a variety of worship settings over time. It must be recognized that worship continues to expand. Ndiy & Susanto stated that if worship is not reevaluated and altered here and there, we would be reading the Greek Bible and singing Hebrew psalms today (Ndiy & Susanto, 2019). Therefore, it is normal for humans to experience shock and waves of resistance if confronted with waves of change brought on by the technological revolution. However, there is a time of adaptation that you can eventually embrace.

Theological Responses to the Implementation of Online Worship

So it is undeniable that the re-meaning of worship that must meet physically is just waiting for time to change. The church also has to adapt to the situation wherever it is. The church will always be in transit, and always on the way. The church on this journey always needs to respond to the culture in the place and in the time it exists. That is why there is no standard or absolute church that can answer the needs of all ages, because the main task of ecclesiology is to "help the church respond to its context as best as possible by reflecting theologically and critically on its concrete identity" (Moon, 2021). Therefore when the world it serves changes, the church must be able to adapt its ministry to those changes, but the church must not change its main purpose (Village & Francis, 2020).

Research on this matter was once conducted by Kurlberg who emphasized the importance of actualizing the gift of ministry in the digital era, where it was stated that the church should not be apathetic, and must be ready to follow developments and changing times (Kurlberg, 2020). That is why, when the world is now changing towards digital native, the church must also be able to follow; but it must be remembered that the church must not and should not lose its focus. The same opinion from Moon reinforces that fellowship takes place online and creates community, for him "More and more the web is not seen only as a way for individuals to access...as in single religious seekers seeking the truth out there, but also as a way for many people to come together, to be together, in cyberspace" (Moon, 2021).

Indeed, until now, actually there has been no adequate reference as a theological basis for doing online worship permanently. If you observe in the early church, it is found that worship does not have to be in the Temple or Synagogue, which is due to various things, especially because of the persecution that occurred against Christians at that time, so that what developed was worship in the homes of the congregation. That is, fellowship together cannot be done in a house of worship. This can be used as a basis that in times of difficulty or disaster, worship may not be done together in the church building. However, because congregational meetings in worship are indispensable as a means for mutual growth, many Christians generally think that private Sabbath worship (home worship) is actually not recommended to be carried out continuously.

Ephesians 4:4-6, 16, which explains that the church is essentially one unified Body of Christ, united in God's steadfast love and Holy companion. From this text it is clearly stated that the church is not a building but a congregation united by God, the church is the body of Christ, the church is more than just a building. Further this statement can also be seen in 1 Corinthians 1:2 where Paul refers to the believers in Corinth as the church. This gives understanding, where there are God's people gathered, there is a church. Because what is actually called the universal church is all the congregations, who call on the name of Jesus and confess that Christ is the Great Shepherd. In this case, it should be noted that what is important is not the physical church, but the presence of God, because where believers call on God's name, God is present there (Matt. 18:20). That is why, in Acts 2:42-47 we can find the place of worship of the early church not always in the temple of God, sometimes also in the Jewish synagogue or in the houses of the church.

Therefore, if the more important thing in worship is the presence of God, then this can be used as a basis that worship does not always have to be in the building by gathering together, but can also be carried out online. To answer the objections of those who argue that online worship is causing the disappearance of *koinonia*, because *koinonia* is a "physical" meeting between God's people, it is necessary to realize that Christian fellowship should not be limited by location and physical encounters. Notice Paul's writings where location does not prevent him from being spiritually present and gathered in spirit, when Paul invites the Corinthians to unite with him in spirit and make a common decision about a case in the church (1 Cor 5:3-5).). In a similar way, online worship can accommodate the fellowship. If there is unity among God's people, even if it is done online, it is actually a fellowship. Especially when technology is able to answer and overcome physical presence barriers.

Note also that the expression "community" has changed over the centuries. In the early 20th century, communities were noted by relationships within small towns and villages, neighbors getting to know each other and spending time talking to each other. As time goes on and cultures change, people become more introverted and less connected to their neighbors. Bigger cities draw people out of smaller communities. There is much to be learned from research into the sociological evolution of communities in relation to the ways in which communities are built by churches (Cho, 2021). Actually it's only a matter of time. The concept of physical space that is so exalted today will gradually change to a digital concept in cyberspace. All of that is a necessity, no one is able to withstand the waves of change that continue to occur, it is certain that a revolution in the church will occur along with the times.

And if the history of the church's journey is reviewed, especially the Protestant tradition, changes in the format and style of worship are commonplace, this can happen because of the development of civilization/situation of human life (Bhandari et al., 2020), and can also be caused by a changed understanding of church theology. That's why it's not unusual for changes in worship that were previously conventional that glorified physical gatherings to turn into digital/online. In the end, with technology that continues to develop, the great commission of the Lord Jesus Christ in Matthew 28:19-20 is getting faster because it is able to penetrate space and time faster than before (Alderson & Davie, 2021). And in the implementation of worship, people who previously had difficulty worshipping in the certain areas can finally join online with other congregations in different places.

Of course, even if the online church is finally accepted, there are things that need to be considered. Kurlberg, based on a SWOT analysis, said that there are at least seven dangers of a digital

church, namely: disconnected, disengaged, distracted, disruptive, disbelieved, distressed, and disloyal (Kurlberg, 2020). Disconnected where according to him there is no long-term relationship between the people, because it does not require a location as a result there is no strong root because there is no relationship or meeting. In addition, it also results in the absence of an emotional connection or a close relationship with the church. What is meant by disengaged (no involvement) is the absence of deep involvement from church members, and the absence of a sense of belonging and ultimately creating consumer Christians. Distracted means that the congregation loses focus because of the many choices or information, because gadgets are not only used for worship, while from the church side, the church loses focus on pleasing God so that the congregation is only given 'candy'. Disruptive means that chaos can occur. The disbelieve in question is that the church is increasingly attached to technology, and it can result in faith based on technological capabilities and affecting the position of information technology in the life of the congregation, meaning that information technology dominates over God. Distressed (negative stress) means, the intended danger is the high cost for the use of information technology, lack of expertise in the field of information technology, limited tools and facing judgment. Then the last danger is disloyalty, where there is a phenomenon of moving churches as you wish which ultimately focus on being yourself. Agree with what Luchenko said, it is undeniable, online worship has various negative sides. Online worship sometimes makes the people who follow it end up only being passive spectators, and worship can be just a concert, not to mention the congregation can switch worship channels so easily if they feel that the worship that is followed is not according to their wishes. That is, the congregation turns into connoisseurs in attending worship, no longer with the aim of worshipping and pleasing God, which in the end causes the servants to compete with each other to be able to perform worship and deliver sermons to please the congregation, so that the congregation can survive with its online worship (Luchenko, 2021).

Limitations and Implications

As previously explained, the Bible is not against online worship. This is because worship that is carried out with the aim of worshipping God, actually cannot be limited by space and time. The church must be able to contextualize with the times, while still paying attention to the main essence of the church as the body of Christ. The pattern of worship carried out by the church during the Covid-19 period can be used as a reference for carrying out online worship, even if not because of the pandemic. The era has changed from analog/conventional to digital, so like it or not, the church must renew its thinking patterns, especially in viewing and managing conventional worship into online worship.

In addition to responding to the changes and challenges of an all-digital era, it is also necessary to think about and determine what the goals of the church or online worship are. For example, what are the goals of worship, evangelism, discipleship, fellowship and online ministry? Apart from being in conflict with the administration of the sacraments of Baptism and Holy Communion, the church needs to equip and renew the church system so that it is able to accommodate all the changes that are taking place. People also need to be made aware that legitimate worship does not always have to be in a church building or physical gathering, but also online can be accepted as legitimate worship. Finally, no church is 100% effective in every ministry, there is still room for further development and improvement. Likewise, the implementation of church services in online worship, must continue to advance and improve its effectiveness. Continuous evaluation needs to be done to correct deficiencies and the development and development of God's people can continue well.

Conclusion

As time goes by, online worship which initially raises pros and cons must eventually be accepted, because there is a need that is very relevant. Change is a necessity, so the church must prepare itself to respond to change, if it does not want to be left behind by future generations. Technology is a gift given by God to humans, and God uses it for His work, and especially during the Covid-19 pandemic where technology has contributed tremendously to the development of online churches/worships. The pattern of worship carried out online after the Covid-19 pandemic does not

conflict with God's word, because the most important thing in worship is the presence of God and the fellowship of believers. The essence of worship itself is a personal relationship between humans and God which has implications for human love for each other. Therefore, as long as the worship carried out fulfills these elements, whatever method is used (including online) does not reduce the essence or value of worship. Especially if by technology, physical meeting worship encounters obstacles and limitations can be overcome, then there is no reason to refuse the implementation of online worship/church.

References

- [1] Alderson, H., & Davie, G. (2021). Online worship: a learning experience. *Theology*, 124(1). <https://doi.org/10.1177/0040571X20985697>
- [2] Ancient Christian worship: early church practices in social, historical, and theological perspective. (2015). *Choice Reviews Online*, 52(07). <https://doi.org/10.5860/choice.187961>
- [3] Barth, H.-M. (2018). The Theology of Martin Luther. In *The Theology of Martin Luther*. <https://doi.org/10.2307/j.ctt22nm8rj>
- [4] Bhandari, S., Shaktawat, A. S., Patel, B., Dube, A., Kakkar, S., Tak, A., Gupta, J., & Rankawat, G. (2020). The sequel to COVID-19: the antithesis to life. *Journal of Ideas in Health*. <https://doi.org/10.47108/jidhealth.vol3.isspecial1.69>
- [5] Cho, A. (2021). For the church community after COVID-19. *Dialog*, 60(1). <https://doi.org/10.1111/dial.12642>
- [6] Dandelion, P., & Grant, R. (2021). "When two or three are gathered" in a Zoom Room: The Theology of Online Unprogrammed Quaker Worship. *Quaker Studies*, 26(2). <https://doi.org/10.3828/QUAKER.2021.26.2.7>
- [7] Gabor, M. R. (2010). DESCRIPTIVE METHODS OF DATA ANALYSIS FOR MARKETING DATA-THEORETICAL AND PRACTICAL CONSIDERATIONS. In *Management & Marketing Challenges for Knowledge Society* (Vol. 5, Issue 3).
- [8] Ge, Y., Sainz, M., Gore, J., & Epps, F. (2021). "Everything is Either Sent by God or Used by God": An Exploratory Study on the Impact of COVID-19 Upon the Religious Lives of Black Families Living with Dementia. *Journal of Religion and Health*, 60(5). <https://doi.org/10.1007/s10943-021-01332-4>
- [9] Henderikus Nayuf. (2021). Ibadah Online sebagai Gaya Hidup: Sebuah Kajian Teologi Moral Terhadap Konsumerisme di Tengah Pandemi Covid-19. *SOPHIA: Jurnal Teologi Dan Pendidikan Kristen*, 2(1).
- [10] Hunt, H. (2018). Religion and the Body. In *A Companion to Religion in Late Antiquity*. <https://doi.org/10.1002/9781118968130.ch22>
- [11] Kurlberg, J. (2020). *Reflecting Theologically on Online Worship Services*. Medium.
- [12] Larsson, J., Westram, A. M., Bengmark, S., Lundh, T., & Butlin, R. K. (2020). A developmentally descriptive method for quantifying shape in gastropod shells. *Journal of the Royal Society Interface*, 17(163). <https://doi.org/10.1098/rsif.2019.0721>
- [13] Lizardo, J. (2020). Penerapan gereja Rumah sebagai Cikal Bakal Virtual. *Jurnal Teologi Rahmat*, 6(2).
- [14] Luchenko, X. (2021). The digitalization of worship practices during the coronavirus pandemic in the context of the mediatization of orthodoxy. In *Gosudarstvo, Religii, Tserkov' v Rossii i za Rubezhom/State, Religion and Church in Russia and Worldwide* (Vol. 39, Issue 1). <https://doi.org/10.22394/2073-7203-2021-39-1-39-57>
- [15] Mcleister, M. (2019). Worship, technology and identity: A deaf protestant congregation in urban China. *Studies in World Christianity*, 25(2). <https://doi.org/10.3366/swc.2019.0258>
- [16] Mhandu, J., & Ojong, V. (2021). Covid-19 and the South African Pentecostal Landscape: Historic Shift from Offline Liturgical Practice to Online Platforms. *Journal for the Study of Religion*, 34(2). <https://doi.org/10.17159/2413-3027/2021/v34n2a5>
- [17] Moon, H. (2021). Worship for people with cognitive challenges in the pandemic era: A

- korean presbyterian perspective. *Religions*, 12(8). <https://doi.org/10.3390/rel12080587>
- [18] Ndiy, F. P., & Susanto, S. (2019). Prinsip Pertumbuhan Gereja Mula-Mula Ditinjau Dari Kisah Para Rasul 2:1-47 Dan Aplikasinya Bagi Gereja Masa Kini. *Integritas: Jurnal Teologi*. <https://doi.org/10.47628/ijt.v1i2.13>
- [19] Prabowo, W. (2021). DASAR ALKITABIAH MENERIMA IBADAH ONLINE MENURUT FILIPI 3:3. *Jurnal Teologi Dan Pengembangan Pelayanan Shiftkey*, 11(2).
- [20] Schuller, E. M. (2010). Jewish and Christian Liturgy and Worship: New Insights into its History and Interaction. *Journal of Jewish Studies*, 61(2). <https://doi.org/10.18647/2994/jjs-2010>
- [21] Village, A., & Francis, L. J. (2020). Faith in Lockdown: Experiences of Rural Church of England Clergy and Laity during the Covid-19 Pandemic. *Rural Theology*, 18(2). <https://doi.org/10.1080/14704994.2020.1818385>

Mission Strategies in Reaching Folk Islam Among the Sundanese, Indonesia

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Abstract: Sundanese Folk Muslim is the second largest unreached people group in Indonesia. They are located mainly in West Java and the Banten provincial region. One dissertation and one DMin project has been written regarding evangelism to Sundanese Ethnic Group; however, none of the strategies addressed the need of these people as Folk Muslim. Therefore, there is a need to design a mission strategy that will fit perfectly with their religious identity as Folk Muslim. The methodology implemented is library research focusing on the cultural and religious beliefs of Sundanese Folk Muslim. Based on the research, the researchers proposed a three-pronged strategy which is; (1) the necessity of a long-term strategic plan in reaching the respective people group; (2) the need to develop a long-term livelihood and transformational development; and (3) the need to shift the focus on eschatology and salvation to the message of Shalom and its implication in daily life.

Keywords: *Muslim evangelism, contextualization, culture*

Introduction and Literature Review

Joshua Project recorded that there are 36,705,000 Sundanese in which 93.9% are Muslims, 0.10% are Christians, and 0.09% are evangelicals (Joshua Project). This is the reason Sundanese is identified as "the largest unreached people group" in Indonesia. According to Indonesian National Research Network, there is already a Sundanese Bible, Jesus film, hand radio evangelism available for the people (Indonesian Peoples Profiles: Unreached People Groups, 2003, pp. 74-75). Nevertheless, Christian evangelism remains stagnant throughout the years due to the peoples unflinching faith on Islam.

Justification of the Study

The Adventist work itself struggles to find stability in evangelizing the Sundanese. The former President of West Java Conference, Pastor Rudi Situmorang stated that according to church membership record, around 1000 Sundanese Muslims have been baptized, yet tragically only 50 remains active in their respective churches (Situmorang, 2015). In probability, there are three aspects that might contribute to the low conversion rate. Firstly, the presence of Islamic paramilitary organizations such as Islam Defender Front, who antagonizes, blocks, and intimidates any "Christianizing" attempt in Islamic territory. Secondly, there is no solid discipleship program for Sundanese, who have been baptized. And lastly, the Adventist message did not fit correctly into the worldview of Sundanese culture and tradition.

The tension between Islam and Adventist intensified in 2009 during a conflict in Garut. An Adventist pastor was forced to set an agreement where the Adventist church, as an organization, would never attempt to Christianize Muslims in the region (Gereja Advent Berjanji Tidak Ganggu Muslim Garut, 24). The fear of Christianization leads the people in forming an organized resistance toward the Christian message and as a result, the Sundanese people remain highly resistant to the gospel itself.

Purpose of the Study

Until present times, one Doctoral dissertation (Sipayung, 2009) and DMin project (Tjakrapawira, 2000) have been written concerning mission strategy to reach the Sundanese.

However, both researchers did not provide a strong light on Sundanese identity and beliefs as folk Muslim. This creates a literary gap that needs to be addressed. Therefore, this research aims to design a mission strategy that will fit perfectly with their religious identity as Folk Muslim.

Historical and Religious Background of Sundanese

Historically, the term "Sunda" appeared at the 9th AD inscribed on a stone tablet that is found in Bogor, West Java. It was recorded that in the year of 854 A.D. existed a Sundanese kingdom called as "Prahajian Sunda." Furthermore, various stone tablets, inscriptions, and ancient historical writings affirm the supremacy of the Sundanese Kingdom that covered a portion of high land in Jawa (Ekadjati, 1995, pp. 1-6). In contrast with the Javanese who are known as low land people, the Sundanese are often identified as high land people who live in a mountainous area. The first westerner who recorded the presence of a Sundanese Kingdom was a Portuguese named Tome Pires. Pires wrote that the territory of this kingdom lies from Cimanuk to Banten. He also distinguished the Sundanese from the Javanese-based on the geographical, linguistical, and religious aspect of both peoples. All the historical records above validated the existence of a Sundanese people with their distinctive unique identity and cultural values. Although the kingdom collapsed in the year of 1579, their social tradition, values, and culture continue to exist until today albeit much has been eroded along with the passing of time (Ekadjati, 1995, pp. 1-8). Today, most of the Sundanese resides within the province of West Java, Banten, and the outskirts of Jakarta and Central Java.

Traditionally, the religion of Sundanese people is animistic in nature and only later did they adopt the Hindu and Buddhism beliefs. However, through contact with Muslim traders in the 16th century, Islam became the dominant religion among the people even until today. Nevertheless, animistic beliefs have survived and become an integral part of the community and Islam itself (Sundanese, 2002). This hybrid of beliefs between Islam and animistic teachings are also known as Folk Islam. To understand it better, further exploration is needed.

Folk Islam could be defined as the syncretistic belief between the Islamic teaching and local cultures and traditions. It was also called "high" and "low" Islam. Ridgeon identified both with the following characteristics:

"The former is the Islam of the urban scholars, middle classes, and tradesmen, who all prefer an orderly sober Islam where religious study is promoted, and God is transcendent. The latter is the Islam of the urban poor, country people and tribes, where an ecstatic, mystical form of Islam predominates and God is imminent or reached through an intermediary, such as Sufy shaykh." (Ridgeon, 2003, p. 281)

Ridgeon offers an accurate observation of spiritual differences between the formal and folk religion. However, there is a mistake in establishing the boundaries between folk and formal Islam according to economical and geographical location, because there is only a thin and invisible thread that separates both. The difficulties in creating a clear-cut line between folk and formal religions are due to a possibility that since the origin of Islam, Muhammad himself never completely removed the ties with the surrounding animistic beliefs. Even until today, Muslim leaders find it challenging to condemn the practice of folk Islam because some of these beliefs are supported by ambiguous Qur'an verses and pre-Islamic tradition (Caleb, Kim, & Travis, 2009; Pharshall, 1983, 26).

Despite the thin line between both dynamics, Rick Love (Muslims, Magic, and the Kingdom of God, 2000, p. 22) provides a table to identify the unique teaching of both formal and folk Islam.

Formal Islam	Folk Islam
Cognitive, Truth-Oriented	Heart-felt, Emotional
Legalistic	Mystical
Ultimate Issues of Life: Origins, Heaven, Hell, Purpose	Everyday Concerns: Health, Guidance, Success, Prosperity
The Qur'an	Supernatural Power
Sacred Traditions	Spiritual Revelation
Institutional	Inspirational
Supplicative	Manipulative

Love offers a distinct characteristic of both dynamics and he also warned that a follower of folk religion is often unaware of their erroneous practices and beliefs. Thereby, it is possible for a person from a formal Muslim background and lives in urban areas to unconsciously practice folk Islam (Love, 2000, p. 4). The difference between folk and formal Islam could not be defined by the syncretistic practice which are being incorporated into the religion alone. It is best to understand both beliefs (Folk and Formal Islam) as “terms that describe dynamic religious aspect of Islam observed in any Muslim society” (Caleb, Kim, & Travis, 2009). Folk Islam addresses the need of a Muslim in two aspects in life: it provides a solution to the troubles and questions they face daily, and it provides security from the power of evil ones and jinn alike. In general, folk Islam gives them the meaning and answers to the questions that cannot be answered or neglected by formal religion.

Surprisingly, Phil Pharshall estimates that around 70% Muslims in the world are affected by the teachings and practices of folk Islam (Pharshall, 1983, p. 16). The large numbers of folk Islam believers convinced Rick Love to identify them as “the most pressing issues in Muslim Evangelism (Love, 2000, p. 22). The large numbers of folk Muslims can also be found in Indonesia as well. It is important to remember that although most Islam in Indonesia still observes the five pillars of Islam in their life, but the syncretistic blend between Islam and animistic beliefs can be discovered throughout the contingent and it change its shape in different regions to adapt to its surrounding cultural background (Indonesian Peoples Profiles: Unreached People Groups, 2003). This is what made the situation in Indonesia so challenging, because it forces the missionaries to rethink and reformat their strategies in approaching Muslims in different Islamic territories.

Furthermore, what gave birth to the popular folk Islam among the Sundanese was mysticism rooted deep down in the heart of the pre-Islamic religion of the people. It was by utilizing this element that the Sufis teaching flourished among the people and gradually all Sundanese people became Muslims (Kruithof, 2015). Nevertheless, the animistic beliefs have become a part of their worldview and gave birth to a syncretistic Islamic teaching called as “Traditional Muslim” that sealed the culture and identity of a Sundanese person with their Muslim beliefs (Surjadi, 2006). Therefore, it is not sufficient to design an evangelistic plan which will fit into a Muslim context. The only way to address folk Islam is to focus both on its animistic and Muslim aspects instantaneously and there is no easy way to accomplish this task.

Ironically, folk Islam has rarely been addressed as part of crucial aspects in Muslim evangelism in Indonesia. For example, in his dissertation, Sipayung seems to neglect the animistic beliefs of Sundanese people and did not explain how these beliefs affect their worldview (Sipayung, 2009). Even AMR Seminar and training in Indonesia, often focus on the cognitive aspect of bible study instead of a heartfelt approach that is required by Folk Muslim. This clearly indicates that there is a common

assumption among Indonesian Adventists which underestimates the influence of folk Islam among the Sundanese and even the entire Islamic community. However, to analyze the influence of folk Islam among Sundanese, it is necessary to understand their culture and worldview. By understanding their worldview and culture, one could trace and identify the influence of folk religion in their Muslim beliefs.

Rites and Tradition

Due to the limitation of this paper, it is impossible to discuss in detail each rite and tradition in Sundanese culture. However, Surjadi (Surjadi, 2006, pp. 175-192) divided most significant Sundanese rites and traditions into three major life cycle:

1. *Pre-birth traditional ceremonies*

a. Hajat

The objective of this ceremony is when the "paraji" (traditional midwife) officially announces the status of women's pregnancy and therefore, the husband should not have an excessive sexual relationship with the wife. This ceremony is rarely exercise in the modern times.

b. Tingkeban

This ceremony celebrates the seventh month pregnancy and to forbid further sexual relationship between husband and woman. During this traditional rite, the pregnant woman will be washed with a water which has been mixed with seven different flowers.

c. Hajat bubur lolos

This is held on the eighth or ninth month of pregnancy. The objective is to remove all worries and fear from the pregnant woman. The previous ceremony and this ceremony will be led by "paraji" (Traditional midwife).

2. *Lifetime traditional ceremonies*

a. Kelahiran (Birth)

During the childbirth, paraji will use different spells to ease the process of giving birth. She will be responsible for different kinds of rites such as the burial of the abby umbilical cord and to set amulets around the house as a measure against evil spirit. After few days, paraji will conduct "ngahuripan" ceremony where she will tie a white thread around the baby and the mother to connect their life to two hens that have been prepared beforehand. As a result, if the mother and the baby are sick, the disease could be transferred to the hens instead.

b. Mahinum or Tasyakkur (40 days)

When the baby reaches 40 days old, the community will hold Mahinum ceremony where they will cut a portion of the baby's hair accompanied with the reading of Barzani book that told the story of Muhammad the prophet. The hair which has been cut will be weighed upon and the family should prepare money as much as the weight of the hair. This money will be donated to the poor.

c. Khitanan (Circumcision), Bancakan (Birthday), Pertunangan (Bethrotal)

Since this ceremonial practice is not exclusively unique, Surjadi did not discuss extensively regarding these three.

d. Perkawinan (Wedding)

The wedding ceremony of Sundanese is quite extensive and unique. The wedding ceremony is always preceded with "neundeun omong" in which both parents discuss the prospects of the wedding. There are three things which will be considered, babat (social status), bibit (family history), bobot (personality and income of the male). If both parents disagree, then the wedding is canceled; but if both agree then the wedding will proceed. The wedding is full of traditional ceremonies such as: ngeuyeuk seureuh; nyawer, nincak endog; huap lingkung; and buka pintu. The purpose of all these ceremonies is threefold, the first is to share the happiness of both the bridegroom and their family,

secondly, to advise and instruct the young couple that they might achieve a happy marriage. And finally, to build a strong bond between community and the newly married.

3. Traditional Funeral Ceremony

When a person dies, the whole community will participate in preparing the burial. Women will work in the kitchen while men will prepare the place, cleaning the mosque and digging a grave. Before they bury the body, the local religious leader will read the Talqin or instructions so that the dead person will know what to say when the angels visit them in their graves. In the evening, the community will gather once again to conduct "tahlilan" where they will recite prayer and praise to Allah so the spirit of the dead person will be accepted into paradise. However, the funeral ceremony does not end here. There will be celebrations on the third day, seventh day, fortieth day, hundredth day, and thousandth day. All these ceremonies are financially demanding and people often go into debt just to hold this ceremony¹

Philosophy and Way of Life

As what has been enumerated above, the Sundanese communities are being connected by a series of rites and traditions. These rites and traditions called "adat" which could be understood either as "common sense" or "character" (Surjadi, 2006). Adat is composed of a set of principles, values, norms, and rites that define and give meaning to the life of a Sundanese. To go against adat is neither safe nor respected. Sundanese culture encourages the people to live in peace with one another. In fact, they were known as peaceful and soft-spoken. At a glimpse, one might be tempted to interpret Sundanese adat as rooted on Islamic principles. However, it is obvious that the worldview of the people are the mixture of Islam and animism.

In general, the life of a Sundanese is revolved to keep the balance in universe and there are two elements which are central to their life, supernatural and social elements. The Supernatural realm is filled with unseen beings such as Jinn, ghosts, spirits, and demons. Aside of ancestors' spirits, Sundanese believe in the existence of wandering spirits. There are two kinds of wandering spirits, the good one and the bad one. The good wandering spirits comes from those people who lived a holy life, while the bad spirits are those whose spirits are rejected by God due to their sins (Anwar, 2012)² These two spirits play a pivotal role in Sundanese life since they have the power to bless or disturb the lives of ordinary people (Anwar, 2012).

1 H.A. Surjadi, Masyarakat Sunda: Budaya dan Problema, 175-192.

2 Etty N. Anwar, "Peran Candoli Dalam Perhelatan (Suatu Fenomena Keyakinan Orang Sunda), accessed, May 2, 2016, https://icssis.files.wordpress.com/2012/05/2729072009_39.pdf

In his writing, Surjadi did not elaborate much on the animistic aspect of Sundanese culture, nevertheless, Mustapa (Adat Istiadat Sunda, 2010) gave a detailed account on the supernatural aspect of Sundanese adat. He argues that most rites and tradition in Sundanese culture is used to repel and appease the evil spirits in their life. He wrote with clarity that it is common for a Sundanese to consult with dukun (shaman), and to use amulets (Mustapa, 2010, pp. 151-164). Dukun have the power to communicate with the spirits and summon them according to the need. Old sayings in Sundanese tradition says, *lir jampe dening pamake*, which means that it is okay to use spells from dukun (shaman) if the intention is good. Dixon also noted that "From the cradle to the grave few important decisions are made without recourse to the dukun. Most people carry charms on their bodies and keep them in propitious places on their property." Furthermore, the Sundanese often seek success by visiting tomb of the ancestors, and holy people to appease their spirits and receive their blessings. During their visits to the tomb, they bring offerings that is favored by the deceased person. This ritual is done usually prior to the month of Ramadhan, pilgrimage to Mecca, or in preparation for any significant life events such as marriage or entering a new house. The timing of this ritual confirms the integration of non-Islamic teachings within Sundanese values and their belief system. The name of this practice is *ngarowahkeun*. (Dixon, 1999).

Just as adat holds the balance over supernatural power, so does *gotongroyong* and kinship system that serves as a glue which connects the social life within the community. Sipayung analyze that "the Sundanese place great value on showing people respect by following an unwritten code of behavior" (Sipayung, 2009). And one of the strongest codes is *gotongroyong* which is akin with the concept of *bayanihan* in Philippine culture. Through *gotongroyong* and kinship system, the Sundanese find their values and social standing among the people. And if one takes a closer observation on traditional rites and ceremonies which have been described above, it is obvious that Sundanese values community above everything else. This cultural identity has been tied to Islamic religion and therefore, when one becomes a Christian, he/she will be ousted from the village and receive no social standing among the people. In fact, persecution is imminent to those who convert to Christianity.

In contrast with the Batakese people, Sundanese is not a generally ambitious and daring people. They prefer a life of tranquility and peace. In fact, only a handful of them immigrated to other provinces in Indonesia. Sundanese views of success is represented paradoxically by the folk stories of *Kabayan* (an Indonesian version of *nasruddin*). One of the philosophies of the *Kabayan* and Sundanese worldview is *geus teu nanaon ku nanaon*, which means nothing can affect me. Whether the situation is bad or good, Sundanese will try their best to have a brighter view of life. Instead of lamenting over their loss, they will do their best to enjoy the present (Dzulkarnaen, 2015). Nevertheless, they were not known for being hardworking and often try to seek shortcuts toward prosperity. Prostitution is one of the worst epidemics among Sundanese people. Since they are pragmatic, morals are not necessarily high. It is common for a child to grow up in a broken family and not know their dad/mom (Nadeak, 2017). Furthermore, it is a public secret that some Sundanese are willing to be baptized and change their religion if it is beneficial for them (Nadeak, 2017).

In summary, the influence of animistic beliefs strongly resides behind the Muslim religion of the Sundanese people. One of the primary objectives of the people is to keep a balance in life. Adat or traditional beliefs and ceremonies is useful to maintain the equilibrium with the supernatural world, while *gotong royong* and kinship ties are useful to keep the balance of social life.

Findings of the Study

To deal with the Folk Muslim among Sundanese, the researchers proposed three pronged studies. First is, developing long term mission strategy; second, evangelism centered on the relationship between Church and Sundanese society; and the change of evangelistic message.

Developing Long Term Mission Strategy

Throughout its encounter with Sundanese Muslims, the Adventist Church has tried to conduct a long-term mission strategy consisting of a five-year evangelical program. But such an approach is not feasible in reaching the folk Muslim group. There is a need for a longer term of mission strategy. Sundanese and folk Islam has become a unified identity that the only avenue to reach them is through a slow process of penetration that aims not only ten years ahead but even twenty to twenty-five years in the future. The target should include not one generation, but children and young people in the community. Instead of trying to aim for conversion, the evangelistic process should be gradual and cautious.

Evangelism Centered on the Relationship of the Church and Sundanese Community

As what had been discussed in the previous chapter, folk Islam demands absolute loyalty from its believers and hold strong influence in dictating the life of the followers. Ustadz, imam, and shamans (or Orang Pintar) are the key people in the society, and they have the power to control the people. To reach the Sundanese, the Adventist church must attempt all efforts to gain the goodwill of the people without attracting much attention. The reason of this is because a high number of conversion will provoke outburst from the community such as what took place in Garut, West Java. To minimize any suspicion from the hostile Muslim fanatics and to gain more influence on the Sundanese society, the following programs can be conducted:

1. Mission Educational Training

One of the factors which hinder evangelism effort to Sundanese is the lack of a proper training for church elders and young leaders especially in the area of mission and folk Islam. All this time, the work of mission is wholly dependent on the pastors and although many souls are baptized but due to their limited tenure, they did not have sufficient time to gain significant influence on the community. If a proper training is given to church elders and young leaders in West Java Conference, each church will be able to function as a center of influence according to the needs of the respective communities around them and by utilizing the newfound knowledge they gained from the training, they will surely be a force that can be reckoned with.

There will be three primary objectives of the training program, first is to develop a mission paradigm in the minds of the participants. Second, to increase their analytical and practical knowledge concerning Sundanese culture and worldview; and lastly, to prepare them in encountering folk Islam especially in the areas of power encounter. All of these three objectives are formulated not as a short-term solution to reach Sundanese, but rather the beginning of a long-term program that aims the whole people group instead of individuals. At the end of the training, each participant is expected to understand the basic concepts of mission work among the Sundanese Community and capable to conduct ministries to be significant among the people.

The training will take two months and will be conducted either at the conference office or at the Adventist University of Indonesia in Parompong. It will be held every Sabbath afternoon from 2 PM-5PM. Each church will send two representatives to attend the training and they must either be a church elder (preferably in their 40-45s), and prospective young people. Due to the large numbers of attendance, the training will be divided into five batches and each batch will compose of twenty people. If a church is too far from the training center, online learning will be utilized. The timespan of two months or eight weeks will be divided into the following:

Two Weeks: Worldview, Culture, and Evangelism
Two Weeks: Understanding Sundanese People
Two Weeks: Encountering Folk Islam
Two Weeks: Great Controversy and Power Encounter

The participants are expected to attend all seminars and fulfill the assignments that the teachers give them. At the end of the seminars, they will be given certificates and are expected to share the knowledge with their fellow members in their churches.

2. Conducting Livelihood and Developmental Program

Folk religion arguably causes poverty among the people. As what had been discussed earlier, Sundanese is obsessed to maintain the balance between supernatural and natural world. And the process to appease the spirit is not cheap. Each ceremony requires a certain amount of money and people often goes into debt to satisfy the demands of ritual and rites. Moreover, folk religion also enslaved the people; it limits their capability into a narrow point of views that leads them to be over dependent on supernatural causes to improve their lives. As a result, they lived under the constant pressure of paralyzing fear and uncertainty of life (Myers, *What is Poverty Anyway?*, 1999).

Due to the high number of poverty among Sundanese people, livelihood and developmental programs have been one of the strongest avenues in preaching the gospel to them. Nevertheless, there are no significant results being produced over the years. As soon as the program ended, so were the conversions of the people. This occurred because of the following factors: First, the livelihood program is not supported by a good assimilation process. With the economic benefit that the Adventist offers, the people are more than willing to contact them; in fact, they are keen to be baptized for it.

However, based on an interview with one of the lay members in West Java Conference; He observes that the conference has prepared a well-developed livelihood program that connects with the surrounding culture and values of Sundanese community. The major problem lies with the lukewarm response of the members who did not actively participate to welcome the newly converted Sundanese as part of their social groups within the church (Walukouw, 2017). Consequently, with no social support in sight, all the livelihood projects that had been done will ultimately be nullified by the lack of the sense of belonging in the hearts of the newly converted Sundanese.

Second, the practical aspect of livelihood project itself. Most programs are short term in nature and culminate not on discipleship, but baptism; which probably the cause of low retention numbers. On the other side, these programs mainly aimed at individuals or families not at a village as whole. Silitonga suggests that there should be a livelihood project that has strategic plan which consist of short term and long-term planning but these strategy requires large funds that are unavailable (Silitonga, 2017). To ensure a proper management, the Conference must assign a junior pastor to oversee the project. His suggestions and ideas are excellent in many ways; but personally, the author proposes that the work of livelihood should be extended to the whole village rather than a selected few individuals and thereby, aiming intentionally at people group movement.

Third, they did not realize that they have incorrect motives and assumptions in starting livelihood and development project. The livelihood program is done primarily from an etic perspective and did not resonate deeply into the core of Sundanese worldview. In order to facilitate change, particularly economic transformation, there is a need for what Myers called as a "convergence of stories." Myers believes that all livelihood program and transformational development must be based on knowledge that each community has its own distinct story of its own identity and rather than focusing primarily on God's story in their life. A missionary should discover how God works within the culture and history

of the community through the convergence of three stories; the missionary story, the local story, and God's story in a larger context (Myers, *Walking with the Poor: Principles and Practices of Transformational Development*, 2006, pp. 578-580). This convergence will result in a livelihood and transformational development program which will be based upon the Sundanese own need and desire as a community.

In conclusion, the author did not offer a specific livelihood and transformational development program but proposed a change in the underlying worldview, approach, and duration of the program. The program should be done from an emic perspective that resonate within the Sundanese culture and aims to improve the quality of life of the people. Rather than reaching for individuals, its intention should be the transformation of the whole village or social structure and thereby, enabling the missionary to penetrate the society in an unobtrusive and unsuspecting manner. Due to its ambitious nature, it requires a large amount of money and support from the conference and church members.

Person of Peace

The work of livelihood and transformational development must always be preceded by discovering a person of peace in the community. The concept of persons of peace could be traced to a method that Jesus shares in Luke 10:6 where He advised the disciples to abide within the house of a receptive person and use it as a channel of ministry to the community. Tom Wolf identified a person of peace with the following characters: receptivity, reputation, and referral (Wolf, 2016). These persons could come from various backgrounds, and they do not necessarily need to be the cream of the crops from the community; because what is important is not their social status, but their receptivity of the gospel and their dedication to share what they have experienced.

This method of approach clearly fits within the communal and extended family settings of Sundanese culture. Although it requires a lot of patience and time, but it lessens the level of resistance from local residence (Moreau, 2012). Moreover, when a person of peace finally accepted the gospel, their residence could function as a prospective house church and the beginning of a new kingdom community. In conclusion, the use of this method is efficient for three objectives: to establish a foothold in a targeted area especially for livelihood project, maintaining good relationship with the local community, and pioneering a church planting initiative in the long run.

3. Shift of Emphasis in Message

The need for a shift of emphasis is concluded from the cultural studies of Sundanese in chapter two. Rather than emphasizing on topics such as commandment, trinity, second coming, or justification by faith; the author recommends the topic of Shalom or peace as the primary message in reaching Sundanese. The word Shalom is complex in nature and could be understood as peace. Nevertheless, the concept of shalom does not limit itself to the absence of wars or conflicts, it primarily means as "an ideal state of complete peace" (Eisenberg & Society, 2001, p. 147) or "wholeness" (Peace, 1995). Shalom, as reflected by Vine, also includes a peaceful state of mind and soul relying completely on God's protection in one's life (Peace, 1996, p. 174). Based on the statements above, it is safe to assume that shalom is a peaceful state that incorporates all aspects of life such as religious, social, and physiological well-being (Waltner, 1984).

Living amidst the economic difficulties, Sundanese resorts to acquire help from the supernatural world through rituals and rites such as pilgrimages to holy site, and seeking assistance from shamans and witch doctors to ensure the help and support from the spiritual world. They did this to gain peace in their turbulent and uncertain world. However, the dependency on supernatural means backfire since

it creates an addiction that could not be fulfilled. This is where the message of Shalom becomes necessary, because it addresses both the supernatural and natural world; social and personal aspects.

The concept of Shalom will be centered upon the topic of great controversy between God and Satan which begins at heaven and its ongoing struggle throughout the universe particularly on earth. With the entrance of Satan and his companies to earth, it brings chaos, destruction, and falsehood among God's people. Consequently, the peace that God had originally created in the world has been eliminated into pieces and mankind spent their lives striving to recover the peace that they have lost. At the core of this teaching, mankind is unable to gain peace by personal efforts no matter how hard they try. In their futile efforts in reaching for this peace, people solicit help and assistance from a darker power; yet true delivery of peace can only come from God alone.

This is where the message of Shalom holds its importance, because it introduces Jesus as the bringer of peace. Through his death, He reconciles the world with God and brings a sense of completeness to the life of a believers in their horizontal and vertical aspects. Furthermore, the concept of Shalom also moves people from where they are to where God wants them to be. It involves a dynamic experience that motivates people to obey God's commandment and surrender to His wills (Yoder, 1987, pp. 10-23). What makes this message so applicable to folk Islam or Sundanese is due to two factors. First, it addresses their fear of the future and provides a sense of security through the power of Jesus Christ. Second, it helps them to see themselves within the perspectives of God's plan. Shalom provides a larger picture of what God desires from them.

Discussion

This approach provides a wide perspective on evangelism and Sundanese culture. Rather than just copying mission strategy given by the higher office (Union and Division), it aims towards a worldview change among the Adventist members in West Java Conference. If every member and organized church is willing to connect with the local community, then each church will be transformed into a center of influence. The conventional Muslim evangelism relies on cognitive bible studies which required years of study on Islamic mindset and ability to argue with Muslims. What is required now is a heartfelt and community centered approach that is intended to win family network instead of isolated individuals.

Conclusion

The struggle between God and Satan spilled over the earth and its residence. In an attempt to undo God's work in mankind, Satan utilizes all tricks of falsehood and vain promise of peace in order to win the loyalty of the people. Living amidst this controversy, Sundanese people often depend on these powers to achieve a peaceful life. Hiding beneath the mask of Islam, they seek help from shamans and witch doctors and this resulted in a dependency that leads them astray.

To reach the Sundanese, the author proposes three pronged strategies which are; developing theology of time, church and society, and a shift of emphasis in message. The first strategy focuses on a need to develop a long-term strategic plan in reaching the respective people group. Second strategy relies on broadening the influence of the church within the Sundanese community by educating the church members, developing a long-term livelihood and transformational development, and establishing contact with the person of peace in a local residence. The final strategy endorses a change of evangelistic message in reaching Sundanese. Instead of focusing on salvation by faith or eschatological teaching, the message should be centered on the message of Shalom and its implication in life.

References

- [1] Anwar, E. N. (2012, May). *Peran Candoli Dalam Perhelatan (Suatu Fenomena Keyakinan Orang Sunda)*. Retrieved from ICSSIS: <https://icssis.files.wordpress.com/2012/05/>
- [2] Caleb, C., Kim, -S., & Travis, J. &. (2009). Relevant Responses to Folk Muslims. Dalam D. Woodberry (Penyunt.), *From Seed to Fruit: Global Trends, Fruitful Practices, and Emerging Issues among Muslims* (hal. 267-278). Pasadena: William Carey Library.
- [3] Dixon, R. L. (1999). *The Sundanese*. Diambil kembali dari Sunda. Org: <http://www.sunda.org/sundanese/sundanese.htm#magic spells>
- [4] Dzulkarnaen, Z. A. (2015). *Filosofi si Kabayan: "Manusa nu geus teu nanaon ku nanaon"*. Diambil kembali dari wattpad.
- [5] Eisenberg, J., & Society, E. S. (2001). *The JPS Dictionary of Jewish Words*. Philadelphia: Jewish Publication Society.
- [6] Ekadjati, E. S. (1995). *Kebudayaan Sunda: Suatu Pendekatan Sejarah*. Jakarta: PT. Dunia Pustaka Jaya.
- [7] *Gereja Advent Berjanji Tidak Ganggu Muslim Garut*. (24, February 2009). Retrieved from Republika: <http://www.republika.co.id/berita/dunia-Islam/islam-nusantara/09/02/24/33338-gereja-adven-berjanji-tidak-ganggu-Muslim-garut>
- [8] *Indonesian Peoples Profiles: Unreached People Groups*. (2003). Jakarta: Indonesian National Research Network.
- [9] Joshua Project. (t.thn.). *Sundanese People Group*. Diambil kembali dari Joshua Project: <https://joshuaproject.net/>
- [10] Kruithof, M. (2015, November 20). *The Acceptance of a New Religion on Java in the Nineteenth Century and the Emergence of Various Christian and Muslim Currents*. Retrieved from kawalujournal: <http://www.kawalujournal.bantenologi.org/index.php/>
- [11] Love, R. (2000). *Muslims, Magic, and the Kingdom of God*. Pasadena: William Carey Library.
- [12] Moreau, A. S. (2012). *Contextualization in World Missions: Mapping and Assessing Evangelicals Models*. Grand Rapids: Kregel Publications.
- [13] Mustapa, H. H. (2010). *Adat Istiadat Sunda*. Bandung: P. T. Alumni.
- [14] Myers, B. L. (1999). What is Poverty Anyway? Dalam R. D. Winter, & S. C. Hawthorne (Penyunt.), *Perspectives on the World Christian Movements* (hal. 580). Pasadena: Paternoster.
- [15] Myers, B. L. (2006). *Walking with the Poor: Principles and Practices of Transformational Development*. Maryknoll: Orbis.
- [16] Nadeak, P. R. (2017, March 28). Sundanese Lifestyle and Worldview. (Y. Sinaga, Pewawancara)
- [17] Peace. (1995). Dalam J. W. Hayford (Penyunt.), *Hayford's Bible Handbook*. Nashville: Thomas Nelson Publisher.
- [18] Peace. (1996). In W. E. Vine, & M. F. White (Eds.), *Vine's Complete Expository Dictionary of Old and New Testament Words* (p. 174). Nashville: T. Nelson.
- [19] Pharshall, P. (1983). *Bridges to Islam: A Christian Perspective on Folk Islam*. Grand Rapids: Baker Book.
- [20] Ridgeon, L. (2003). Islam. In L. Ridgeon (Ed.), *Major World Religion: From Their Origins to the Presents* (pp. 230-238). New York: RoutledgeCurzon.
- [21] Silitonga, P. (2017, October 21). Reaching the Sundanese. (Y. Sinaga, Pewawancara)
- [22] Sipayung, S. (2009). *Critical Factors that Facilitated the Conversion of Muslims in the Garut District West Java Province Indonesia*. Philippines: Adventist International Institutes of Advanced Studies.
- [23] Situmorang, R. (2015, November 15). Diskusi Mengenai Penginjilan ke Sunda. (Y. Sinaga, Pewawancara)
- [24] Sundanese. (2002). Dalam *The New Encyclopaedia Britannica Vol. 11* (hal. 392). Chicago: Encyclopaedia Britannica.

- [25]Surjadi, H. A. (2006). *Masyarakat Sunda: Budaya dan Problema*. Bandung: P. T. Alumni.
- [26]Tjakrapawira, S. (2000). *A Church Planting Strategy for the Sundanese People in the Territory of the West Java Conference of Seventh-day Adventist*. Philippines: Adventist International Institute of Advanced Studies.
- [27]Waltner, E. (1984, January 1). Shalom and Wholeness. *Brethern Life and Thought*, hal. 145-151.
- [28]Walukouw, Y. (2017, April 27). Reaching the Sundanese. (Y. Sinaga, Pewawancara)
- [29]Wolf, T. (2016, February 4). *Person of Peace*. Diambil kembali dari KNCSB: <http://www.kncsb.org/PersonsofPeace.pdf>
- [30]Yoder, P. B. (1987). *Shalom: The Bible's Word for Salvation, Justice, and Peace*. Kansas: Faith and Life.

The Dispensationalist's End-Time Remnant People of God in Revelation: An Exegetical Evaluation

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Abstract: Biblical scholars from different schools of thought have already written so much about the "Remnant" theme in the Scripture both from OT and NT. It appears to me that one area that needs to be explored is the appraisal of one of these ideas in the light of sound biblical exegesis and biblical principles of interpretation. This paper attempts to exegetically evaluate the Dispensationalist's interpretation of the "Remnant" of Revelation. The Dispensationalist, with Futuristic approach to the book, asserts that the "Remnant" of Revelation represents the literal Israel that would believe the Messiah at the *Parousia* and would reign with Him on earth during the Millennium while the Church would be in heaven.

However, after the exegetical evaluation of such view, it was found out that the evidences and arguments presented by the Dispensationalist biblical scholars and theologians are not exegetically founded.

Keywords: *remnant, dispensationalism, revelation*

Introduction

The issue about the "Remnant" in the Scripture is a very well-trodden biblical theme. Many scholars^a have already written articles and books with various perspectives and theological baggage. Consequently, it seems to me that there is only a little room left to fill in. Thus, instead of proposing another study on the "Remnant" in the Scripture, this paper would want to exegetically evaluate the view of Dispensationalist^b regarding the "Remnant" of Revelation. It will look into whether or not the Dispensationalist's view is exegetically sound in the light of principles of Biblical interpretation. Furthermore, this is not an exhaustive treatment of the said view being mentioned.

J. Dwight Pentecost (1960) already mentioned that this view (Dispensationalists' Pre-tribulation rapture, literal Jewish nation as Remnant) has been under attacked by Amillenialists and Post-tribulation rapturists (p. 123). It seems to me that to objectively evaluate this view, it is wise and proper to evaluate this view in the light of the widely accepted *Sola Scriptura* and *Analogia Scriptura* principles among biblical scholars and theologians. First, this paper describes the Dispensationalist's view of the "Remnant" in Revelation, then, it evaluates the view in the light of those principles mentioned above. In the process of evaluation, this paper will present evidences and arguments either for or against the said view.

Dispensationalist's Remnant View in Revelation

Pentecost (1960) begins his treatment of the "Remnant" in the book of Revelation by anchoring his arguments to the statement in Rom 11:26 "all Israel will be saved"^c which according to him would refer to the believing Jews at the second advent of Christ (p. 128). He continues by stating that the "Remnant" of Rev 12:17 refer to the believing Jews who would witness for Jesus during the seven-year tribulation period prior to the second advent of Jesus (p. 133). He came up with this conclusion because he claims that the woman of Revelation 12 who is the target of Satan's attack is not Mary the Mother of Jesus, nor the Christian Church^d but rather the nation of Israel (p. 129). He presented several arguments for this conclusion: (1) the Son of the woman here is the Messiah (12:5); (2) the woman clothed with the Sun, Moon, and Stars which according to Gen 37:9 (cf. Jer 31:35-36; Josh 10:12-14; Judg 5:20; Ps 89:35-37) refer to the Sons of Jacob; (3) the imagery of a woman was used of Israel (Isa 54:5-6; 47:7-9; Jer 4:31; Isa 66:7-8; Mic 4:9-10; 5:3) (p. 129);^e (4) the theological reasoning that God would unconditionally fulfil His covenant promise to the nation of Israel.^f The fourth argument is further elaborated by asserting that the nation of Israel will be brought back to

their land after the rapture of the Church because God would definitely save all of Israel by all means before the second coming (p. 129).

In addition, Walvoord (1990) asserts that the seventieth week or the last seven years of Daniel 9:25-27 will be the last seven years of earth's history before the *Parousia*.⁸ Consequently, he proposes a Futuristic interpretation of the Book of Revelation suggesting that the visions of Rev 4-18 will take place during the seven-year tribulation prior to the *Parousia* (Rev 19), and Millennium (Rev 20) (Walvoord, pp. 518-614). In this school of thought, the Church is already raptured and is seen in heaven in Rev 4 and 5 (Ibid., p. 543).

Another additional piece of the picture about the "Remnant" in Revelation deals with the relationship of the "Remnant" of Revelation with the 144,000 of Rev 7 and 14. According to this view, the 144,000 "constitute a special part of the Remnant nation, set apart by a sovereign act of God to be a special witness during the tribulation period" (Ibid., p. 132). The 144,000 are considered as a part of the "Remnant" but not the entire "Remnant" itself (Ibid.). However, Nathaniel West (1993) argues that the woman of Rev 12 and the 144,000 are the same. They represent the nation of Israel, the people of God who would survive the great tribulation and living to the advent of Jesus (pp. 233-254). Furthermore, after the second coming, this "Remnant" will reign with Jesus on earthly Mount Zion during the Millennium (Rev 14:3) (Walvoord, 1990, p. 132).

Evaluation of Dispensationalist's View of the Remnant People of God in Revelation

The one of the evidences to be evaluated, in support to the idea that the Remnant people of God in Revelation are Israelites in the flesh, is the Dispensationalist's proposed structure of the book of Revelation. It asserts, in line with the Futurist school of thought, that Rev 4-18 corresponds to the seven-year tribulation prior to the *Parousia* of Jesus Christ. One of the prominent arguments for this view is the contention that the word "church" (ἐκκλησία) has not been mentioned in Rev 4-18. Their argument implies that the church has already been raptured prior to the seven-year tribulation. Hence, the people of God on earth during the seven-year tribulation prior to the second coming (Rev 19) are only the believing Israelites (Rev 7:1-8; Rev 14:1-5) who will pass through the great tribulation but will be delivered from that tribulation and will reign with Christ during the 1000 years (Rev 20) (cf. Walvoord, 1990, 543-44; Walvoord, 1966, 101-103).

Contrary to the Dispensationalists' view, Rev 4-18 seem to evidently show that the visions featured what would happen from the time of John until the end of time just prior to the *Parousia* (this supports the Historicist's view of revelation). To support this statement, this paper presents several evidences. First, Rev 4 and 5 do not talk about the Church but rather, this second major vision of John, pictures Christ's enthronement in the heavenly throne room. Chapter 4, describes the majesty and power of God as the creator on His throne. In the Biblical historical setting, this imagery most likely would allude to the enthronement of a king. Ranko Stefanovic (2002) suggests that "the description of the scene in Revelation 5 is patterned after the OT coronation and enthronement ceremony (cf. 2 Kgs 11:12-19; 2 Chron 23:11-20)" (p. 161). Evidences such as: (1) "the Lion of the tribe of Judah" (5:5) which is a messianic title refers to the Lamb being mentioned here (Revelation 5); (2) "the root of David," another messianic title of the Lamb (5:5; cf. Isa 11:1,10); (3) The Lamb took the seven-sealed scroll out of the right hand of God the Father who sat on the throne (5:7) was an OT imagery for an enthronement of an Israelite king; (4) "have made us kings and priests to our God" (5:10); (5) and the adoration and worship of the Lamb together with the God the Father (5:12-14); would imply kingly or royal setting and would probably point out that the Lamb has already been enthroned and has regained His authority and power after His death, resurrection and ascension (5:9; cf. 1:18). This enthronement would most likely take place right after His ascension rather than after more than two thousand years in the future (in John's standpoint). This is evident in the immediate and wider canonical context. In Rev 3:21, it is evidently clear that Jesus already sat (καθίσαι, an Aorist which, in the context, denote a one point in time action in the past) at the throne of His Father even prior to the time when the messages to the seven churches were given. In the wider canonical context, it is even very persuasive. For example, Apostle Paul, when writing to the Ephesians (c.a. A.D. 62-64),

also acknowledged the historical fact that after Jesus' resurrection God exalted Him by reinstating Him to position and authority in heavenly places (1:20) immediately after He ascended to heaven (cf. Acts 2:30; Heb 1:3; 8:1; 10:12; 12:2; 1 Pet 3:22).^h

Second, the expression "καὶ δείξω σοι ἃ δεῖ γενέσθαι μετὰ ταῦτα" (and I will show you what must take place after these *things*, NIV) is another verification that warrants a fulfilment of Rev 4-18 in the course of history from the time of John up to the *eschaton*. Walvoord postulates that this expression "should be regarded as a prediction of events which shall occur at the end of the age" (Walvoord, 1966, 102). However, in view of the literary context, it is apparent that the antecedent of the first and second phrase "μετὰ ταῦτα" (after these *things*, the first one is at the beginning of 4:1 and the second is at the last) in Rev 4:1 could be the first vision (Rev 1:9-3:22). The expression "μετὰ ταῦτα" is a literary device here in the book that occurred several times (1:19; 4:1; 7:1; 7:9; 9:12; 15:5; 18:1; 19:1; 20:3).

It seems that when this phrase is used, the antecedent is always the preceding vision or events. For example, in Rev 7:9, the antecedent of "μετὰ ταῦτα" is the previous vision about the 144,000. The same is true with the antecedent of Rev 9:12 which describes the two others "woes" that will happen after the first "woe." In these occurrences, it appears that the visions/events (subsequent) after the visions/events in the antecedent seem to happen chronologically one after the other in a continuous manner in the course of history or in the *eschaton* (except in some occurrences like in 7:1; 15:5). This is further evident in Rev 19:1, wherein "μετὰ ταῦτα" refers to the destruction of the harlot woman Babylon in the *eschaton* and the subsequent vision/events portrays the rejoicing of the great multitude in heaven because our God Almighty has judged Babylon (v. 2).

Thus, going back to Rev 4:1, my contention is that the antecedent of "μετὰ ταῦτα" is the first vision, that is, the messages to the seven churches in 1:9-3:22, which primarily are events that transpire during the late first century A.D., and the subsequent second vision/events in Rev 4-22:5 may point to the events that would happen from the time of the seven churches up to the *eschaton* in a continuous manner. This was also already implied in Rev 1:19 "γράψον οὖν ἃ εἶδες καὶ ἃ εἰσὶν καὶ ἃ μέλλει γενέσθαι μετὰ ταῦτα" ("Write therefore the things which you have seen, and the things which are, and the things which shall take place after these things, NAS). Here, the things "which are" would probably refer to the messages to the seven churches (2:1-3:22), and **the things** "which shall take place after these (μετὰ ταῦτα, after the events in the seven churches)" may indicate the events that would transpire immediately after or consecutively with the seven churches up to the time of the *eschaton* in an unbroken succession. I saw no obvious reason for believing that there is a gap of more than 2000 years from the time of the "things which are" and the time of "the things which will take place after these."

There are compelling evidences in chapters 6:1-8:1 that would render the Dispensationalists' "gap theory" exegetically unfounded. First, verse 1 puts on view the fact that chapter 6 is still connected to chapter 4-5 (And I saw when the Lamb broke one of the seven seals, and I heard one of the four living creatures saying as with a voice of thunder, 'Come,' v. 1). It describes the unbroken chain of events from the coronation or enthronement of Jesus in heaven immediately after His ascension (first century A.D.) to the opening of the seven-sealed scroll given to Him by God the Father in 5:7. Thus, if chapters 4-5 describe the enthronement of Jesus, then, reasonably, the subsequent events after the opening of the first seal (in heaven) should describe the events that happen right away on earth (And I looked, and behold, a white horse, and he who sat on it had a bow; and a crown was given to him; and he went out conquering, and to conquer, Rev 6:2 NAS). The white horse may symbolize the victory of Christ or the Gospel. Andrews Bible (2010) concurs that It portrays here the gradual conquest of Christ, pictured riding on a white horse (p. 1668). Barclay (1960) observes that "a Roman general would ride a white horse to celebrate a triumphal victory" (p. 178). Stefanovic (2002) adds, "in this dramatic presentation, John is shown, in symbolic language, the victorious spreading of the Gospel to the world" (p. 178). Furthermore, Ladd (1972) also suggests that the events in the first seal would refer to "the first generation of believers . . . (who) victoriously established the gospel in all the Roman world until the Empire ceased its violent opposition" (p. 97). Paulien (1992) suggests

that it refers to "His kingdom through the preaching of the Gospel by His church during the first century A.D. (p. 229). Luke in the book of Acts noted that even the enemies testified that they turned the world upside down.ⁱ

The remaining seals (second seal to seventh seal), when opened by the Lamb one after another, of course like in the first seal, logically portray the events that would happen in succeeding centuries, after the events of the first seal, up to the *Parousia*. The symbolic descriptions of the events from second seal to the seventh would really suit with the events happened in history from the early centuries of the Christian Church up to the *eschaton*.^j Since Rev 4 and 5 evidently portray the enthronement of Jesus after His resurrection and ascension. Since it chronologically happened in first century A.D., it is then reasonable to conclude that the succeeding scenes in Rev 6-8:1 describe the events from the first century up to the *Parousia*. Contrary to the Dispensationalists' view, the church is still on earth. Furthermore, Rev 4-18 does not portray the events on the so-called seven-year tribulation prior to the *Parousia*.

The next evidences presented by the Dispensationalists, as noted above, are in Revelation 12. Pentecost asserts that the woman here represents literally the nation of Israel during the seven-year tribulation based on several arguments already noted above. It is overwhelmingly evident, that the Child of the woman whom the Dragon (Satan) wanted to destroy was Jesus (v. 5; Cf. Matt 2:13-18) (pp. 123-133). However, this paper does not concur with their interpretation of the identity of the woman. Looking at Revelation 12 in the light of its immediate and wider contexts, it is fairly evident that this woman may represent the people of God in its entirety both faithful Israel in the flesh and spiritual Israel. Revelation 12 supports this assertion. The people of God when Jesus was born were the faithful Israelites (only the faithful Israelites were considered as people of God, cf. Rom 9:6,7,8,27), and some Gentiles who became God-fearers, but the majority of the Gentiles were not yet evangelized at that point in time. However, when the Child of the woman was "caught up to God and His throne" (v. 5), then Dragon turn his focus to the woman. What is now the identity of the woman after Jesus' ascension? Definitely, the woman here includes the believing Israelites (in Palestine and in Diaspora) and the vast number of Gentiles (cf. Acts 2, 8:26-40; 10; 11; 13; 14; 16; 17; 18; 19; Gal 3:26-29; Rev 2-3; Rev 7:9-17; etc.). Furthermore, the imagery of the woman in the Scripture is not only exclusive to the nation of Israel (Isa 54:5-6; 47:7-9; Jer 4:31; Isa 66:7-8; Mic 4:9-10; 5:3) but also, especially in the NT, was used for the Church (2 Cor 11:2-3; Eph 5:22-33) which includes both believing Israelites and believing Gentiles.

The chronological setting of Revelation 12 and the OT allusions do not also support the interpretation that the woman is the literal nation of Israel as the remnant during the so-called seven-year tribulation. Chronologically, Rev 12 does not describe the scene during the seven years prior to the *Parousia* but rather portrays the tribulation or persecution of the woman (after the ascension, the people of God in the NT, the Church) which was inflicted by the Dragon during the "1260 days" or "a time, and times, and half a time" (12:6,13; A.D. 538-1798). The chronological setting of Rev 12 would not warrant a period of seven years prior to the *Parousia*, but would rather point to the time immediately after the ascension of Jesus (Rev 12:5). The sentence flow of Rev 12:5 and 6 does not support the "the gap theory" of about 2000 years. The conjunction "καί"^k at the beginning of v. 6 connects its idea to previous verses (vv. 3-5). This means that after the Male-Child has been caught up to heaven (v.5) away from the Dragon (v. 4), the Dragon shifts his focus to the woman and persecutes her (v. 13). However, the woman found refuge in the wilderness with two wings of an eagle given to her (v. 14). It is reasonable to assert that the time period (1260 days, or three years and a half which is symbolic) of the persecution of the woman by the Dragon immediately follows or not long from the ascension of the Male-Child. This fits with the statement of the first voice heard by John showing him what will happen after the messages to the seven churches (4:1).

The Dispensationalists literally interpret "1260 days," that it pertains to the persecution of the remnant of Israel during the seven-year tribulation period. However, considering the immediate context (the book Revelation) of Rev 12, and its broader context both NT and OT, it is evident that "1260 days" should be symbolically regarded as 1260 years. This was the period (A.D. 538-1798) in the

history of the Church that Satan used powerful human institutions both religious and political authorities. In Rev 12, the persecutor of the woman is the Dragon having seven heads and ten horns (v. 3). The period mentioned (1260 days, or 3 and a half years) is very significant in identifying the religio-political systems that Satan used to persecute the woman. In the immediate context, the Dragon who has seven heads and ten horns seems to be related with the sea-beast of Rev 13 which also has seven heads and ten horns.^l It is obvious that the Dragon used the sea-beast^m to persecute the woman who, in Rev 13, is called "saints" (see v. 7) during the same period mentioned in Rev 12. Here, in Rev 13, instead of 1260 days, the one being mentioned is forty-two months (If you multiply 42 months with 30 days per month, it would come up to 1260 days). In broader context, this sea-beast of Rev 13 seems thematically parallel with other NT and OT prophetic description of the same religio-political power.

In 2 Thess 2:1-11, Paul, prophetically, mentions a religious entity (the Man of Lawlessness) which is exactly the same with sea-beast of Rev 13. Both opposed God (2 Thess 2:4a; Rev 13:5-6); both are worshipped (2 Thess 2:4a; Rev 13:4,8); both are related to the temple of God (2 Thess 2:4b; Rev 13:6); both usurped the prerogative of God as God (2 Thess 2:4b; Rev 13:4,8); the one in 2 Thess 2 definitely is future in Paul's time reference, the one in Rev 13, as already pointed out previously, existed not long after the time of John the author of Revelation; both are destroyed at the *Parousia* (2 Thess 2:8; Rev 19:20).

In the OT, the sea-beast of Rev 13, is identified as the "little horn" (Dan 7:7-8; 19-26; 8:9-26). The little horn came out of the ten horns of the fourth beast which symbolizes the fourth world empire (Roman Empire; see Dan 7:17), and he is greater than them (Dan 7:20), the sea-beast also has ten horns (Rev 13:1). Both spoke great words of blasphemies against God (Dan 7:25a; Rev 13:5, 6). Both desecrated the temple of God (Dan 8:11; Rev 13:6). Both have persecuted the saints or the people of God (Dan 7:21,25a; 8:10; Rev 13:7). The time-period of their reign, and persecution of the saints under their dominions was the same (Dan 7:25c; Rev 13:5).ⁿ Both usurped the authority of God (Dan 8:11; Rev 13:6, 8). Both seemed to be a religio-political powers (Dan 7:20; 8:9; Rev 13:2, 4, 6, 7, 8). Both are destroyed by the Messiah at his coming (Dan 7:11, 26; 8:25; Rev 19:20). If this little horn arose after the demise of the Roman Empire ruled by the Caesars, as Dan 7 and Dan 8 would indicate, and if this religio-political power would continue until the *Parousia*, it is very reasonable to conclude that the 1260 days (time, times, and half a time) time period is not literal days but years. In view of these similarities, it is fitting to assert that they refer to the same religio-political power which was used by Satan to persecute the people of God, the woman or people of God during the 1260 days or years. It is then logical to suggest that the woman of Rev 12 does not refer to the nation of Israel during the seven-year period prior to the *Parousia*, but rather symbolizes the Church or the people of God who were persecuted not long after the ascension of the Male-Child—Jesus the Messiah.

Lastly, the Dispensationalists contend that the remnant of Rev 12:17 and the 144,000 of Rev 7:1-8; 14:1-5 are remnants within the remnant nation of Israel that would witness for God during the seven-year tribulation prior to the *Parousia* (see Pentecost, pp. 131-132). They argue that the word "ἐκκλησία" (church) does not occur in Rev 4-22:15.^o However, upon examining their arguments, it seems to lack biblical moorings. Looking at Rev 12:17, it is pretty obvious that the flow of the prophetic narrative of Rev 12 is chronologically unbroken from the beginning to the end of the chapter. As already discussed above that Rev 12:5 and 6 have an unbroken chronological and syntactical connections, so, the same argument is applied between Rev 12:16 and 17 which means that the presence of the conjunction "καί" connects v. 17 to v. 16 in an unbroken syntactical and chronological fashion. It naturally implies that the time-period of the remnant (who keep the commandments of God and have the testimony of Jess) seed of the woman of v. 17 would be after the 1260 days or years previously discussed. Thus, it is not during the so called seven-year tribulation period prior to the *Parousia*. Hence, the remnant seed of the woman are not literal Jews or Israelites but rather spiritual Israel.

These remnants are the target of the Dragon's persecuting agencies in Rev 13:11-18. However, in Rev 14:1-5, they are called the 144,000 or saints (14:12) who refused to receive the "mark" of the

beast (13:15-18), but would rather receive the seal of God on their foreheads (14:1; cf. Rev 7:1-8). They were viewed as standing on Mount Zion together with the Lamb (14:1). These 144,000 were not literal Israelites, who, according to the Dispensationalists will reign with Christ on an earthly mount Zion or Jerusalem, but rather spiritual Israel^P who will reign with Christ during the 1000 years in heavenly mount Zion after they have gotten the victory over the beast, and over his image (Rev 15:2; cf. Rev 20:4-6). The location of the reign of those who gained the victory over the beast and over his image in 15:2 is in heaven (the sea of glass is in heaven, see 4:6). It is therefore, reasonable to conclude that the remnant of Rev 12:17 and the 144,000 of Rev 7:1-8 and Rev 14:1-5, and the victorious saints over the beast and over his image are not literal Israel but spiritual, the church of God who will reign in heaven not on earth during the 1000 years.

Summary and Conclusion

To summarize, this study evaluates whether or not the view of the Dispensationalists that the end-time remnant people of God in Revelation are the Israelites in the flesh is biblically and exegetically founded. They proposed several arguments which are anchored on Rom 11:26, Dan 9:24-27, and Rev 12 (also includes Rev 7, and 14) and on the presupposition that God will unconditionally fulfil His covenant with them. Thus, they argue that the Children of Israel will be restored during the seven-year tribulation prior to the *Parousia*. They came up to this belief by asserting that the seventieth week of Dan 9:24-27 prophecy will be fulfilled during the seven-year tribulation prior to the *Parousia*. This is also called the "Gap Theory." Based on these presuppositions, they argue that Rev 4-18 describe the events during the so-called seven-year tribulation prior to the *Parousia*. This is called "Futurist School of Thought." Consequently, they contend that the woman of Rev 12 and the remnant of her seed (12:17) are the restored and converted Jews during this seven-year tribulation. Furthermore, the 144,000 of Rev 7 and 14 are also literal Israelites that would reign with the Messiah on the earthly mount Zion during the 1000 years in Rev 20.

However, this study found out that Rev 4-18 do not describe the events during the so-called seven-year tribulation but rather evidently describe the scenario from the time of John (first Century A.D.) up to the *eschaton*. This study also found out that the woman of Rev 12, the remnant of her seed (12:17), and the 144,000 of Rev 7 and 12 are not the literal Israelites but the people of God, which in the context of Rev 12 would comprise the faithful Israel before the ascension, and the after the ascension of Jesus would include the Gentile believers. This study concludes that based on these findings, the view of the Dispensationalists that the literal nation of Israel as end-time remnant people of God in Revelation is not biblically or exegetically well-founded. These findings are based on the following reasons.

First, Rev 4 and 5 does not describe the raptured church in heaven at the beginning of the seven-tribulation, but rather describes the enthronement of Jesus right after His ascension. It was clear that the antecedent of "μετα ταυτα" was the messages to the seven churches, hence the events "after these things" would be from Rev 6-22. It was also evident that the taking of the seven-scroll of the Lamb (Rev 5), and several kingly terminologies imply the enthronement of Jesus. He sat at His Father's right hand as argued from the OT background, the immediate, and broader contexts. Since there is, syntactically, an unbroken connection between Rev 4 and 5 to Rev 6, consequently, the events that follow (Rev 6-22) describe the events from the first century up to the *Parousia* or beyond.

Second, this is also strengthened by the analysis of Rev 12 in its immediate and broader contexts. It is obvious that Rev 12:3-5 has a first century A.D. chronological setting. It is further asserted that Rev 12:6 is chronologically linked with vv. 3-5 in an unbroken manner due to the syntactical function of "καί" in the prophetic narrative.

Third, it is also argued that the 1260 days or time, times, and half a time (Rev 12:6,13) is not literal but symbolic, due to its link to sea-beast of Rev 13, the man of lawlessness of 2 Thess 2:4, and the little horn of Dan 7 and 8. It is noted that the little horn arose after the fourth world empire (Roman Empire, fell in A.D. 476), and would continue until the *Parousia*. Hence, the persecution of the saints of the Most High was not for 1260 literal days but for 1260 years. If this is the case, the woman of Rev

12 and the saints of Dan 7 and 8 during the 1260 years persecution, represent the people of God in its entirety, not the literal Israel during the seven-year tribulation.

Fourth, the remnant of Rev 12:17, the 144,000 of Rev 7 and 14 are not literal Israel but Spiritual Israel both believing Jews and Gentiles. The syntactical connection of Rev 12:17 to the preceding section would negate such assertion. The immediate and broader contexts would indicate that the NT people of God are also called Israel of God, children of Abraham by faith, and the twelve tribes that are in the *diaphora*. The mount Zion also is not the earthly mount Zion but heavenly mount Zion. The reign of saints is not on earth but in heaven during the 1000 years.

Again, due to these evidences and arguments, this paper concludes that the view of the Dispensationalists that the end-time remnant in Revelation are the restored nation of Israel is very obviously, not biblically or exegetically well-founded. This study recommends a thorough study of the "gap theory" of Dan 9:24-27.

References

- [1] Andrews Study Bible (2010). Berrien Springs, MI: Andrews University Press.
- [2] Barclay, William. (1960). *The Revelation of John*. 2d ed., 2 vols. The Daily Study Bible Series. Philadelphia: Westminster Press, 1960.
- [3] Barth, Markus. (1988). "One God, One Christ, One People." *Ex Auditu*. Pp. 8-22.
- [4] Christian, Ed. (2000). "Straight-Legged People: Elijah's Message to Revelation's Remnant." *Journal of Adventist Theological Society* 11:1/2. pp. 315-323.
- [5] Diop, Ganoune. (1996). "The Remnant Concept as Defined by Amos." *Journal of Adventist Theological Society*. pp. 67-81.
- [6] Evans, Craig. (1988). "Isa 6:9-13: In the Context of Isaiah's Theology." *Journal of Evangelical Theological Society* 29/2. pp. 139-148.
- [7] Graham, Pat. (1976). "Remnant Motif in Isaiah." *Restoration Quarterly*. pp. 219-228.
- [8] Hasel, Gerald F. (1972). *The Remnant: The History and Theology of the Remnant Idea from Genesis to Isaiah*, Andrews University Monographs, Volume V. Berrien Springs, MI: Andrews University Press.
- [9] Heil, John Paul. (2002). "From Remnant to Seed of Hope for Israel: Romans 9:27-29." *The Catholic Biblical Quarterly* 64. pp. 703-720.
- [10] Johnson, Alan. (1981). "Revelation." *Hebrews-Revelation*. Edited by Frank E. Gaebelin. Grand Rapids: Zondervan.
- [11] Johnson, Dan G. (1984). "The Structure and Meaning of Romans 11." *The Catholic Biblical Quarterly* 46. pp. 91-103.
- [12] King, Greg. (1994). "The Remnant in Zephaniah." *Bibliotheca Sacra* 151. pp. 414-27.
- [13] Easton, Jr., W. Burnet. (1948). "The Strategy of the Remnant." *Theology Today*. pp. 199-220.
- [14] Keener, Craig S. (2000). *Revelation. The New International Version Application Commentary*. Vol. 66. Grand Rapids: Zondervan.
- [15] Ladd, George Eldon. (1972). *A Commentary on the Revelation of John*. Grand Rapids: Eerdmans.
- [16] McConville, J. G. (1986). "Ezra-Nehemiah and the Fulfilment of Prophecy." *Vetus Testamentum* XXXVI/2. pp. 205-224.
- [17] Merkle, Benjamin L. (2010). "Who will be left Behind? Rethinking the Meaning of Matthew 24:40-41 and Luke 17:34-35." *Who will be Left behind? Western Theological Journal* 72. pp. 169-79.
- [18] Meyer, Ben F. (1965). "Jesus and the Remnant of Israel." *Journal of Biblical Literature*. pp. 123-130.
- [19] Osborne, Grant R. (2002). *Revelation. Baker Exegetical Commentary on the New Testament*. Vol. 27. Grand Rapids: Baker.

- [20]Peacock, Kevin C. (2003). "Who is a God Like You?: Theological Themes in Micah." *Southwestern Journal of Theology*. pp. 27-47.
- [21]Pentecost, J. Dwight. (1960). "The Godly Remnant of the Tribulation Period." *Bibliotheca Sacra*. pp. 123-133.
- [22]Pfandl, Gerald. (1997). "The Remnant Church." *Journal of Adventist Theological Society* 8. pp. 19-27.
- [23]Paulien, Jon. (1992). "The Seven Seals." In *Symposium on Revelation—Book 1*. Daniel and Revelation Committee Series 6. Silver Spring, MD: Biblical Research Institute.
- [24]Stefanovic, Ranko. (2002). *Revelation of Jesus Christ*. Berrien Springs, MI: Andrews University Press.
- [25]Sneen, Donald. (1986). "The Root, the Remnant, and the Branches." *Word and World* 4:4. pp. 398-409.
- Thayer (2008). *Lexicon, Bibleworks 8*, s.v. "καί."
- [26]Walvoord, John. (1971). *Daniel: The Key to Prophetic Interpretation*. Chicago: Moody.
- [27]_____. (1962). *Israel in Prophecy* (Grand Rapids: Zondervan, 1962).
- [28]_____. (1959). *The Millennial Kingdom* (Findlay, OH: Dunham).
- [29]_____. (1990). *The Prophecy Knowledge Handbook* (Wheaton, IL: Victor).
- [30]_____. (1974). *The Rapture Questions*. Grand Rapids: Zondervan.
- [31]_____. (1966). *The Revelation of Jesus Christ* (Chicago: Moody).
- [32]Watts, James W. (1988). "The Remnant Theme: A Survey of New Testament Research." *Perspective in Religious Studies*. Pp. 109-129.
- [33]West, Nathaniel. (1993). *The Thousand year Reign of Christ*. Grand Rapids: Kregel.

Endnotes

^aFor example, J. Dwight Pentecost (1960), "The Godly Remnant of the Tribulation Period," *Bibliotheca Sacra*: 123-133; Ganoune Diop, (1996), "The Remnant Concept as Defined by Amos," *Journal of Adventist Theological Society*: 67-81; Dan G. Johnson (1984), "The Structure and Meaning of Romans 11," *The Catholic Biblical Quarterly* 46: 91-103; Gerhard Pfandl (1997), "The Remnant Church," *Journal of Adventist Theological Society* 8: 19-27; Gerhard F. Hasel (1972), *The Remnant The History and Theology of the Remnant Idea from Genesis to Isaiah*, Andrews University Monographs, Volume V, Berrien Springs, MI: Andrews University Press, 1-460; John Paul Heil (2002), "From Remnant to Seed of Hope for Israel: Romans 9:27-29," *The Catholic Biblical Quarterly* 64: 703-720; Greg King (1994), "The Remnant in Zephaniah," *Bibliotheca Sacra* 151: 414-27; James W. Watts (1988), "The Remnant Theme: A Survey of New Testament Research," *Perspective in Religious Studies*: 109-129; Pat Graham (1976), "Remnant Motif in Isaiah," *Restoration Quarterly*: 219-228; W. Burnet Easton, Jr. (1948), "The Strategy of the Remnant" *Theology Today*: 199-220; Benjamin L. Merkle (2010), "Who will be left Behind? Rethinking the Meaning of Matthew 24:40-41 and Luke 17:34-35," *Who will be Left behind? Western Theological Journal* 72: 169-79; Donald Sneen (1986), "The Root, the Remnant, and the Branches," *Word and World* 4:4: 398-409; Ben F. Meyer (1965), "Jesus and the Remnant of Israel," *Journal of Biblical Literature*: 123-130; Kevin C. Peacock (2003), "Who is a God Like You?: Theological Themes in Micah," *Southwestern Journal of Theology*: 27-47; Markus Barth (1988), "One God, One Christ, One People," *Ex Auditu*: 8-22; Craig Evans (1988), "Isa 6:9-13: In the Context of Isaiah's Theology," *Journal of Evangelical Theological Society* 29/2: 139-148; J. G. McConville (1986), "Ezra-Nehemiah and the Fulfilment of Prophecy," *Vetus Testamentum* XXXVI/2: 205-224; Ed Christian (2000), "Straight-Legged People: Elijah's Message to Revelation's Remnant," *Journal of Adventist Theological Society* 11:1/2: 315-323.

^bDispensationalism is a theological system which asserts that all OT prophecies concerning national Israel will unconditionally be fulfilled. Hence, in this system, the seventy weeks prophecy in Daniel 9 is divided into two parts. The 69 weeks or 483 years has already been fulfilled in the past, whereas the last week or the seventieth week or seven years is carried to the future which is called "seven-year tribulation prior to the Parousia. The Period between the end of the sixty-ninth week and the beginning of the seventieth week is called a parenthesis or the age of the Church. The people of God are divided into two groups. The Church will be raptured before the seven-year tribulation begins. The literal Israel will reign with Jesus during the millennium while the Church will be raptured to heaven. See John Walvoord (1990), *The Prophecy Knowledge Handbook*, Wheaton, IL: Victor, 248-258; Ibid. (1959), *The Millennial Kingdom*, Findlay, OH: Dunham, 139-322; Ibid. *Daniel* (1971), *The Key to*

Prophetic Interpretation, Chicago: Moody, 216-237; Ibid. (1974), *The Rapture Questions*, Grand Rapids: Zondervan, 23-27.

^c This paper will not deal with the issue of Rom 11:26.

^d According to him, during this period, the Church has already been raptured before the start of the seven-year tribulation prior to the visible coming of Jesus (p. 129).

^e Craig Keener (2000) also supports the view that the woman here symbolizes Israel or a faithful remnant of Israel due to the argument that OT which was the theological source to early Christians portrayed righteous Israel as the mother of the restored future remnant of Israel (Isa 54:1; 66:7-10; Mic 4:9-10; 5:3; cf. Isa 7:14; 9:6; 26:18-19) (p. 314). However, He does not exclude the idea that the Gentile converts are also included. Ibid. On the other hand Grant R. Osborne (2002) postulates that the woman here represents the whole people of God both the faithful Israel and the church (p. 456). On the other hand, Alan Johnson (1981) observes that the woman under attack in Rev 12 represents the new Israel which is composed of both Jews and Gentiles (p. 515).

^f Gerhard Hasel, however, argues by presenting evidences that God's covenant with Abraham and his descendants was conditional. Since Abraham's descendants failed to fulfil the conditions of the covenant, thus, they also forfeited the promises of the covenant. Gerhard Hasel, "God's Plan for Israel," Biblical Research Institute, accessed July 2022.

^g This study will not deal with the gap theory.

^h The Greek word καθίσας (seated) is an Aorist participle denoting a punctiliar action in relation to another Aorist participle ἐγείρας (raised) which denotes physical resurrection of Jesus when linked with the phrase "ἐκ νεκρῶν" (from the dead). The unbroken link of the phrase "seated Him in His right hand in heavenly places" ([Eph 1:20] NKJ) with the phrase "raised Him from the dead" with a conjunction "and", indicates that the enthronement of Jesus in heavenly places happened immediately after His resurrection and ascension. This is also supported by the immediate context, when Paul declares that the believers in Christ also would have the same experience, which means that, in their case, the moment they were spiritually resurrected, by God's power, they will also spiritually be raised up to heavenly places and would be seated with Christ (Eph 2:5,6).

ⁱ Stefanovic further notes that "in the OT, God sometimes portrayed as riding a horse with a bow in His hand, going forth, conquering His and His people's enemies, and bringing salvation to His people (Hab 3:8-13; cf. Ps 45:4-5; Isa 41:2; Zech 9:13-16). In Revelation 19, Christ is returning to the earth on a horse and bringing judgment and justice (19:11-16). While in Revelation 19 He wears the diadem crown, which is the royal crown, in chapter 6 he has a crown of victory. This is the crown that in Revelation is almost always used with reference to the overcomer Christ and His overcoming people. With His victorious death on the cross, Christ has overcome and conquered the prince of this world (John 12:31-32; 16:11. By virtue of His death (Rev 5:5) through which he was enabled to redeem humanity, Christ was pronounced worthy to take the sealed scroll (Rev 5:9). Now in Chapter 6, He wears the crown of victory that He earned at the cross" (pp. 227-28).

^j The red horse in second seal may represent war and bloodshed. The rejection of the gospel may produce strife, persecution, and confusion. This (red horse) would likely fit with the experiences of the early Christian church when Pagan Roman emperors, like for example Nero, Domitian, Trajan, Decius, Diocletian, etc., persecuted them which was only stop when Constantine became emperor. The black horse in the third seal whose rider holds a scale with the expression that conveys acute famine. The black horse portrays the spiritual famine in the Christian church when it became a state religion of the empire during and after the reign of Constantine. The pale horse and its rider in the fourth seal represent spiritual death. . The pale horse describes the spiritual death of those who experienced spiritual famine during the third seal. Andrews Study Bible suggests that the four horses well represent the initial surge of the gospel followed by the decline and apostasy of the church into the middle ages. The scene in the fifth seal describes the saints who were martyred because of the gospel. The scene in the sixth seal portrays the events at the just prior and during the *Parousia*. The "silence in heaven" in heaven in the seventh seal has several divergent interpretations. However, they seem to agree that this will be at the *eschaton*. See Ladd (1972, pp. 100-101); Stefanovic (229-32; Andrews Study Bible, 1668-69; 1670.

^kSyntactically and lexically, “καί” connects clauses and sentences. It annexes what follows from something said before (καί consecutive). See Thayer, *Lexicon*, Bibleworks 8, s.v. “καί.”

^lTheir differences are: the Dragon's seven heads have the crowns, while in the sea-beast, the crowns are on the horns.

^m The Dragon gave the sea-beast his power, his throne, and great authority (Rev 13:2). This indicates that the sea-beast is an earthly power which has a kingdom or dominion. It is also a religious entity because it is worshipped by the people of the world (13:3,4). Further evidence that this is also a religious institution is the fact that it blasphemed God, His Name, and His tabernacle (v. 6), and it also persecuted the saints of God (v. 7). It is also a worldwide power that exercises authority over the nations of the world (v. 7).

ⁿ NAB translates “time, times, and half a time” as “a year, two years, and a half-year.” The time-period of the little horn's world-wide dominion in Daniel 7, 8, and Rev 13:5 obviously is not literal but rather symbolic. If the little horn is a religio-political power that reign and exercised authority both in religion and politics, and if it arose after the fourth world empire which is the Roman Empire, and since the Roman empire fell in A.D. 476, it is then reasonably to conclude that the reign of this religio-political power began after A.D. 476. The most likely period would be A.D. 538-1798. It was during this period time when the Papacy, the one that possessed all the characteristics described here about the little horn of Dan 7 and 8, and the sea-beast of Rev 13, as evident in history, persecuted the saints or the people of God. His reign was only stopped when one of its heads was wounded (Rev 13:3).

^oThe word “ἐκκλησία” is not found in Rev 4-22:15 because of the nature of the genre of the book which is apocalyptic. Hence the church is portrayed in symbolically. For example, in Rev 12 it is presented as a woman. In Rev 19:7, it is portrayed as the bride of the Lamb (cf. Eph 5:23-33). In Rev 21:2, it is depicted as the New Jerusalem, the bride.

^pIn addition to the arguments above, in favour of the Spiritual Israel it is clear that Mount Zion in the NT is no longer the earthly Mount Zion but the heavenly (Heb 12:22). It is also clear that the people of God, the Church (both Jews and Gentiles), in the NT is also called the Israel of God (Gal 6:16). The Church as spiritual Israel is called a spiritual house of God, a holy priesthood (1 Pet 2:5); Jesus as their cornerstone (1 Pet 2:6); they are called as “a chosen generation, a royal priesthood, a holy nation, His own special people (1 Pet 2:9). Take note that this letter was addressed to Christians of Pontius, Galatia, Cappadocia, Asia, and Bithynia, and most likely composed of Jews and Gentiles (1 Pet 1:1). It is also worth noting that the term “διασπορά” was also referred to the Christians who were scattered in different places of the Roman empire (1 Pet 1:1). Andrews Study Bible notes that James also metaphorically called them, in his letter as “twelve tribes which are scattered abroad (διασπορά)” (Jas 1:1) (2010, p. 1621). The nation of Israel as a chosen has already forfeited the promised of the covenant as indicated in the Jesus' statement in Matt 21:43 “the kingdom of God will be taken away from you and given to a nation producing the fruits of it.

Restorative Theology and Health: Examination of Health-Related Biblical Principles with Modern Practice of Medicine

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Abstract: The Bible is considered a divinely inspired book by Christians as the moral and living guidelines encompass all aspects of life, including physical, mental, spiritual, and social. Theologically, Christians place the Bible as the basis of all their beliefs, including the concept of origins, the problem of pain, and the restorative plan of God for humanity. In terms of restorative theology, some Christian denominations adopt health-related principles from the Bible as part of their belief in God's plan for human restoration. This paper examines the intersection of health-related Biblical principles and modern health science, focusing on comparing diet practices in the Bible with modern nutritional science. Comparative literature analysis will compare biblical principles with nutritional and medical works of literature and practitioner experiences. Findings indicate that Biblical practices such as quarantine practice and principles of a plant-based diet have shown to be like present-day nutritional and public health practices. The study provides evidence that health-related biblical principles remain impactful in the modern field of medicine.

Keywords: *Bible, physical, mental, spiritual and social, restoration, plant-based food*

Introduction

The Bible is the Book that has the teachings and practices of Christians recorded. It is divided into two parts: the Old Testament which has the same content as the Torah of the Jewish religion of Judaism and the New Testament which is a record of the life and the practices of Jesus and His apostles. The Bible has principles of preventive healthcare. There are recommendations for nutrition with different guidelines to prevent illness. They can be effectively applied in this modern era as has been proven by scholars, and modern medicine. There are also evidences from those who implement these principles.

The Bible and God's Love and Care

Christians believe that, "All Scripture is given by inspiration of God, and is profitable for doctrine, for reproof, for correction, for instruction in righteousness, that the man of God may be complete thoroughly equipped for every good work." (2 Timothy 3:16). This verse affirms that those words are from God for the benefit of all the believers. When we believe and act on it, it brings desirable results making us ready to be vessels that bring salvation to others. The Bible, therefore, contains all the teachings and advices related to human life and health issues.

When God created Adam, he was perfect in every way like Jesus who is perfect in "wisdom and stature, and in favor with God and men." (Luke 2:52). Jesus was physically, mentally, spiritually, and socially ready. These four areas are the goals Satan is determined to destroy. We are now on the battlefield between good and evil, between God and Satan. Satan seeks to destroy humans at all times. On any of these four goals, food is man's weakest point with which Satan defeated the world's first man. It convinces the mind by taking the drive of the physical body to distract the soul. Thus, as we take our spiritual defenses seriously, let's not forget that the physical side is a fragile part that Satan can easily destroy.

Satan defeated Adam and Eve through "Eating" (Gen. 3). Esau lost his birthright because of "Eating" (Gen. 25:29-34). The Israelites perished because of their "Eating" (Exodus 16). Satan first

tempted Jesus after a forty-day fast with "eating" (Matt. 4:3-4). There are many other instances where Satan used eating and drinking as temptations in which humans can rarely overcome except through Jesus alone. Satan effectively uses food to destroy the lives of human beings around the world. When people become sick, they will turn their attention away from God. Christians, particularly God's workers, preachers, and pastors who become sick will not be able to perform their duties fully. The Bible therefore requires Christians to adhere to the fruits of the Holy Spirit, especially "self-control" (Galatians 5:22-23) in order to overcome the appetite and to always recognize that the body is the temple of God. Therefore, the body should be kept clean and we should not be destroying this temple. Therefore, Paul warned "Present your bodies a living sacrifice, holy, acceptable to God, which is your reasonable service" (Romans 12:1). Caring for the body is worshiping God. That's why Satan is trying to destroy the body.

God's Plan for Man

In the Old Testament, the prophet asked the people of Israel, "Is there no balm in Gilead? Is there no physician there? Why then is no recovery for the health of the daughter of my people?" (Jeremiah 8:22). The behavior of the Israelites in Jeremiah's day was a hindrance to their spiritual and physical health.

In the New Testament, the Apostle Paul encourages Christians of his generation to change their lifestyles. "We pray that you may be made complete.... become complete" (2 Cor. 13:9, 11). The aim is for all to have spiritual progress. To be made complete (restoration) in the sense of what Paul means is to have a perfect life like Adam. Before he went astray, he had a perfect life in every way in terms of health. The Bible states, "See, I have given every herb that yields seed which is on the face of all the earth, and every tree whose fruit yields seed; to you it shall be for food" (Gen. 1:29). Following God's instruction will impact our health positively. As the saying goes, "There are many foods in the world to choose from, but fruits and vegetables are two foods that cannot be ignored." God has made man to seek holistic perfection in physical, mental, spiritual and social areas using the things that are in nature for health care by taking the following advise "Fresh air, sunlight, self-control, sleep, exercise, proper diet, drinking water, and trusting in God's power is the true protection and healing." and the guidelines of Jesus who is our Example of our life (Luke 2:52) and the plan according to God's will in the creation of man (White, 1942).

The Bible and Disease Prevention

We have heard the advertisement that says "Half vegetables and half other things" from the Ministry of Public Health campaigning for people to eat more vegetables and fruits due to the incidence of chronic non-communicable diseases. Non-Communicable Diseases (NCDs) such as cancer kills nearly 60,000 Thai people a year, accounting for a ratio of 88.34% (Strategy and Planning Division, 2019). The main reason is due to unhealthy lifestyle. If Thai people consume their diet each day in the right proportion, that is, eating half amount of the vegetables and half other things, this can reduce the risk of cancer (half vegetables, half other things). The four diseases that threaten the lives of people in today's society will also be reduced.

Non-communicable diseases in modern times such as cancer, high blood pressure, coronary artery disease, heart disease, diabetes and other diseases are not caused by pathogens but the result of unbalanced lifestyles, behaviors, unhealthy diet, lack of exercise, stress, exposure to toxins from food and the environment. All of these are important factors that cause these non-communicable diseases. In 2014, Thai people have lost a total of 14.9 million as a direct result of Disability-Adjusted Life Years (DALY) (Thai Health, 2014). When there was COVID-19 outbreak, especially among the 608 group, namely people over 60 years old, they were among the most vulnerable toward seven types of

congenital diseases such as chronic respiratory disease, cardiovascular disease, chronic kidney disease, stroke, obesity, cancer, and diabetes. From the information presented here, it shows that because of sin, human are separated from God and moving away from his health principles as mentioned in the Bible. God knows every molecule in our body. David said "I am fearfully and wonderfully made...my frame is not hidden from You....Your eyes saw my substance, being yet unformed" (Psalms 139:14-16). The Creator knows the human body best.

Doctors do not know how to heal every part of the human body. The body is a miracle beyond all human comprehension. We therefore have specialists in each disease. God knows each part of the organ so he gives us the rules as recorded in the Bible that are not difficult to follow. Everyone can implement these guidelines. By believing and following these rules, we can help prevent various diseases. It is a preventive method that God has bestowed upon mankind against any health problems. His name is "Yahweh, thy Physician" (Exodus 15:26). It is considered the oldest preventive medical advice in the Bible.

The Bible and the Food of those who Live Eternally

God gives eternal life, the life without illness and death to Adam. He prepared the food, and He said, "See, I have given you every herb that yields seed which is on the face of all the earth, and every tree whose fruit yields seed; to you it shall be for food" (Genesis 1:29). The diet of man was vegetables and plants; it is the food of those who have eternal life. God gave it to man for food before sin entered the world. Switching to other diet consumption, diet that emphasizes deliciousness over nutrition, meat, and animal fats, is therefore a major cause of NCDs.

The saying "Whatever you eat, so will your body" is true. Diet directly affects the health of the consumer. Others added that "Short-lived foods (fresh vegetables, fresh fruits) make people live longer." Instant food and processed food make consumers live shorter." The creator of this slogan is a group of people who are interested in natural food and turning back to natural healing by using food as medicine. About 2,500 years ago, Hippocrates, the Greek father of medicine stated, "Use food as medicine" (Witkamp & van Norren, 2018).

The medical personnel recognizes that the food from natural vegetables is valuable for growth and for preventing disease from our lifestyles as well. Returning to the Garden of Eden, God knows that in the future man will get sick and died from the food they eat.

Proving the Bible

According to the testimony of Prof. Dr. George Malkmus, his mother experienced a painful death from cancer. So he told himself that if he had cancer, he would not be treated with radiation and chemotherapy (Malkmus & Dye, 1995). At the age of 42, the professor got sick with colon cancer. Therefore, he sought healing from God by studying the Bible. What he discovered from Genesis 1:29 changed his food intake. He started drinking vegetable juice and eating fruit instead of the usual food. Within a year, he was miraculously cured from cancer. So he wrote the book "God's Way to Ultimate Health" which is written from his real life experiences. At one point he said, "The conclusion after my research and experience over the years is that we don't need to get sick. Diseases and illnesses are the result of self-harm. Almost all health problems except accident are caused by unhealthy eating habits and lifestyles. All we have to do is to eat and live according to the will of God" (page 26).

Dr. Malkmus believes the only food that can regenerate cells is the living food, especially fresh vegetables and fresh fruits (Malkmus & Dye, 1995). Through faith and the experience from God, Dr. Malkmus built a health care center called "Hallelujah Acres" that produces natural food for medicinal

purposes, known as the Hallelujah Diet, and many people have recovered by using the natural remedies. The interesting thing about Hallelujah diet is that great emphasis is place upon the products from vegetables. "It has been almost twenty years Since I recovered from colon cancer. What is considered the most basic and important thing that I have learned is

"God's way and the way of man are completely different."

Dr. Tom Wu, a specialist in nutrition and natural therapies from the United States was ill with with terminal lung cancer. Modern medical doctors say Dr. Wu has a few months left to live. When the current medical treatment cannot cured his disease, he turned to nature. In his book "Nature Saves," Dr. Wu recalls that experience: "In that state of despair and helplessness, I happened to think of a believing God hoping for spiritual peace. So I hurriedly picked up the Bible. knelt down and prayed to God. Strangely enough, the Bible in the hand suddenly fell to the ground and opened to chapter one of Genesis (Gen. 1:29) which is the chapter on the creation of the world. Finally, I decided to eat according to the guidelines of God" (Wu, 2010). Nine months later, the test result showed that his body has no cancer cells left. Dr. Wu was eager to testify and educate people around the world. This is a witness to show that God has used health as a mean of bringing many people to the truth.

In Dr. Douglas Winnel's article "Biblical Principles of Health," he said, "The Bible is not a health manual or a diet guide. God gave the basic doctrine introducing us to choose things that promote health and prevent diseases. In ancient Israel, priests and religious leaders, not the doctors, were the ones who gave advice regarding the health of the people and the nation. A thousand years ago God has revealed these fundamental principles in His Book. It takes medical science for thousands of years to find and confirm this truth. Unfortunately, many theologians do not understand the value of the principles of health recorded in the Bible. As a result, they fail to fulfill the duties that God has entrusted to them" (Tomorrow's World, 2001).

God knows very well that man will be destroyed by the diet he eats. After the global flood, when He allowed them to eat meat, He commanded, "Every moving thing that lives shall be food for you. I have given you all things, even as the green herbs. But you shall not eat flesh with its life, *that is*, its blood." (Gen. 9:3-4). This was forbidden by the Lord because blood is a habitat for germs, and waste products that are harmful to the body. As an epidemic prevention God also warned that "You shall not eat any fat, of ox or sheep or goat....they may be used in any other way; but you shall by no means eat it." (Leviticus 7:23-24). These days, the medical personnel had proved that animal fats are a common cause of cerebrovascular disease, heart disease, and paralysis. Dr. Winnel said that God had a reason for not allowing the Israelites to eat unclean meat (Leviticus 11). The unclean animals are a group of animals that clean up the environment, such as snails, crabs, and shrimp, which may contain heavy metal toxins, dangerous toxins, germs, bacteria and viruses. They are dangerous for consumers. When we eat these animals, it is the same as eating the creatures that God has created to be the 'Cleaners' from nature. Even though they are flavored to meet the taste, the consumer is still at risk of poisoning the body" (Tomorrow's World, 2001).

From the scan of ancient Egyptian mummies in the same era as the Israelites and Moses, Dr. Randell Thomas, a cardiologist from Mid-America Heart Institute, found that the mummies had chronic diseases such as heart disease before they died (Advisory Board, 2017). To prevent His people from suffering the same diseases as the Egyptians, God thus gave the Israelites health guidelines (Lev. 11, Deut. 14:3-21). Today, the ancient Egyptian diseases still exist in the world. It shows that the principles God gave to the Israelites are undoubtedly applicable in this day and age.

God said "If you diligently heed the voice of the Lord your God and do what is right in His sight, give ear to His commandments and keep all His statutes, I will put none of the diseases on you which

I have brought on the Egyptians. For I am the Lord who heals you.” (Exodus 15:26). While the Egyptians were sick and dying of dangerous diseases caused by their unhealthy lifestyles, God's people were safe from those diseases. Taking into account the crowds of millions (Gen. 12:37), as they kept moving, there must be a good waste disposal system such as faeces and urine to prevent epidemics. God provided a way for disposal of the waste by saying, “When you sit down outside, you shall dig with it and turn and cover your refuse.” (Deuteronomy 23:13). This is a very good advice against pestilence. The Bible is therefore the first Book to introduce the system of health that has been applied all along.

The Bible and the Special Nation

God intended His people to be a clean, holy and healthy nation. So He gave them manna, the Heavenly food to replace the unhealthy Egyptian diet. He made them worship the only true God instead of the Egyptian gods and idols. The Lord gave guidelines on public health that they may be a clean and perfect people for the priesthood to prepare the world for the coming of the Messiah. Nowadays, God's chosen spiritual Israelite Christians leave Egypt (the world). The Lord intended His church to be perfect in every area, being clean, Holy and healthy to prepare the world for the second coming of Jesus.

The Bible and the Everlasting Covenant

The Jews who follow strict health rules according to the teachings of the Bible has proven to the world that they are healthy, intelligent and more talented than other nations. In his article "Muslims Looking at Muslims", the author Dr Faruk Saleem, a former government adviser of Pakistan, had commented that "in the last 105 years, out of 14 millions Jews, 180 of them have been awarded the Nobel Prize" (The Muslim Times, 2010). He wondered what makes the Jews so intelligent. For those who understand the Bible, there's no surprise about it because the Jews obeyed the teachings of God especially in nutrition and Bible-based education.

Seventh-day Adventists is a group of Christians that adheres to the Biblical health principles. They are also known to live long and healthy. National Geographic magazine published an article regarding the result of this study (National Geographic, 2005). The US NEWS Report magazine recommends Americans to stay healthy and if anyone would like to be healthy and live a hundred years, they are to live like a "Seventh-day Adventist" (Sabbath Blog, 2009).

In addition, two health books widely recognized globally "The Health Revolution on Your Plate" (The China Study) and "How Not to Die" accept plant-based principles and made reference to the Seventh-day Adventist lifestyle (Campbell, 1987).

The Seventh-day Adventists is a group of Christians that adheres to Bible principles of health and present this principle to people around the world. The staff of Pan-American Health Organization, which is an organization affiliated with the World Health Organization (WHO), has asked the leaders of the Seventh-day Adventist Church to spread the principles of health according to the teachings of the Bible to the world. From the evidence, it is found that this principle can effectively reduce the rate of morbidity from chronic non-communicable diseases (NCDs) (ANN, 2014).

All Christians will reap the rewards of obedience, if he or she knows how to apply those practices in his or her life especially in today's polluted society. This is the intellectual challenge to the world and a challenge to the Christian faith in this day and age. We are encouraged to believe and listen to the teachings of the Bible. Good health can belong to everyone.

Devoted Christians who believe and follow the teachings of the Bible benefit their health by relying on food and things that exist naturally. It has been proven by the scholars, those who practically apply the principles and the medical evidence. According to the purpose of the doctrine, it says, "Beloved, I pray that you may prosper in all things and be in health, just as your soul prospers." (3 John 1:2).

Conclusion and Suggestion

Devoted Christians who believe and follow the teachings of the Bible will receive health benefits mainly from the consumption of plant-based foods and applying resources that exist naturally for health. By so doing, we can save the expenses of the people and the nation. It is also suggested by world-class corporate health scholars to spread this principle to the world.

There are numerous evidences to support Biblical principles on diet and nutrition that can provide solid foundation for good health. Therefore, there should be more research and publication on these principles for the prevention of sickness and for the sustenance of good health.

References

- [1] Advisory Board. (2017). The mummy's secret: 'Modern' diseases aren't so modern after all . Retrieved from <https://www.advisory.com/daily-briefing/2017/06/09/ancient-mummies>
- [2] ANN. (2014). Pan-American Organization Urges Adventists to Share Health Expertise. <https://adventist.news/news/pan-american-health-organization-urges-adventists-to-share-health-expertise>
- [3] Campbell, T. C. & Campbell, T. M. (2016). *The China Study*. C. Education.
- [4] Ludington, A. & Diehl, H. (1993). *Dynamic Living*. Review and Herald.
- [5] Malkmus, G. H., & Dye, M. (1995). God's way to ultimate health. *Shelby, Hallelujah Acres*.
- [6] The Muslim Times. (2010): Why are Jews so powerful and Muslims so powerless? Retrieved from <https://themuslimtimes.info/2012/01/26/why-are-jews-so-powerful-and-muslims-so-powerless/>
- [7] Sabbath Blog. (2019). *Live Like a Seventh-day Adventist*. Retrieved from <https://www.asabbathblog.com/2009/04/us-news-world-report-live-like-seventh.html>
- [8] Strategy and Planning Division. (2021). *Public Health Statistic 2019*. Retrieved from https://bps.moph.go.th/new_bps/sites/default/files/statistic62.pdf
- [9] Tantrarungroj, S. (2013). *Lifestyle for a Healthier Heart*. Sam Lada.
- [10] Thai Health. (2014). *Disability Adjusted Life*. Retrieved from <http://www.thaihealth.or.th/healthcontent/article/20516>
- [11] Tomorrow's World. (2001). Bible Principal of Health. Retrieved from <https://www.tomorrowworld.org/magazines/2001/may-june/bible-principles-of-health>
- [12] White, E .G) .1942 .(*The Ministry of Healing* .Pacific Press Association.
- [13] Witkamp, R. F. & van Norren, K. (2018). Let thy food be thy medicine.... when possible. *European journal of pharmacology*, 836, 102-114.
- [14] Wu, T. (2010). *Dr. Wu's Principles of Natural Cure*. Nanmee Books.