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# MARIBOJOC MUNICIPALITY: HOW THE COVID-19 PANDEMIC AFFECTS ITS TOURISM INDUSTRY

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## ABSTRACT

**Tourism development is significant as it impacts the country's progress in general and the local community. The tourism industry helps boost the Philippine economy due to the influx of local and foreign tourists from various countries who avail of different tourism services. This study aimed to explore and describe the tourism industry of the municipality of Maribojoc, Bohol, during the COVID-19 pandemic. Specifically, the study sought to determine the participants' lived experiences and the strategic plans formulated by the local and provincial government unit tourism officers during the onslaught of the global pandemic. It utilized the case study design using purposive sampling with twenty-two (22) participants broken into the following: one (1) provincial tourism officer, one (1) municipal tourism officer, and twenty (20) local tourism officers through a one-on-one semi-structured interview technique to generate views and opinions. The study revealed that the tourism industry suffered an economic crisis due to its closure which resulted in a financial burden on its operators and workers; the tourism sites appeared to be like ghost towns and experience difficulties in recovery. Considering the findings, the local and provincial governments should have a sustainable long-term budgetary plan to help the affected tourism industries, such as financial assistance, training, and workshops that may help to be more responsive when there is a pandemic reoccurrence. The tourism operators in the industry should strictly implement the provision of employee insurance benefits and financial literacy education and improve marketing strategies and services that offer maximum guest satisfaction while ensuring safety by following standard health protocols.**

*Keywords: Covid-19, pandemic, tourism, industry, experiences, case study, financial*

## INTRODUCTION

The province of Bohol, known in the country and the entire world as a tourist destination island, has become its chief economic source. It opens various job opportunities to marginalized groups in the province and contributes mainly to governmental development through its taxes. The outpouring of tourists from different parts of the globe availing of the rare sights and attractions from the tourism operators impacts people's livelihood and boosts the province's economy.

However, when the deadly virus, later named COVID-19, is said to have originated in Wuhan, Hubei, Province of China, dated back on December 31, 2019, broke out in the country, things dramatically changed the landscape of the people's way of life (Gössling et al., 2020). One of the most noticeable aspects that have primarily been affected by the continuing health crisis is the tourism industry, which is considered the people's lifeblood as the chief source of income of the local folks.

The tourism industry has been one of the key economic drivers in many developing and first-world countries. The government manages its tourism industry in the Philippines through the Department of Tourism (DOT). DOT regulates tourism activities by implementing appropriate and responsive ordinances that encourage and safeguard excellent services among the stakeholders.

In the town of Maribojoc, the municipality of Bohol, which is also known for its natural features and historical landmarks that include the Abatan river (an ecotourism destination), the historical landmarks Punta Cruz Watchtower (the old-stone church of the Holy Cross Parish, now Diocesan Shrine of Saint Vincent Ferrer), the sports tourism activity known the Dragon boat having its features only two dragon boats in the whole province. Undoubtedly, through the Local Government Unit's efforts spearheading various programs and initiatives that take care of the tourist attractions, the town is one of Seal of Good Housekeeping and a Galing Pook Awardee in 2012.

The global pandemic affects not just the tourism destinations themselves but the human resource that runs the industry, most especially to the tourism stakeholders, either government or private entities. The drawbacks being experienced require more aggressive initiative to recover (Chung-Shing et al, 2020). One of the keys to recovery from the pandemic's negative impact is stakeholders who thoroughly understand the needs and build mutual trust with other sectors to strengthen the partnership, promoting higher inclusivity in future disaster management and untoward incidents.

The Keynesian Economics Theory by John Meynard Keynes proposed that supply generation is an outcome of demand (Jahan et al., 2014). To redeem the economy from a devastating recession, the government must interfere with its national economy by increasing its expenditures b, giving financial assistance, and lowering its taxes. Doing this may stimulate demand despite the country's recession due to the pandemic. Currently, the tourism industry provides 1 in 11 jobs worldwide, according to United Nations Sustainable Agenda 2020 (Hall, 2019). By providing access to employment possibilities, the tourist sector may assist youngsters and job seekers in enhancing their knowledge and skills to create and execute programs and policies that promote sustainable development, provide job opportunities, and highlight indigenous goods and culture.

The Theory of Change by Kurt Lewin (1947) posited three steps in handling change, namely: (1) unfreezing, (2) changing, and (3) refreezing. For Lewin, managing change entails conceptualizing the idea that change is necessary. An organization moves to desirable new actions and ultimately crystallizes that behavior as the norm. Lewin (1947) posited that an organization must thoroughly understand its steps or activities to reach desirable outcomes. It applies at any level of organizational interventions (e.g., programs or organizational policies and strategies). Hence, an accurate assessment and reflection on the implemented programs in the tourism industry will eventually lead to positive outcomes if sustained.

Moreover, Republic Act No. 11494, or Bayanihan to Recover as One Act, mandates the Department of Tourism to extend assistance to the heavily affected businesses that fall under the tourism industry, including tourism-oriented barangay and cooperatively engaged tourism-related activities or other informal sector members of the tourism economy. In view further, the State acknowledges tourism as a crucial element of the national economy and industry. Thus, it is necessary to critically assist the sector and subsidize it to the extent that innovative programs, infrastructure product sourcing, and domestic package tours will augment the tourism industry. To this end, the Department of Tourism (DOT) shall serve as the principal government agency responsible for planning, programming, coordinating, executing, and regulating the tourism industry's development and promotion. It ensures that LGUs adhere to national criteria for licensing tourist firms and coordinating, integrating, prioritizing, and implementing local tourist development strategies.

With the preceding observations, the researcher finds it very timely and relevant to assess the stakeholders' strategies to recalibrate its operations, though limited, and encourage patronage among tourists despite the emerging threat of COVID-19. Through this, the concerned authorities may implement programs that center on promoting the tourism industry.

## **PROBLEM**

This case study has explored and described the lived experiences of the selected people engaged in the tourism industry of Maribojoc, Bohol, during the COVID-19 pandemic. Specifically, this study sought to answer the following questions: (1) what are the significant experiences of the participants in the onslaught of the COVID-19 pandemic?; (2) How did the local and provincial government units undertake strategic tourism planning to realize its short-term and long-term goals?; and (3) How did the

government respond to the current pandemic's socio-economic threat concerns with the tourism industry's downward trend?

## METHODOLOGY

This case study used phenomenology as its design that aims to explore and describe the lived experiences of the participants engaged in the tourism industry of Maribojoc, a municipality located in the southeastern part of Bohol, approximately 14 kilometers away from the province's capital city. As a first-hand source of information, they can demystify and elaborate on the industry that is not yet thoroughly understood from the outsiders' point of view. The researcher employed a semi-structured interview with an interview guide to gather the data. There was a total of twenty-two (22) participants in the study, of which two (2) were tourism officers from the municipal and provincial government units, thirteen (13) local tourism stakeholders, and seven (7) residents using the purposive sampling technique. The researcher personally interviewed the respondents following the minimum health protocols imposed by the Inter-Agency Task Force for Emerging Infectious Diseases (IATF), such as using facemasks, and face shields, undergoing disinfection procedures, and maintaining social distancing. Then, the researcher asked the participants to allow recording devices for review purposes.

## FINDINGS

### I. Lived Experiences of the following Sectors in the Onslaught of COVID-19

#### a. Provincial Government Unit

***Snail Pace Tourism Recovery.*** The researcher uses this theme to describe the status of the tourism industry from the onset of the pandemic to this point based on the informant's response representing the provincial government. The tourism industry is far from its complete recovery stage due to travel restrictions which cause difficulties among tourists in sites for leisure activities.

*"The Tourism of Bohol suffered a huge hit- in the eight months of quarantine (lockdown) amounting to 15 billion in revenues has been lost, affecting over 40% or 200,000 of its local tourism workers. Due to quarantine restrictions, there are relatively limited business operations and movement of people in the province. Bohol, as of now, is far from recovery from the pandemic-triggered a slump in the industry even after we started welcoming travelers again last November."*

*(I-A, Capitol Building, Tagbilaran City)*

#### b. Local Government Unit

***No operation, no income.*** Without function, revenue has been directly affected since the process is the chief source of income from local and foreign tourists. The informant revealed a time when operation resumed, but it never lasted longer since there had been surging cases of local transmission. As a result, the economic status of the tourism operators became even more difficult.

Based on the informant's response, the researcher sensed that the tourism industry had experienced a total economic backdown, leading to a loss of income among workers since tourism owners no longer had enough financial means to fund the salary of their workers. It is imperative that since the operation was clogged, workers had to temporarily cease to work as there could be no income to support their wages.

#### c. Tourism Stakeholders.

Based on the informants' responses relative to their lived experiences during the onslaught of the pandemic, the researcher came up with the following themes.

***The Doom and Gloom of the Industry.*** With the closure of the operation, tourist sites appeared to be like ghost towns. There had been few or almost none on the premise compared to the previous years. If a few guests were coming, a local tourist or a family circle, they usually brought along with their food and never mind buying souvenir items from the stalls nearby. The guests never stayed for long, but only a matter of hours. Then, it took a while before other guests would come. The rooms became empty while its amenities and facilities maintenance remained the same.

*"Customers were scarce during the limited resumption of tourism operations. Most tourists visible on random days were locals who opted to bring their food provision and never mind buying our food items. So, some delicacies will be expired while not being sold since they were perishable items leading to profit and capital loss."*

*(I-B, 45, F, Municipality of Maribojoc)*

*"Due to the limited presence of customers in the tourist sights, there is relatively less income which is not proportionate to living costs. As a result, our livelihood is greatly affected by the continuing decline in revenue."*

*(I-C, 31, M, Municipality of Maribojoc)*

**Colossal Economic Breakdown.** All informants stated that the closure of the tourism industry resulted in a severe income loss as they primarily depend on their livelihood in tourism operations. With few tourists availing of the services of the attractions, the business operators near the tourism sites lost a significantly significant portion of their income through selling various items, e.g., souvenirs, foods, and snacks. Boat operators lost income since very few or almost no guests were hired for their services, such as firefly watching, kayaking, and river tours. Adding to the plight of the stakeholders are their existing loans for their capital investment to keep their business operations running. Before the pandemic, many tourism stakeholders availed of financial and car loans for the guests' convenience. Thus, when the operation stopped due to the pandemic, they experienced extreme financial setbacks in paying for their existing loan obligations to different financial institutions.

*"From the onset of the massive lockdowns up until now, there have been no bookings for tourism services such as boat travel and fun activities leading to complete income paralysis among marginalized operators who depend on customers' fees. Since our income depends on actual operation, having no customers means no income."*

*(I-D, 35, M, Municipality of Maribojoc)*

**Ingenious Initiatives Undertaken.** Since stakeholders have uncertain financial assistance from the government, the informants expressed their means of coping with the pandemic's economic crisis. This theme describes the respondents' resources and varied strategies utilized to solve the financial challenges in front of them.

*"In the light of the continuing threat, we just diverted ourselves to finding alternatives to sustain our living by using our boats for fishing instead of fetching tourists for mangrove attractions. The meager income due to the limited number of clients could not suffice our means of living, so we just resorted to fishing for practical reasons. In addition, we came to austerity measures to keep our tourism site working at its best by focusing on repair strategies in the absence of regular guests. In so doing, the tourism site would eventually become ready for the resumption of operation at any time based on the order of the IATF."*

*(I-E, M, 53, Municipality of Maribojoc)*

## **II. Strategic Plans formulated by Tourism Officers for Rehabilitation and Restoration of the Tourism Industry.**

**Uncertain Financial Assistance.** Most informants stated that they heard that the government would extend financial assistance to the displaced tourism workers or those who lost income due to the closure of tourism industries. However, it was several months ago, but nothing came to them as they had hoped for it. There was a time that the government gave financial assistance through the Department of Social Welfare Services, known as the Social Amelioration Fund. Still, unfortunately, they were unable to receive such after being informed that they did not qualify as recipients of the said cash assistance. In addition, they heard that their barangay would provide cash assistance to them, but nothing happened after several months since the hearsay broke out.

*"We have the plan to extend rehabilitation initiatives to the tourism industries like the proposed National Historical Commission of the Philippines Landmark Site Development; however, this project needs assistance, and to our end, we have to follow up with the provincial government since it needs a big source of fund. In terms of assistance to our displaced workers, it is beyond our control since we depend on the support from the higher government since we do not have enough funds to cater to the massive demands of the people"*

*(I-F, 52, F, Municipality of Maribojoc)*

### III. Effectiveness/Ineffectiveness of Strategic Planning undertaken by LGU for Realization of Long- and Short-Term Goals.

**Financial Access Denied.** Most informants said they never received equitable financial access from the government to alleviate their pressing economic conditions. However, those tourism workers of municipality-run tourism sites showed satisfaction in terms of other means of support exerted by the government, like absorbing the displaced workers into the different departments, e.g., Agriculture, to receive remuneration continuously. The barangay-based funds absorbed others for their wages by equally distributing them to quarters as their official duty time. On the contrary, workers from privately-owned tourism industries showed no satisfaction in terms of strategic planning exerted by the government as they did not receive any assistance from the government to help them out with their economic drawbacks.

*"For over six months of lockdown, we never received any financial assistance from the government, even in the so-called Social Amelioration Fund, since we were accordingly not qualified to avail such. However, we observed that some vendors like us received it while others are not, so it was unfair. Some of those who received it have kids working abroad, while we who never had the same did not get anything.*

*(I-G, 45, F, Municipality of Maribojoc)*

#### Local Government Unit

**Scarcity of Funds.** The informants revealed that in as much as they wanted to exhaust whatever means to support the plight of the tourism sector within its jurisdiction, deficiency of funds hampers them from reaching out for financial assistance to the displaced tourism workers, both publicly and privately run tourism industries. Due to huge numbers of affected workers, the LGU cannot afford to continually give financial aid to the latter. It tried to seek funds from the Department of Labor and Employment but said the request is pending approval.

*"We had strategic plans to alleviate the pressing state of the local tourism of Maribojoc; however, these long-term projects need assistance from the provincial government. That is why we are to follow the processes they prescribed at our level, considering it requires a significant source of funds.*

*(I-H, F,45, Municipality of Maribojoc)*

On the provincial tourism side, the respondent expressed a firm stance on the strategic measure that the office initiated to respond to the plea of the affected stakeholders:

*"As we re-opened our tourism industry last November 15, 2021, the resumption of operation shall adhere to the policy - Not for mass tourism. A response strategy to sustain tourism by catering to lesser tourists to implement health and safety protocols. To further our cause, we advocated the tagline Balik sa Bohol: Bohol Online Sale, a program in which the island-wide travel sale will offer discounts of up to 70 % on accommodations, dining, and tour services which aims to promote domestic tourism among the public further and encourage them to see Bohol's natural and cultural wonders. With this program, we look forward to more people traveling to Bohol to see and experience the beauty and wonder of the province."*

*(I-I, F, 40, Tagbilaran City)*

### IV. Government's Response to Socio-Economic Threats by COVID-19 on Tourism Industry. On Tourism Stakeholders

**Insufficient Fund Assistance.** Most informants stated that they just did their ways and means to cope with the intense economic breakdown due to permanent loss of income. To meet both ends, they availed of a loan to lending institutions with exorbitant interests. They never relied on the government to help them battle the economic crisis as it takes a while to receive financial assistance due to the lengthy process and delayed response.

*To sustain our living amid the crisis, we resorted to avail loans from lending companies with exorbitant interest. Due to less income, we never purchased items from the supplier to roll the business. For some of our unsold items owed by the customers with the uncertainty of payment from them, we just took the risk; otherwise, we would never totally get the chance of getting back our capital.*

*(I-J, F,45, Municipality of Maribojoc)*

### **On government**

**More Demands, Less Supply.** With complete paralysis in operation, the government could hardly generate income. As a result, the accumulation of funds is slower, resulting in the disproportionate distribution of allotted financial assistance to the affected workers. Even when the government links with other agencies, the support still cannot suffice the needy public's enormous demands.

*"The overwhelming number of affected individuals made it even more difficult for the government to allocate financial assistance considering that it needs a huge budget, which is what we lack. There will be a budget from the DOLE, but it would take time to comply due to volumes of requirements, which would pressure the availing affected workers to comply."*

*(I-I, F,40, Municipality of Tagbilaran)*

## **CONCLUSIONS**

In the premise of Keynesian economics theory by John Maynard Keynes, the government must have an active policy to manage aggregate demand to address or prevent economic recessions. Although the government extends financial assistance by all means to the affected individuals, it cannot afford to assist the overwhelming number of individuals suffering from extreme financial needs due to the pandemic.

In the course of the continuing threat to the economy brought by the pandemic, expectation and actual outcome performance are the two most important variables influencing satisfaction measure judgment under the Expectancy-Disconfirmation Paradigm Theory. Based on the participant's perception of their level of satisfaction, the government supposedly responded to their pressing condition and the actual outcome they received. The participants expressed dissatisfaction with governments' initiatives and strategic measures to alleviate their economic downfall.

Furthermore, the government needs to increase its preparedness, readiness, and response mechanism to alleviate the affected people's economic suffering due to health emergencies, particularly COVID-19. Since COVID-19 will not be the only pandemic that may hit the county in the future, thus, the government must be resilient enough to undertake strategic measures to save the struggling workers from the loss of income due to clogged operations of the tourism sectors.

## **RECOMMENDATIONS**

The researcher came up with the following recommendations in light of the findings and conclusion.

- The national government should provide sound policies to avoid drastic lockdown declarations. Instead, it should intensify its regulatory measures in preventing the spread of infectious diseases to develop confidence among our tourists in availing of tourism services and amenities. Such ways may balance, if not the economic gains and losses.
- The government, including concerned agencies like the Department of Social Welfare and Development, Department of Tourism, and others, may devise a sustainable long-term budgetary plan for the affected individuals, which includes training or workshops that may help them to be more responsive if another wave of a pandemic may occur and facilitate coping strategies for mental health recovery.
- Improve the delivery of assistance and other services like lessening the documentary requirements in availing financial aid from government agencies.
- At the same time, the tourism operators may intensify their insurance benefits to employees and provide enhanced financial literacy education to them. They may improve their marketing strategies and services that offer maximum guest satisfaction while ensuring their safety by religiously following standard health protocols.

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# KNOWLEDGE DIMENSION PRACTICES OF PROFESSIONAL EDUCATION STUDENTS DURING THE NEW NORMAL: IMPLICATIONS TO TEACHING IN AN ACTUAL SCHOOL SETTING

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## ABSTRACT

The COVID-19 pandemic has wreaked havoc across all sectors all over the world, and that deeply impacted negatively to the education sector. The education sectors worldwide have initiated a response to ensure learning continuity amid the pandemic. The highlight of this study ascertained the knowledge dimension practices of Professional Education students during the new normal and its implications to teaching in an actual school setting. This study employed a mixed method approach using mean, standard deviation, and thematic analysis. Sixty-one (61) SED students were purposively chosen as respondents who have undergone 18 units of their Professional Education subjects. Significant findings revealed that the knowledge dimension predominantly practiced by the SED students during the new normal is metacognitive knowledge. This implies that they have self-awareness and understanding of their cognition, including learning techniques, contextual and conditional information about cognitive activities, and self-knowledge. On the implications to their teaching in an actual school setting, this knowledge dimension practices honed them to become; (1) skilled and holistic; (2) proficient in teaching intervention; (3) 21st century teachers; and (4) knowledge facilitators. Based on the findings, it suggests the following: (1) facilitate teaching to ensure consistency and effective use of the knowledge dimensions; (2) strengthen students' teaching-learning skills during actual teaching through practice and application of the knowledge dimensions, thereby becoming proficient teachers for the appropriate teaching-learning environment.

*Keywords: Knowledge Dimension, Conceptual Knowledge, Factual Knowledge, Metacognitive Knowledge, Procedural Knowledge, Professional Education Subjects, New Normal*

## INTRODUCTION

The advent of the COVID-19 pandemic had a profound impact on all countries across the globe. This sends school authorities to launch a response to ensure continuity of learning amid the lockdown due to the pandemic. With this, the learning modality is shifted from the traditional learning modality to the online learning modality. However, this response from the education sector raises several questions and apprehensions about the performance level of the students learning, in the course of the new normal. Barrot, Llenares & del Rosario (2021) explained that a global health emergency had hit the educational system. Subsequently, governments worldwide have initiated a crisis response to offset the pandemic's negative impact on education. Curriculum adjustments, supply of technical resources and infrastructure, shifts in the academic calendar, instructional delivery, and evaluation guidelines are crafted to meet the educational needs of the new normal education. Higher Education Institutions are under growing pressure to modernize since education was perceived as needing to adapt to satisfy the conceptual demands of our day (Karanicolas et al., 2015). Thus, the assessment of students is a crucial part of any professional's work in further and higher education, and it is a field that is constantly evolving.



One of the bases for assessing what students have learned in their studies and whether it aligns with what they need to know is to use Anderson & Krathwohl's (2001) Revised Bloom's Taxonomy. The Revised Bloom's taxonomy provides a framework for classifying different student distinctions and better understanding students' knowledge, strengths and areas of need, to meet educational goals and is composed of four categories (Anderson & Krathwohl, 2001). First, is Factual knowledge which is a classification of learning the basic terminologies and appropriate details and elements that a student must know and work with, to solve problems. Second, is Conceptual knowledge, which is the classification, principles and generalizations, theories, models, and structures of learning the interrelationships between basic factual information that indicate how parts function together. Third, is the Procedural Knowledge category, which applies the methods of inquiry, skills, algorithms, strategies, and methodologies to evaluate how something was carried out. Lastly, is Metacognitive Knowledge, in which students who develop this dimension, have the self-awareness and understanding of their cognition, including learning techniques, contextual, and conditional information about cognitive activities, and self-knowledge.

On the other hand, the Professional Education subjects taken by the education students are essential for them to gain an understanding of the theories, concepts, and teaching techniques. This acquisition of the knowledge dimension will capacitate them to become competent and skilled teachers in the future. Western Governors University (2020), asserts that current and future teachers must be trained to be prepared to educate children daily, and recognizing varied learning styles is a vital component of education. Teachers can benefit from varied well-established learning theories as they prepare to assist students in the classroom. In addition, teachers who are familiar with learning theories can employ a variety of approaches in their classes to accommodate various types of learners. This can assist all learners in achieving high academic performance.

In the Academic Year 2019-2020, before the onset of the pandemic, records from the promotional report of the registrar showed that 82% of the SED students successfully passed the Professional Education subjects. However, in the following year, 2020-2021, on the onset of the new normal, the promotional report shows that only 69% of the Education students have successfully passed the Professional Education subjects. There is a drop of 13% in the passing rate of the Education students.

The complete shift of delivering instruction to students during the new normal brought about by COVID-19 prompted the researchers to delve into the knowledge dimension practices of professional education students and the implication of these knowledge dimensions in an actual school setting. It is hoped that this undertaking would evolve a more comprehensive delivery of professional subjects, thereby enhancing the knowledge and skills of students to become competent teachers of 21st-century learners.

## LITERATURE REVIEW

### *Revised Bloom's Taxonomy: Knowledge Dimension*

Max Englehart, Edward Furst, Walter Hill, and David Krathwohl, Benjamin Bloom released the taxonomy of Educational Objectives in 1956 as a framework for classifying educational aims. Bloom's Taxonomy is a well-known teaching framework utilized by generations of K-12 teachers and college professors (Armstrong, 2020). Bloom's Taxonomy, as it is often known, is a classification system for educational goals that can be utilized by classroom instructors and educational leaders alike in the construction of test items and instructional objectives. Every instructor must decide how to interpret these goals in his/her lessons and assessments to encourage students to move through each level and develop higher-order thinking abilities (McBain, 2011).

As stated by, Krathwohl (2002), the Taxonomy of Educational Objectives is a classification system for educational aims, objectives, and recently, standards. In addition, White (2019) emphasized that Bloom's taxonomy, combined with knowledge dimensions, creates a tool kit to support the attempts in giving the students comprehensive undergraduate educational options. Bloom's taxonomy allows teachers to pose challenging questions to students to assess their knowledge as the facts provided form the basis of their justification of an answer. It also promotes students' ownership and sense of power over their education, as students can be motivated in a way that encourages them to make judgments and commit to an idea, allowing them to revise their answers (London School of Management Education [LSME], 2019).

According to Coccoli, Vercelli & Vivanet (2013), the Knowledge Dimension is composed of four types of knowledge: (1) Factual knowledge which includes the fundamental elements that students must understand to become familiar with a discipline or solve problems in it; (2) Conceptual knowledge which provides students the knowledge of the interrelationships that allow essential elements within a larger structure to work together; (3) Procedural knowledge which includes how to do something, methods of inquiry, and criteria for students to use; and (4) Metacognitive knowledge which encompasses both a broad understanding of cognition as well as awareness and understanding of one's cognition.

As reported by Hew & Cheung (2014), one of the most frequent forms of knowledge that students are supposed to master is factual knowledge. Factual knowledge may be defined as the fundamental facts of a subject or field that students must be familiar with. In addition, student value Factual knowledge because it provides the foundation for understanding the broader links between significant pieces of information that characterize a topic. This knowledge may and must be acquired by exposure, repetition, and memory commitment. It is common knowledge that to achieve a goal and one must be aware of the relevant "facts" (Tapia, 2018).

In addition, Tapia (2018) expounded that conceptual knowledge is similar to factual knowledge. It involves understanding the interrelationships and functions between the features and elements that make up a larger structure. Understanding information classification and categorization, knowing principles, generalizations, and knowing theories, models, and structures are all included in this description. In a nutshell, conceptual knowledge is the ability to organize information in meaningful ways. Jain (2021) highlighted that students might draw on what they have learned and use conceptual learning to apply it to new areas through conceptual knowledge. It helps students and teachers gain a complete understanding of how topics interact with one another and create an example that will be remembered and empower them throughout their educational and professional careers. Conceptual learning aids future learning. It is built on a firm foundation that promotes understanding across different points of view. Both the instructor and the student play an essential part in conceptual comprehension, and the teacher provides tasks or difficulties that motivate students to construct an idea ultimately.

Moreover, Procedural knowledge is information on how to carry out a task. It is a particular skill that includes knowledge about techniques, processes, and equipment functioning. Implicit knowledge, or know-how, is another name for procedural knowledge. This knowledge category is essential for goal achievement because it turns the "what" into action through the "how" process. Knowledge of (1) subject-specific abilities and algorithms, (2) subject-specific approaches and methods, and (3) criteria for determining when to apply the correct processes are referred to as procedural knowledge (Tapia, 2018).

Furthermore, Brookman-Byrne (2018) explained that the capacity to think about and control one's thoughts is known as metacognition. Metacognitive techniques can help students do better in school. As a result, it is a solid, evidence-based intervention target. Metacognition also includes the capacity to control one's thinking, or metacognition. It goes beyond basic knowledge of mental processes to include the power to change ideas and behaviors. Tapia(2018) added that metacognitive is understanding cognitive tasks (i.e., contextual, conditional), and self-knowledge. Bloom's taxonomy is a technique that human services instructors may use to assist their students in studying more deeply.

Furthermore, Anderson & Krathwohl (2001) revised the taxonomy of educational objectives which is one of the most widely used methods for defining them. Simply, it is a system for classifying statements about what students should know as a result of education. Moreover, the Knowledge Dimension is a term that denotes particular educational material. In other words, any learning objective is defined by a verb and an object, with the former referring to the cognitive process and the latter identifying the knowledge that students should gain.

## METHODS

### Research Design

A mixed-method approach was employed in this study whereby researchers collect both quantitative and qualitative data. According to Wisdom (2013), mixed-method research is especially beneficial to interpret gaps between quantitative and qualitative findings. Second, mixed methods research gives the participants a voice and ensures that the study's conclusions are based on their experiences. Finally, by combining quantitative and qualitative research and data, the researchers receive a greater breadth and depth of insight and confirmation while mitigating the drawbacks of each technique on its own.

## Locale

This research study was conducted at San Isidro College. San Isidro College was established when Malaybalay was still a young capital town of Bukidnon. It is the only Catholic Institution of learning in the locality and the oldest in the province. It was founded by the late Fr. Joseph Reith, S.J., in July 1949. Currently, San Isidro College continues to serve the community as the only Catholic college in Malaybalay City. San Isidro College offers primary education from pre-school up to Grade 6, Junior and Senior High School, and the college level which offers ten (10) programs.

## Participants

The total respondents of the study were sixty-one (61), purposively chosen Education students who have taken up at least 18 units of Professional Education units. Researchers purposively selected third-year and fourth-year education students as respondents because they have better knowledge about concepts, theories, and teaching techniques acquired from professional education subjects taken.

## Research Tool

In this study, a researcher-made self-assessment survey questionnaire was used to answer problems 1 and 2 to determine the knowledge dimension predominantly practiced by Professional Education students and the implications of these knowledge dimensions in an actual school setting. Part I of the researcher-made survey questionnaire consists of 20 statements to answer problem 1. Part II has one interview question to answer problem 2. Two experts examined the survey questionnaire for its content validity. As for reliability of the questionnaire, it undergone a reliability test to measure its internal consistency and it obtained a Cronbach Alpha of .744. A reliability coefficient of .70 or higher is considered acceptable in most social science research situations (Mocknovak, 2016). Thus, the questionnaire is self-administering with simple and straightforward instructions and was conducted using google form and sent online.

## Data Gathering Procedure

With the approval of the VPAA and the Dean, the researchers sent an informed consent form to the respondents via messenger or email. The informed consent was secured to respect the respondents' freewill to decide on whether to participate or not in the study. Thus, the respondents are assured that the results will be treated with utmost confidentiality and anonymity. The ethical standards for researching with humans were also considered in this study. The gathered information and data were tallied and analyzed for interpretation purposes. Moreover, the researchers used Descriptive Statistical Analysis using SPSS and Thematic Analysis. Descriptive statistics helps to describe the connection between variables within a sample or population. While the thematic analysis emphasizes the interpretation of the data by using themes to interpret the qualitative data.

## RESULTS

**Table 1. Result on the Factual Knowledge Practices of Professional Education students during the new normal**

<i>When learning during the New Normal, I,</i>	Mean	Std. Deviation	Description
1. studied the theories, concepts, and foundation of education	3.70	.882	Often
2. acquired knowledge on the principles on how to handle the child and the adolescents	4.13	.670	Often
3. studied the teaching profession	4.36	.707	Always
4. studied several methods and strategies of teaching	4.26	.680	Always
5. studied facilitating learner-centered teaching	4.27	.755	Always
<b>Overall</b>	<b>4.14</b>	<b>.557</b>	<b>Often</b>

LEGEND: Never - 1.00-1.80, Rarely - 1.81-2.60, Sometimes - 2.61-3.40, Often - 3.41-4.20, Always - 4.21-5.00

The results above imply that during the new normal, the SED students practiced the indicators in the Factual knowledge *most of the time*. This implies further that SED students could study and define essential information in their Professional Education subjects and acquire skills and knowledge on founda-

tion, theories, concepts, methods, and strategies in teaching. This claim was supported by Hew & Cheung (2014) that factual knowledge is crucial as it gives fundamental facts about a subject or field that students must be familiar with. In addition, a student should value factual knowledge because it provides the foundation for understanding the broader links between significant pieces of information.

**Table 2. Result on the Conceptual Knowledge Practices of Professional Education students during the new normal.**

<i>When learning during the New Normal I,</i>	Mean	Std. Deviation	Description
1. can conceptualize the theories, concepts, and foundation of education	3.70	.715	Often
2. can make a hypothesis on the theories and principles of child and the adolescent behavior	3.73	.793	Often
3. can visualize the teaching profession	4.06	.793	Often
4. have to innovate several methods and strategies of teaching	3.98	.695	Often
5. believe that I can facilitate learner-centered teaching	4.27	.609	Always
<b>Overall</b>	<b>3.95</b>	<b>.566</b>	<b>Often</b>

LEGEND: Never - 1.00-1.80, Rarely - 1.81-2.60, Sometimes - 2.61-3.40, Often - 3.41-4.20, Always - 4.21-5.00

It can be gleaned in table 2 that SED students are using their knowledge to conceptualize theories, methods, and strategies in teaching. This reveals that during the new normal, students were able to conceptualize, visualize and innovate their knowledge of Professional Education students. Among the five indicators in the conceptual knowledge dimension, 36.1% of the respondents said that they always believe that they can facilitate learner-centered teaching during the new normal. The mean of the fifth indicator accumulated  $\bar{x}=4.27$  and  $\sigma=.60913$ , interpreted as the students practicing the indicator *all the time*. This fact will highly contribute to their professional development as they become teachers in the future. This result reveals that the students who practice conceptual knowledge can visualize the connection of theories, concepts, and methods in teaching, to employ an effective teaching and learning process. The result of this study supported the claim of Tapia (2018), which explained that, in the conceptual knowledge dimension, a person who develops or practices this, could understand the interrelationships of functions and concepts, information classifications, categorization, knowing principles, generalizations, knowing theories, models, and structures to organize information in meaningful ways.

**Table 3. Result in the Procedural knowledge Practices of Professional Education students during the new normal.**

<i>When learning during the New Normal I,</i>	Mean	Std. Deviation	Description
1. could apply the theories, concepts, and foundation of education	3.91	.737	Often
2. develop a method on how to handle the child and the adolescents	3.96	.657	Often
3. can apply the processes included in the teaching profession	4.18	.695	Often
4. try to practice several methods and strategies of teaching	4.32	.651	Always
5. could facilitate a learner-centered teaching	4.26	.704	Always
<b>Overall</b>	<b>4.13</b>	<b>.563</b>	<b>Often</b>

LEGEND: Never - 1.00-1.80, Rarely - 1.81-2.60, Sometimes - 2.61-3.40, Often - 3.41-4.20, Always - 4.21-5.00

As shown in table 3, the overall mean ( $\bar{x}=4.13$ ) and ( $\sigma=.563$ ) were described as often. This means that in terms of their procedural knowledge as Professional Education students, they were able to practice this dimension during the new normal. Furthermore, in the new normal, students try to practice several methods and strategies of teaching. This is essential knowledge in teaching wherein students can practice different methods and strategies in the teaching and learning process. This significantly helps them, as they become teachers in the future. This data result was supported by the research study of Tapia (2018) which explained that students can practice particular skills that include knowledge about techniques, processes, and equipment functioning, implicit knowledge, or know-how. This knowledge category is essential for goal achievement because it turns the "what" into action through the "how" process.

**Table 4. Result of the metacognitive knowledge Practices of Professional Education students during the new normal.**

<i>When learning during the New Normal, I know my thoughts and the factors that influence my thinking about...</i>	Mean	Std. Deviation	Description
1. the theories, concepts, and foundation of education	4.04	.739	Often
2. the principles on how to handle the child and the adolescents	4.06	.704	Often
3. the teaching profession	4.14	.749	Often
4. methods and strategies of teaching	4.29	.691	Always
5. facilitating learner-centered teaching	4.31	.671	Always
<b>Overall</b>	<b>4.17</b>	<b>.593</b>	<b>Often</b>

LEGEND: Never - 1.00-1.80, Rarely - 1.81-2.60, Sometimes - 2.61-3.40, Often - 3.41-4.20, Always - 4.21-5.00

The overall mean ( $\bar{x}=4.17$ ) and ( $\sigma=.59383$ ) reveal that the students often use their metacognitive knowledge during the new normal. The highest mean among the five (5) statements ( $\bar{x}=4.31$ ) and ( $\sigma=.67184$ ), implies that the students know their thoughts and the factors that influence their thinking about “facilitating learner-centered teaching”. This implies further that students always practiced this indicator in the metacognitive knowledge dimension. The importance for a teacher to facilitate learner-centered teaching is essential in fostering 21st-century skills to let students, develop, explore, and construct their knowledge. Moreover, the metacognitive knowledge practices of Professional Education students helped them create new meaning about the foundation, concepts, theories, methods, and strategies in teaching as they become future teachers. This claim was supported by Brookman-Byrne (2018) when he expounded on the idea that metacognitive knowledge can help students do better in school. As a result, it is a solid, evidence-based intervention target. This dimension also includes the capacity to control one's thinking or metacognition. Students can change and create ideas and behaviors beyond basic knowledge of mental processes.

**Table 5. The overall result of the knowledge dimension practices of Professional Education students during the new normal.**

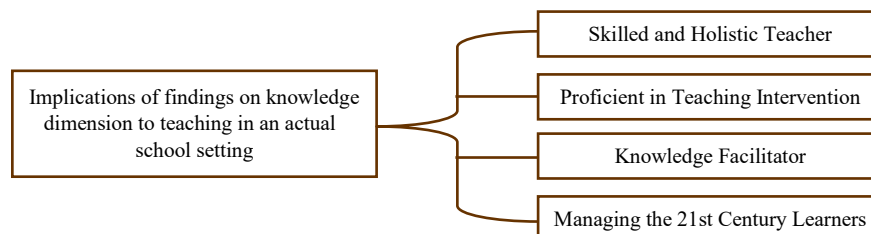
Knowledge Dimension	Mean	Std. Deviation	Description
Factual Knowledge	4.14	.557	Often
Conceptual Knowledge	3.95	.566	Often
Procedural Knowledge	4.13	.563	Often
Metacognitive Knowledge	4.17	.593	Often
<b>Overall</b>	<b>4.10</b>	<b>.474</b>	<b>Often</b>

LEGEND: Never - 1.00-1.80, Rarely - 1.81-2.60, Sometimes - 2.61-3.40, Often - 3.41-4.20, Always - 4.21-5.00

Table 5 reveals the summary results of the knowledge dimension practices of the Professional Education students during the new normal. The overall mean ( $\bar{x}=4.10$ ) and ( $\sigma=.47469$ ) was described as often. The knowledge dimension with the highest mean is Metacognitive Knowledge which implies that the SED students practiced this knowledge dimension most of the time during the new normal. Education students who develop metacognitive knowledge in Professional Education subjects can share their thoughts about the different theories, concepts, methods, and strategies in teaching.

***Implications of findings on knowledge dimension to teaching in an actual school setting***

Teaching is a career that is all about encouraging and motivating learners to reach their full potential. The most excellent teachers in history have dedicated their careers to motivating and enabling their learners to achieve greatness and be decent people (Verma, 2020).



**Figure 2: Themes that Emerged from the Participants' Responses**

Figure 2 above displays the themes from the participants' responses.

### **Skilled and Holistic Teacher**

According to Roberts (2007), many studies have been done on what makes a difference in student accomplishment in the previous ten years. It is now apparent that what instructors know is the single most critical driver of what students learn. Instructors' qualities, knowledge and abilities have a significant impact on student learning than any other element. The SED students responded that the implication of these knowledge dimensions to teaching in an actual school setting would make them skilled and holistic teachers. SED students responded:

*"The implication of these four-knowledge dimensions will help me in providing excellent teaching and learning in the future. It prepares me to become a versatile teacher. It is important because it teaches me a lot of learning about education and guides me in my learning to be a good teacher".*

*"These four-knowledge dimensions will help me be an effective teacher in the future. It allows me to enhance myself as a teacher and lifelong learner, making my teaching-learning effectively productive and progressive".*

*"These four-knowledge dimensions will help me be to become competent and skilled future educator."*

*"These four dimensions can really helpful and be apply to oneself in order to be more creative and innovative as an educator."*

These responses explained that SED students were able to identify the importance of acquiring knowledge and how to use it to help them become skilled and holistic teachers. This implies that the four knowledge dimensions would provide them with a strong foundation as they become teachers in the future. This claim was supported by DeNeen (2021) and she explained that a holistic professional teacher is formed strongly via the process of effort to strengthen the teacher's holistic profession in communicative and instructional learning, learning practical experience, and critical reflection.

### **Managing 21st Century Learners**

Gone are the days when learning meant sitting in rows all day, listening to the teacher's lecture. It is no longer appropriate for a teacher to be the focal point of the classroom, with learners studying passively. Students are the leaders and the focus of learning in the 21st-century classroom, with the instructor serving as a facilitator. As a result of this transition in education, the design and management of a modern classroom must also alter. The placement of furniture and supplies and how teachers regulate student conduct must match current educational philosophies.

The implication of the four-knowledge dimension practices of the Professional Education students in an actual school setting teaches them to highlight catering 21st-Century learners. This includes considering diverse learners in planning the classroom instructions and highlighting student-centered education. SED students answered:

*"I think these four-knowledge dimensions can give me much knowledge on how to become a better future teacher. And how to deal with different abilities of students and potentials that can contribute to their success, and improves not only their personal satisfaction but also to their community."*

*"This will enable me to cater the educational need of future students and to provide them with techniques and methods that suit them."*

*"As future teacher, this four knowledge is useful in order for us teachers to effectively manage the range of diverse knowledge assets, different tools and what approaches are required in a specific setting. It also allows me to practice recalling knowledge that I have learned and apply them to new situations."*

*"It implies on how to be an effective and productive teacher. Knowing that as a future teacher with this education subjects would prepare me in handling the 21st century learners".*

These responses were supported by Akpan (2020) when he elaborated on the ideology of 21st-Century learners in the classroom. He explained that growing class numbers and other external problems, along with this century's "smart" students, do not make conditions any easier. Today's classrooms are full of varied learners with varying requirements. Teachers indicate that graduates entering the field lack critical skills to foster cooperation, verbal communication, and technological integration into students' lives and learning through developing a classroom management plan that promotes high levels of engagement, improved subject retention, cooperation, and problem-solving.

### **Knowledge Facilitator**

The teacher's primary function is that of a facilitator, providing assistance and guidance as needed and scaffolding and skill instruction when appropriate. Teachers must remember to teach and instruct their students in any specific skill or piece of knowledge essential for their learning. SED students responded that the implication of the four-knowledge dimension would provide them with different views to ensure that they could impart the knowledge the students need to learn and develop in an actual school setting:

*“As a future educator, these four-knowledge dimension to my Professional Education subjects enrich my knowledge and views in teaching professionalism.”*

*“It will help to manage teaching profession is a manageable and easy to facilitate learning.”*

*“The implication of these four knowledge helps me in providing great teaching and learning in the future.”*

*“These could help me broaden the knowledge from basic concepts to abstracts enabling to practice and apply it in the future.”*

Most of the SED students responded that this four-knowledge dimensions is a tool with which they can evaluate themselves as teachers who can facilitate knowledge for learners. According to Eller & Gentile (2012) and Mazarin (2015), young people must gain various skills and information that promote mastery and application in the twenty-first century to reach their full potential as adults. As a result, a facilitator of learning is a teacher who does not follow the traditional teaching model but instead guides and assists students in learning for themselves - breaking apart concepts, establishing their own opinions about them, and owning content via self-exploration.

### **Proficient in Teaching Intervention**

Students learn more when teachers collaborate to enhance their practice. Effective schools are built on this basic yet powerful concept. Collaboration fosters a sense of shared responsibility for improving teaching practices and, as a result, student learning. Teachers and schools must work together to build a shared understanding of what constitutes outstanding practice. While not every classroom will be the same, there are several teaching approaches that research reveals work effectively in the majority [Victoria State Government (VSG), 2020].

The SED students evaluate themselves and the knowledge they had acquired from their Professional Education subjects, and taught them various methods and strategies in teaching; to be more learner-centered and provided them a wide range of knowledge and learning as they become teachers in the future. SED students responded,

*“It gives me more knowledge in creating methods and strategies in teaching, and how to handle students. And it helps me to a better teacher in the future where I can apply all my learnings in my teaching career”.*

*“The implications of these four-knowledge dimension to my education subject as a future educator is that it helps my learners to enhance their knowledge as well as this dimension may give a big impact in which it helps me to have an effective teaching wherein through this dimension I can easily manage or handle my student’s needs.”*

*“As a future Teacher it helped to develop an effective strategy to use in teaching in order to nurture students' academically.”*

*“These four-knowledge dimension will give a big contribution to my own experience and helps me a lot in making my own way of teaching.”*

This implies the importance of learning different strategies in teaching for the teachers to be prepared in their respective fields as future teachers. Teachers are the most crucial component of a good education. Although this is firmly engrained in the policy discussion, policymakers must understand what goes into high-quality teaching to enhance legislation, teacher training, and professional development programs to raise student accomplishment. Learning may be aided or hindered by teaching approaches. On the other hand, a practical teaching approach can encourage students to interact with the subject matter and enjoy learning. An effective teaching style can influence academic achievement.

## DISCUSSION

The results of the study have given the researchers in-depth information on the knowledge dimension practices of professional education students and its implications to teaching in an actual school setting. The study revealed that SED students were able to learn and acquire knowledge about different theories, methods, concepts, and strategies in teaching as they will become teachers in the future. The SED students' predominant knowledge dimension practiced was Metacognitive Knowledge, while Conceptual Knowledge was the least practiced among the four (4) knowledge dimensions. Furthermore, SED students, as future teachers, were able to highlight the importance of learning. The implications of these knowledge dimensions to teaching in an actual school setting, will make them skilled and holistic teachers, manage 21st-century learners, become knowledge facilitators, and, lastly, become teachers who are proficient in providing different teaching interventions for better teaching and learning process.

## RECOMMENDATIONS

Based on the results of the study, the researchers, therefore, recommend the following: (1) facilitate an instruction that keeps a balance of the different dimensions to ensure consistency and effective use of the knowledge dimensions for implementation in the classes; (2) Instructors of the Professional Education subjects should strengthen the students' teaching-learning skills that include: being skilled and holistic teachers, being capable to manage, respond and facilitate the 21st-Century learners, being competent knowledge facilitators and being proficient teachers for the appropriate teaching-learning environment.

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# MULTIPLE INTELLIGENCES AND STUDENTS' ACADEMIC PERFORMANCE

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## ABSTRACT

The main thrust of the study was to determine the effect of students' Multi- Intelligence grouping to the academic performance of the BSEd Second year students in Bohol Island State University Main Campus. It sought to answer the questions about the academic performance of the students categorized in the Multiple- Intelligence and non Multi-Intelligence grouping; the significant difference between the control and experimental group of students in their academic performance and the level of acceptability using Multi-Intelligence grouping in the class. The researcher used a quasi experimental method through a pre test and post test activities. To attain the result, the researcher used the t-test, z-test and weighted mean. The result of the study had shown that the BSEd 2- English (control group) and the BSEd 2- Filipino (experimental group) got the same description of their academic performance as "Good". Moreover, there was a "significant" difference between the midterm and final term grades of both control and experimental group. On the contrary, there was an "insignificant" difference of the academic performance in the midterm and final term grades between the control and experimental group. However, the BSEd 2-Filipino students expressed their highest acceptability level in using Multi-Intelligence grouping in the class as to the description of "Strongly Agree". Lastly, the researcher concluded that Multiple-Intelligence grouping does not negatively and positively affect in the academic performance of students but it facilitates students' learning particularly on intrinsic value, self-efficacy and test anxiety. Thus, the recommendations of the study were; strengthen the Multiple Intelligence students' grouping by submitting the students to clinical test on their intelligences for better and more appropriate MI students' grouping; encourage the school head to use the Multi-Intelligence students' grouping to facilitate learning particularly on intrinsic value, self-efficacy and test anxiety; teachers may use the Multi-Intelligence groupings for students' motivation especially on showing intrinsic value, self-efficacy and test anxiety and school head and teachers may collaborate and cooperate in enhancing self-regulation among students when using Multi-Intelligence in the teaching and learning situation.

*Keywords: Multiple Intelligences, academic performance, MI students' grouping, self-efficacy, intrinsic value*

## INTRODUCTION

Learning is a process in which transformation of learners' behavior is the greatest evidence of one's learning. It is either the behavior is modified or changed through experience or training. Such positive transformation is influenced by social interactions, interpersonal relations and communications with other individuals. It can be enhanced when learners are given the opportunity to interact with other learners as they do their tasks. Such that, educational experiences become active, socialize, contextualize and engaging learners' personal involvement to obtain deeper and long lasting learning outcome.

In the teaching-learning process, teacher plays a vital role in the learners' engagement within the duration of one's topic. The learners must be involved in attaining the learning objectives or expected learning outcomes. Moreover, teachers must be well-equipped with various strategies and techniques in the teaching-learning situations. They must know the most appropriate strategies and techniques that will fit to the learners' needs to achieve the expected learning objectives or outcomes.

With this notion, being a faculty member and former BEEd Program Chairperson of Bohol Island State University Main Campus (BISU MC) particularly in the College of Teacher Education (CTE), it is her mission to hone the students and exposed them in varied innovative teaching strategies and techniques that would help the university uphold its culture of excellence not only in the Licensure of Examination for Teachers (LET) but also in the holistic formation of every student in a class through the kind of graduates that the university produce.

For this, it is her ardent goal to conduct a study that would provide data-based information about the difference of students' academic performance categorized in Multiple Intelligences and non- Multiple Intelligences groupings. Furthermore, design an enhancement syllabus and program that will respond to the needs of the learners. In addition, this is her potent desire to give feedback to the College Dean, Director of Instructions, Vice-President of Academic Affairs and other concerned university officials for the concerted effort in the implementation of the findings in the study for the holistic formation and growth of the students entrusted to their loving and tender care.

It is then the hope of the researcher that this endeavor would help the students to understand and imbibe their knowledge, skills and attitudes (K-S-A) and put into practice as the values and skills learned as true BISU MC graduate witnessing the university's Vision-Mission-Goals and Objectives with the Core Values as they move out from the portal of the university.

## LITERATURE BACKGROUND

According to the Theory of Multiple Intelligences of Howard Gardner (1991), "we are able to know the world through language, logical-mathematical analysis, spatial representation, musical thinking, the use of the body to solve problems, or to make things, an understanding of other individuals, and an understanding of ourselves. Where individuals differ is in the strength of these intelligences – so – called profile of intelligences – and in the ways in which such intelligences are invoked and combined to carry out different tasks, solve diverse problems, and progress in various domains." This means that an individuals' intelligence is essential for students, teachers and also the education. With the aid of this theory, it allows students to identify their strengths in learning and gives teachers the opportunity to recognize the dynamics of the classroom. It emphasizes the use of intelligences to realize one's potential and encourages to use it in order to learn and interact. This challenged educational system every individual differ on the way he/she learns.

Moreover, Christison (1999), multiple intelligences provides a way of understanding intelligences, which teachers can use as guide for developing classroom activities that address multiple ways of learning and knowing. This implies that the multiple intelligences will help track and make it simpler for teachers to know what is proper and productive for students learning. However, the kind of intelligence that learners have depends on their interests and maturation level in which the teacher must also take into consideration.

Additionally, one of the successes of the learner greatly depends on his/her learning styles. One of the oldest and most widely used approaches to learning styles is that proposed by Rita and Kenneth Dunn (1978, 1992a, 1992b, and Dunn, 1986). This model identified five (5) key dimensions on which student learning styles differed: (1) environmental, (2) emotional support, (3) sociological composition, (4) physiological, and (5) psychological elements. Rita and Kenneth Dunn define learning styles as, "The way in which each learner begins to concentrate, process and retain new and difficult information. That interaction occurs differently for everyone." These five categories have been identified in determining how they learn.

Through this model, it helps to specify how learners recognize, collaborate with, and respond to the learning environments. Students have their own unique way in learning in which they differ from one another. Learners have their own preferred ways of expressing their thoughts, feelings and ideas which is usual and natural within them.

Learning styles is a characteristics which indicates how a student learns and likes to learn, as well as instructional strategy informing the cognition, and content of learning (Graf, Liu, and Kinshuk, 2010), as cited by Lofranco (2012). It emphasizes that it is within the learners' way on how he/she will be able to learn comfortably.

The primary purpose of teaching at any level of education is to bring a fundamental change in the learner. Therefore, an effective teacher should apply appropriate strategy to meet his/her desired learning outcome based on his/her objectives and enhance the learning of students. Guiding principles in the selection and use of appropriate teaching strategies can help teachers to the teaching-learning process. Teachers must be armed with different teaching strategies and use one of those which is suitable to the complexity of the topics to be covered. In this way, students will be able to engage actively in class and may connect it to their everyday life. The use of effective teaching strategy improves one's understanding and retention of information. This way round, the higher-order thinking skills, the creative and critical thinking of students is developed. Teaching strategies needs to be planned and executed very well to make it effective. (Tebabal&Kahssay, 2011).

In relation to the study, Bandura (1994) defined Socio-Cognitive Model with three (3) factors that influence self-efficacy such as; behavior, environment and personal or cognitive factors. This implies that children learn new behaviors from observing other people and that external reinforcement is not the only way that a person learn new things. Instead, intrinsic reinforcement such as sense of pride, satisfaction and accomplishment could also lead to learning. By observing the actions of others, including parents and peers, children develop new skills and acquire new information.

Self-efficacy theory postulates that people acquire information to appraise efficacy from their performance accomplishments, vicarious (observational), experiences, forms of persuasion, and physiological indexes. As individual's own performances offer the most reliable guides for assessing efficacy. Successes raise efficacy and failures lower it, but once a strong sense of efficacy is developed, a failure may not have much impact (Bandura, 1994).

Furthermore, Lev Vygotsky's Socio Cultural Theory of Development emphasized that learning happens through participation in social activities or social interaction, wide range of experiences that a culture in an environment would give to a child or cultural factor and learning by doing is even made more fruitful when children interact with knowledgeable adults and peers or children's language. (Vygotsky, 1981)

Lastly, added related researches which supports Gardner's theory like: Hamari et al (2016) suggested in the result of their study that engaging in learning games has a positive effect on learning which means educational video games may be an effective means of posing learning challenges that are perceived as interesting and enjoyable, resulting in engagement and immersion in the game-based learning making the lesson more engaging to the students; Morgan (2014) reinforces the MI theory in her research that differentiated instruction benefits all students, but must be presented by well-prepared, experience and knowledgeable teachers so as teachers must be trained to make them equipped with most appropriate teaching strategies and techniques for a more interactive student-teacher engagement; and Bas and Beyhan (2010) agrees the use of MI based learning is more effective in terms of student achievement levels and their attitudes toward learning thereby using such learning method can improve students' academic performance and behavioral perspective in achieving their goals in learning.

## STATEMENT OF THE PROBLEM

The main purpose of this study was to determine the effect of Multiple Intelligences in the academic performance of the BSEd Second year students in Bohol Island State University Main Campus, Tagbilaran City, Bohol during the S.Y 2017-2018.

Specifically, the study sought to answer the following questions:1. What was the academic performance of the students categorized in the Multiple Intelligence and the non- Multiple Intelligence groups? 2. Was there a significant difference between the academic performance of the students categorized in the Multiple Intelligences and non- Multiple Intelligences groups? 3.What was the level of acceptability of Multiple Intelligences grouping in the class? and 4.What action plan may be proposed based on the results of the study?

### Null Hypothesis

There is no significant difference between the academic performance of the students categorized in Multiple Intelligences grouping to those non-Multiple Intelligences grouping in a class.

## METHODOLOGY

### Design

The researcher used the quasi-experimental design of the study. This design contains the pre-test and post-test experimentation. Students' grouping was through Midterm grade pairing for the Multiple Intelligence and non- Multiple Intelligence group of students respectively. The questionnaire items were patterned from the motivated strategies for learning questionnaire (mslq) and was used to find the level of acceptability of Multiple Intelligences students' grouping in the class.

### Environment

The locale of the study was in Bohol Island State University- Main Campus located at C.P.G. Avenue, Tagbilaran City, Bohol. It belongs to a BISU System with six (6) different campuses located in the different parts of Bohol: Balilihan, Bilar, Calape, Candijay, Clarin and Tagbilaran City. These campuses were formerly State Colleges but were converted as State Universities by virtue of R.A. 9722 which was approved last October 14, 2009 and declared as the first State University in Bohol with its Main Campus at Tagbilaran City.

College of Teacher Education (CTE) offered three (3) programs as follows: Bachelor of Technical and Vocational Technology Education (BTVTEd), Bachelor of Secondary Education (BSEd) with five (5) major subjects such as; Technology and Livelihood Education (TLE), Mathematics, English, Filipino and Social Studies and Bachelor of Elementary Education (BEEd).

### Participants

The participants of the study were the thirty (30) Second year students of the Bachelor of Secondary Education (BSEd) Major in Filipino and thirty (30) Second year BSEd students Major in English during the second semester of School Year 2017-2018. They were chosen through Midterm grade pairing as to the experimental and control group of participants respectively. Both sections underwent the university screening procedure and followed the same requirements and criteria in the selection of student entrants.

### Instrument

In order to attain the objective of the study, a questionnaire was utilized as a medium in getting the data. Both the pre-test and post-test contain fifty items (50) answerable in forty minutes. A pilot test and item analysis were conducted at Bohol Island State University, Main Campus to know whether the test was valid and appropriate to the participants' level of comprehension. The researcher collected sample questionnaire from the main textbook of the subject Social Dimension of Education by Tamayao, (2013). The questionnaires were based from the book but the researcher had made some modifications in order to fit to the context of the participants' level and experiences.

To know the level of acceptability of Multiple Intelligences grouping of students, another questionnaire was distributed based on Likert Scale. It was patterned from the motivated strategies for learning questionnaire (mslq) as the items were closely related to the multiple intelligences of the students.

### Procedure

#### Phase I- Pre-data Gathering

The researcher sent a letter to the Dean of the College of Teacher Education and Campus Director for allowing her to conduct the study in the campus. Next, she asked permission from the Office of the Registrar to allow her to acquire the Midterm grades during the 2nd semester, School Year 2017-2018 as basis in the grade pairing for the participants. Then, the BSEd 2 – Filipino students as the experimental group answered the Multiple Intelligences (MI) standardized questionnaire of Howard Gardner taken from the book Principles of Teaching by Corpuz, and Salandanan, (2013). Likewise, the researcher grouped the students based from the answered standardized (MI) result using the given interpretation. After the grouping of students as Multiple Intelligences and non- Multiple Intelligences group, the researcher allowed the BSEd 3- Filipino students to answer the fifty (50) items test questionnaire in the pilot testing. After pilot testing, the researcher consulted the research statistician for test items analysis for some enhancement of the test questionnaire.

#### Phase II- Actual Data Gathering

After enhancing the test questionnaire, the researcher administered the fifty (50) items pre-test to the participants to determine the academic performance of the students. Both groups were exposed to inspi-

rational videos and power point presentation related to the topics of the subject. However, the groupings of the students categorized as the controlled group based from the list of their names in the teacher’s class record in alphabetical order while the experimental group was based from the result of Howard Gardner’s standardized questionnaire. Next, after conducting the discussion of the topic to students in the Multiple Intelligences and non- Multiple Intelligences group, both groups were given the post-test to measure their understanding of the lesson. The set of questionnaire was the same as of the pre-test test questionnaire. The result of the pot-test determined the effectiveness of the grouping of students in Multiple Intelligences and non-Multiple Intelligences grouping. Lastly, after the post-test was conducted, the researcher distributed to the experimental group another set of questionnaires which measured the level of acceptability of Multiple Intelligences grouping of students in the class.

**Phase III- Post-data Gathering**

The researcher gathered all the result of the study. Next, she tabulated, analyzed and interpreted the result. Then, she formulated the findings and conclusion of the study. Finally, some recommendations were crafted based from the findings and conclusion of the study.

**Statistical Treatment of Data**

To determine the academic performance of the control and experimental group the arithmetic mean was used with the interpretation of the score as follows; 41-50 (Excellent), 31-40 (Very Good), 20-30 (Good), 10-19 ( Fair/Passing) and 0-9 (Conditional Failure) and using the description from the BISUMC Student Manual particularly on the grading system for degree and non-degree courses. To find the significant difference of the students’ academic performance between the Multiple Intelligences and non-Multiple Intelligences group before and after using the Multiple- Intelligence grouping, the t test formula was used and the Z test formula was utilized to find the difference of the midterm and final term academic performance of the Multiple Intelligence and non- Multiple Intelligence group before and after using the Multiple Intelligence grouping in the class. For the students’ level of acceptability of Multiple Intelligences group in the class, the researcher used the weighted mean with the interpretation of the range and the description as follows; 3.25-4.00 (Strongly Agree), 2.50-3.24 (Agree), 1.75-2.49 (Disagree) and 1.00-1.74 (Strongly Disagree).

**RESULTS AND DISCUSSION**

**Table 1. Academic Performance of the Control and Experimental Group Before and After Using the Multi-Intelligence Grouping**

Group Name	Term	Average	Description
Control Group	Midterm	2.31	Good
	Final	2.15	Good
Experimental Group	Midterm	2.03	Good
	Final	1.93	Good

**Grading System for Degree and Non- Degree Courses**

Rating	Description	Rating	Description
1.0-1.2	Excellent	2.6-3.0	Fair
1.3- 1.5	Very Good	5.0	Failure
1.6 -2.5	Good		

Table 1 depicts the academic performance during Midterm of the of the BSEd 2- English as the Control Group with the average of 2.31 using the description of “Good” and the BSEd 2-Filipino as the Experimental Group with the average of 2.03 using the description “Good” before using the Multi-Intelligence grouping of students. Moreover, the Final term got the same description of “Good” for both Control and Experimental Group with the average of 2.15 and 1.93 after using the Multi-Intelligence grouping of students respectively.

The grade description is based from the BISU Main Campus Student Manual particularly on Grading System for the Degree and Non- Degree Courses.

**Table 2.1. Difference of the Academic Performance of the Control and Experimental Group Before and After Using the Multi-Intelligence Grouping**

Value	Control	Experimental	Result
t value	5.58	3.77	significant
t critical	2.01	2.01	significant

Table 2.1 compares the difference of the academic performance of the control and experimental group before and after using the Multi- Intelligence grouping. It shows that there is a “significant” difference between the midterm and the final term grades of the BSEd 2- English and BSEd 2- Filipino. Hence, the computed t is 5.58 and critical t is 2.01 for the control group while the computed t for the experimental group is 3.77 and the critical t is 2.01.

**Table 2.2. Difference of the Midterm and Final Term Academic Performance Between the Experimental and Control Group Before and After Using the Multi-Intelligence (MI) Grouping**

Value	Control	Experimental	Result
computed z	1.18	0.97	insignificant
z critical	1.95	1.95	insignificant

Table 2.2 differentiates the midterm and final term academic performance of the control and experimental group before and after using the Multi- Intelligence grouping. It displays that there was an “insignificant” difference of the academic performance in the midterm and final term grades between the control and experimental group. Thus, the computed z is 1.18 and the z critical is 1.95 for the control group whereas the computed z for the experimental group is 0.97 and the z critical is 1.95.

**Table 3. Level of Acceptability of the Multi-Intelligence Groupings Among the Students of the Experimental Class**

MOTIVATIONAL BELIEFS	AVERAGE WM	DESCRIPTION
Self- Efficacy	3.85	SA
Intrinsic Value	3.96	SA
Test Anxiety	3.94	SA
Cognitive Strategy Use	3.22	A
Self-Regulation	2.68	A
<b>GEN. WM</b>	<b>3.53</b>	<b>SA</b>

Interpretation:

3.25-4.00 = Strongly Agree (SA)  
2.50-3.24 = Agree (A)

1.75- 2.49 = Disagree (D)  
1.00- 1.74 = Strongly Disagree (SD)

Table 3 shows the level of acceptability of the BSEd 2- Filipino students using the Multi-Intelligence grouping. The “Intrinsic Value” got the highest average weighted mean with the description of “Strongly Agree” while “Self-Regulation” had the lowest average weighted mean with the description of “Agree”. Thus, the general weighted mean is 3.53 with the description of “Strongly Agree”.

## CONCLUSION

Multiple Intelligences groupings does not negatively or positively affect to the academic performance of the students but it facilitates students’ learning particularly on intrinsic value, self-efficacy and test anxiety.

## RECOMMENDATIONS

Based on the findings and conclusion, the researcher offer the following recommendations:

1. Strengthen the Multiple Intelligence students' grouping by submitting the students to clinical test on their intelligences for better and more appropriate MI students' grouping.
2. Encourage the school head to use the Multi-Intelligence students' grouping to facilitate learning particularly on intrinsic value, self-efficacy and test anxiety.
3. Teachers may use the Multi-Intelligence groupings for students' motivation especially on showing intrinsic value, self-efficacy and test anxiety.
4. Although Multiple- Intelligence does not affect students' academic performance, school head and teachers may collaborate and cooperate in enhancing self-regulation among students when using Multi-Intelligence in the teaching-learning situation.

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# REGISTRAR TRANSACTION MANAGEMENT SYSTEM (RTMS)

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## ABSTRACT

Transaction management is vital for the daily routine operations of each organization. As a trend and for efficiency, many organizations have adopted computer-based systems to manage their daily transactions. The Camarines Sur Polytechnic Colleges' office of the registrar is determined to adopt this trend in order to efficiently manage transactions, particularly the request and release of student records. It is for these reasons that this study was conducted. This study generally aims to develop and evaluate a system that supports the office of the registrar in the efficient management of transactions on the request of student records. To achieve this, the researchers followed the Extreme Programming framework as a guide. Interviews, observation, and questionnaires were utilized as data-gathering procedures. Finally, the weighted mean and paired samples T-test was used for data analyses. The analyses showed that existing and developed Registrar Transaction Management System (RTMS) are significantly different in terms of speed. Further, the result revealed that RTMS is perceived by the end-users as Highly Acceptable in terms of the ISO 25010 based criteria: performance efficiency; reliability; functional suitability, and usability. Therefore, RTMS shall be put to operation in Camarines Sur Polytechnic Colleges for its full implementation.

*Keywords: accuracy, extreme programming, frontline services, functional suitability, performance efficiency, reliability, speed, transaction management, usability*

## INTRODUCTION

Over the decade, the information landscape becomes wider and wider. Along with this is the challenge of how to manage those huge amounts of information properly without compromising integrity and security (Registrar Management System, n.d.).

One of the vital parts of an educational institution such as the Camarines Sur Polytechnic Colleges is the Office of the Registrar. Over the decade, the office of the registrar kept a voluminous amount of data and information. However, in the article published by the Philippine Star (The School Registrar's Attempt to Provide Quality Service \_ Philstar, n.d.) last August 16, 2017, it pointed out that the Registrar's position in a school is no longer solely that of a record keeper. It has progressed from the storage and protection of student records to data collection and management for school planning and decision-making. The article also added that as an additional function of the Registrar Office, it aids in the creation, review, revision, and/or implementation of policies that support the institution's goals. The school calendar, class schedules, curricular programs, and new rules or standards, to name a few examples. Aside from that, the functions such as admission, registration, crediting and promotions, transition, and graduation are all entrusted to the office of the registrar. The Registrar, as registration and records officer, is in charge of new student admissions and total attendance, as well as student accounting and records review for graduation. It is responsible for the development, updating, maintenance, and disposal of student academic records, such as certificates, grades, transfer credentials, and diplomas; it also receives and regulates file flow and protection, verifies and authenticates all records issued by the office and

takes full responsibility for them. With the afore mentioned functions of the Office of the Registrar, it is very vital that all of its processes and transactions that are pertinent to its functions will be managed properly and efficiently.

Various establishments and institutions spent a considerable amount of resources to have an automated solution for managing their respective voluminous data and information(Camad et al., n.d.).

Camarines Sur Polytechnic Colleges as an educational institution is firm on its mandate to provide quality service to its client. Several years ago, the College implements various automated systems in some of its offices as a means of providing quality service.

The office of the Registrar is among those offices that perform vital functions in the institution because it is an academic support unit of the College that administers operation in the areas of admission, registration with allied services, request and releasing of records, data processing, and archiving. Just recently, the College implements already computerized systems to automate the registrar's office operations in terms of admission, registration, and allied services. While these operations were automated already, the request and release of records are still managed conventionally. There is no computerized system used to manage transactions for request and release of records. All transaction records and reports were backed up and generated manually. As perceived, this manual procedure leads to delayed transaction processing, erroneous inputs and outputs, misplaced and lost records, thus quality service is compromised. The College could not afford to compromise its quality service; therefore an IT solution is needed. It is in light of those reasons that the researchers initiated an efficient solution to the mentioned problems. The researchers developed a system that caters to and innovates the operations of request and releasing of records such as TOR (Transcript of Records), diploma, COG (Certificate of Grades), Honorable Dismissal, and various certifications. Also, this will cater to the generation of transaction reports for these are requirements for various quality assurance certifications such as ISO and AACUP. Finally, as part of the College, it is the earnest desire of the researchers to contribute something which will benefit the registrar's office staff, clients, and the College as a whole.

For wide insights on the study conducted, the researchers review various published literatures related to the topic. The review is presented by topic.

#### Role of Information Technology in Transaction Processing System

The operatives and first-line managers of a company typically use Transaction Processing Systems (TPS) to keep track of regular business transactions(Amin, 2017a). TPS also keeps an organization working smoothly by automating the handling of the large volumes of paperwork that must be done on a regular basis, according to Engr. Faizullah Mahar (Mahar, 2003). A university's TPS, for example, assists with activities such as enrolling students in classes, charging students for fees, and paying professors.

Manual transaction processing systems were used in the beginning. As described by Engr. Faizullah Mahar (Mahar, 2003), transactions will be recorded in a journal or on numbered, multi-platforms by the clerk. Further, these transactions will then be manually transferred to a central system of handwritten records or file files that corresponded to particular customers or suppliers. Finally, these records will be set up to send out customer statements or supplier checks.

Many small businesses do use manual transaction processing systems, but low-cost, simple-to-use computer technology is making its way into more of them. The manual method of most companies causes a slew of issues that can be solved with computer and communication technologies. Among these issues are (Mahar, 2003): a high level of error; a temporary or permanent loss of data; a high level of labor intensity; a poor level of service; and a slow response.

Management Information Systems (MIS) departments in various organizations responded in a number of ways as emerging technology such as computers and communications became available to manage the transaction processing workload(Mahar, 2003). Some companies actually scanned their manual processes and entered them into the machine. As a result, their electronic systems inherited all of the glitches in their manual systems. Other companies acknowledged that technology has the ability to change the way people work, so they re-engineered their transaction processing processes before automating them. In today's world, low-cost computers and communications systems are posing two new challenges to transaction processing: using the TPS as a strategic tool and bringing better information to the right people faster.

## **Transaction Management Automation**

Any organization's capacity to obtain accurate and timely data about its operations, manage this data efficiently, and use it to assess and steer its activities is critical to its success (Takramah & Atiwoto, 2015). In line with this, it is imperative for organizations to stay on pace with technology due to the increased and changing trends, needs, and environment in providing quality service to their clientele. If the organization fails to adopt such technologies this will lead to difficulty in maintaining the competitive advantage and satisfy the client's expectations. To ensure efficiency, transparency, and reliability, the operations of an organization need to be streamlined. This can be achieved by adopting the current trend of using information systems. However, the organization still needs to evaluate and ensure the adopted information systems conform to its goals and objectives. One of the information systems commonly used by organizations is the Transaction Processing System. This type of system is “instrumental in collecting, storing, modifying and retrieving the transactions of an organization or business enterprise”. This contains functionalities that ensure that the transaction process is reliable (Katie, n.d.).

Further, transaction processing systems include the following services as mentioned by Mohammad Bin Amin (Amin, 2017b), (1) scheduling and load balancing (2) managing system resources (3) monitoring the progress of transactions (3) managing communications, and (4) time management.

In line with this, the educational institution is one of those organizations that adopted transaction processing systems to perform and record their daily routine transactions necessary to the core function of the organization. One of the busiest offices of an educational institution is the office of the registrar. This office also serves as the repository of all the vital records of the students that need to be updated as time goes by (Registrar Management System, n.d.).

However, automation of transaction processing and management is not enough especially the registrar's office stores the vital and confidential records of the students. As mentioned in the study of Nathan L. Essex, “confidentiality of student's educational records is a serious issue”. When a student's sensitive information from its personal file is disclosed without a written consent can be legally troublesome especially if the information is transmitted to others who have no “legitimate educational interest in the student” (Essex, n.d.). Therefore, the data privacy and security mechanism of the system is a requirement.

Several educational institutions adopted transaction management systems for automation. University of Cebu-Main Campus for example implements the system “UC-Main Registrar's Office Student Document Management and Monitoring System”. The main purpose of the system is to automate the conventional way of managing and monitoring the archive and student pertinent documents. Further, the system includes the following modules: (1) Archive Document Management Module and (2) Report Generation Module (Camad et al., n.d.).

Northern Bukidnon State College was able also to build an eSchool system to provide a centralized system in storing, processing, and retrieval of data of student and school related transactions (Glen Grepon et al., n.d.). Specifically, the eSchool system is developed to automate the major transactions that includes: Admission, Enrollment, Accounting, Student Information System, Grading and Report Generation.

The University of Ghana's School of Public Health was able to launch a rigid and robust integrated student database system that will track and maintain student records (Takramah & Atiwoto, 2015). This user-friendly, integrated database tool is designed to help you save time on administrative activities. The system is designed to accept processes and provide accurate reports, and any user can access it at any time as long as an internet connection is present. The system also aims to improve user services by providing meaningful, consistent, and timely data and information, as well as promoting efficiency by transforming paper procedures to electronic form.

These few mentioned examples are proofs that most of the organizations particularly educational institutions were geared toward transaction management automation.

## **ISO 25010 Model**

The ISO 25010 has been adopted by several researchers to construct a metric for evaluating the performance and acceptability of established software systems (Atanacio & Lacatan, 2019). Since ISO 25010 is an international standard for software and device quality assessment, several researchers have adopted it. In fact, according to Peters and Aggrey's (Peters & Aggrey, 2020) report, this standard was revised three times between 2007, 2011, and 2017.

This software and system standard is also known as the SQuaRE (Systems and Software Quality Requirements and Evaluation) model, according to the same authors. It also applies to the quality of the software product as well as the quality of use. In addition, according to Peters and Aggrey (Peters & Aggrey, 2020), ISO 25010, is an upgrade of the ISO 9126 model. The previous model (ISO 9126) has six (6) factors and twenty-one (21) sub-factors, according to them. However, ISO 25010, a derivation of ISO 9126, defines thirty-one (31) attributes that must be present in any high-quality software product. In this connection, four (4) of those thirty-one (31) attributes are used in this study in the metric for assessing the level of acceptability of the developed system. These attributes are Performance Efficiency; Reliability; Functional Suitability; and Usability. The following section describes each of these criteria based on the characterization of ISO/IEC 25010 ISO/IEC JTC1/SC7 Software and Systems Engineering Secretariat (ISO/IEC 25010, 2008):

*Performance Efficiency:* The performance efficiency factor defines a software product's or system's ability to handle a given collection of resources in order to deliver and optimize performance. This quality factor has been broken down further into three sub-factors: time behavior, resource utilization, and ability.

*Reliability:* The capability of a system or software product to retain its level of performance or specified functions under specified conditions for a specified time period. The reliability factor is linked to four lower-level factors: maturity, availability, fault tolerance, and recoverability.

*Functional Suitability:* When used under defined conditions, this quality attribute defines the degree to which a software product or system provides functions that fulfill the stated and implied needs of stakeholders. Functional completeness, functional correctness, and functional appropriateness are the three sub-factors of this quality attribute.

*Usability:* The usability attribute refers to the degree to which a software or device product can be used to accomplish specific goals with performance, effectiveness, and satisfaction in a given context of use. The usability attribute has a number of sub-attributes, including appropriateness, learnability, operability, user error prevention, aesthetics of the user interface, and accessibility.

It is in the light of the aforementioned literatures that the researchers anchored this study.

## OBJECTIVES OF THE STUDY

Generally, this study aims to develop and evaluate a system that will support the Registrar's office in the management of the frontline services and provide ease of window processes through the digital channel to achieve an efficient transaction on the request of Transcript of Records, Diploma (Renewal), Certificate of Grades, Honorable Dismissal, Certifications, Authentication, CAV (Certification Authentication and Validation), and other relevant documents.

Specifically, this study aims to achieve the following:

1. Develop a Registrar Transaction Management System which includes all the modules as per the functional requirements.
2. Evaluate the performance of the existing and developed Registrar Transaction Management System in terms of speed and accuracy;
3. Determine the significant difference in the performance between the existing and developed Registrar Transaction Management System in terms of speed and accuracy;
4. To determine the level of acceptability of Registrar Transaction Management System based on ISO 25010 metrics such as performance efficiency; reliability; functional suitability; and usability.

## METHODOLOGY

### Software Development Methodology

In terms of system development, this study followed the Extreme Programming (XP) methodology, an agile software development methodology that aims to produce high-quality software and provide an optimal solution to client-based problems (M. et al., 2019).

Further, this methodology also guides the developer to deliver fast the project with minimum risk exposure and is well suited for the small-sized project. This methodology is appropriate for the pro-

posed system development since the methodology focuses more on adaptability and responsiveness to the changing client requirements. With this methodology, any changes from the client requirements can be well accommodated by constantly asking for feedbacks from the client before the release of the system. Figure 1, presents the Extreme Programming software lifecycle followed by the discussion of activities to be undertaken within each phase.

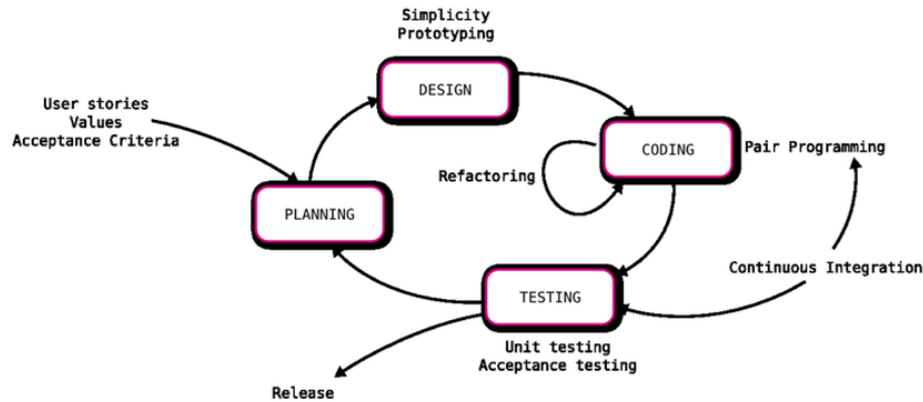


Figure 1: Extreme Programming (XP) Software Lifecycle

*Planning.* In this phase, the client or end-users and the researchers as the developer have a meeting to create user stories or requirements. The researcher also conducted an evaluation on the existing manual transaction management system of the office of the registrar which served also as input for planning. After this, the developer converts the user stories into an iteration that covers a small part of the functionality or feature required. The developer then prepares the plan for the time and costs of carrying out the iterations.

*Designing.* In this phase, the designing process comes into effect which includes the design for the database, logical flow of the data, and architecture. The developer should ensure that system design is as simple as possible just enough to implement a user story or functional requirements of the system.

*Coding.* With inputs from system design, the actual coding was done in this phase. This phase includes pair programming, regular integration, code review, and refactoring.

*Testing.* This phase is integrated with the coding phase wherein all codes undergone unit testing to eliminate bugs, and the code should pass all such unit tests before release. After the completion of coding, acceptance testing was conducted and the developers provide the client or end-users with the results along with demonstrations.

### Data Gathering Procedure

Data gathering procedure was conducted through direct observation, interviews, review of records, procedures, forms to evaluate the existing transaction process in the registrar and determine the functional requirements of the system. These guided the researchers to develop the system functionalities according to the requirements of the office of the registrar.

Two set of evaluation questionnaires were prepared to evaluate the performance of the existing and developed system in terms of speed and accuracy. The first set of questionnaire was used to evaluate the existing system and was distributed prior to the development of the RTMS. The second set of questionnaire was distributed after the development of the RTMS. Both questionnaires include the performance indicators to evaluate the speed and accuracy in accomplishing the transactions such as the request and releasing of student records.

Another set of questionnaires was prepared to determine the level of acceptability of the developed system. The questionnaire also includes indicators for evaluating the acceptability level based on ISO 25010 metrics in terms of performance efficiency, reliability, functional suitability, and usability.

In determining the performance and level of acceptability of the developed system, the respondents of the study were all the six staff of the office of the registrar and selected clients, only 52 clients, which includes the bonafide students and graduates of Camarines Sur Polytechnic Colleges. Since all the staff of the registrar's office was involved as the respondents, total enumeration was used. On the other hand,

the convenience sampling technique was used to determine the clients who were involved as respondents to the study. The researchers only selected those respondents which met the criteria set by the researchers. The availability of the client and the willingness of the client to participate in the study were considered also.

### Statistical Treatment

The researcher utilized the following statistical measures to analyze the gathered data:

**Weighted Mean:** This was used to determine the average response of the respondents in evaluating the system performance and level of acceptability. Statistical software was used to determine this measure.

**Standard Deviation:** This was used to determine how far the individual responses vary or deviate from the mean. This tell the researchers how spread out the responses are- are they concentrated around the mean or scattered far and wide.

**Likert Scale:** The 4-Point Likert Scale was implemented to determine in what scale the computed weighted mean will fall.

**Paired Samples T-Test:** This was used to determine the significant difference in the performance of the existing and developed Registrar Transaction Management System in terms of speed and accuracy. Statistical software will be used to determine this measure.

## FINDINGS

The study implements the Extreme Programming methodology, in this connection, the flow of results and discussion follows the phases of the methodology used.

### Planning

In this phase, the researchers conducted a meeting and interview with the staff and clients of the office of the registrar. The following are the user stories or functional requirements identified as well as the proposed module that will realize the identified functional requirements:

**Table 1. Functional Requirements and Developed Module (Registrar Staff)**

Functional Requirements	Developed Module	Module Description
Manage User Accounts	Account Management	Systems user accounts are managed from administration to end users which is limited to authorized employees only
	Log In	A secure gateway on accessing the system's administrative functions for the authorized users.
Queuing of Transactions	Queuing Window	All applied transactions that are provided with a queuing number from the KIOSK will be logged in the queuing page to be called in the processing window of the office for validation of requests and the pertinent requirements
	Manual Queuing Window	All missed or invalid applied transactions will be re-validated through a manual queuing process page in the processing window of the office, it also serves as retrieval of a halted transaction for the continuing process.
Process Documents	Processing	All validated queued transactions are received for processing and production of the requested documents, it also provides updates on the progress of the request which can be viewed through the tracking page
Release Documents	Releasing	All successfully processed requested documents that are subject to release will be logged through the system with digital signing before handing over to the respective requestor
Transaction Logs	Logbook	All transactions are logged digitally, this provides fast and accurate logbook data of all the transactions made in the office in accordance with the current log report format or template being utilized
Track Transactions	Transaction Tracking	This provides a systematic tracking and tracing of the status of the client's transactions or requested documents
Notification	Notification	This sub-process will provide a timely update on the client's requested documents through an SMS notification via their provided contact number in the KIOSK
Student Management	Student Management	This provides a basic information logging of students for faster validation and verification of the student's identity whenever a transaction is made with or without a requesting representative
Summary of Transactions	Dashboard	Provides overview on the data of the number of transactions made in the office

Table 1 presents all the identified functional requirements needed for the Registrar Transaction Management System on the side of the registrar staff. These functional requirements were converted into system modules that perform the identified functional requirements. The researchers ensure that all the functional requirements specified by the staff of the registrar are incorporated in the Registrar Transaction Management System.

Aside from the functional requirements on the side of the registrar staff, functional requirements on the side of the client, such as students, alumni, parents, or guardians were identified also.

**Table 2. Functional Requirements and Developed Module (Registrar Client)**

<i>Functional Requirements</i>	<i>Developed Module</i>	<i>Module Description</i>
Request Documents	Kiosk	This provides ease of access and less contact on the transactions being made with the office. Clients requesting documents at the registrar’s office will first interact with the KIOSK as it provides a digital transaction form and be filed at the same time in the KIOSK. The KIOSK will provide a queuing number in an ascending order to organize the client transactions. All requested documents will already be provided with a respective tracking number together with the queue number in the transaction slip provided by the KIOSK.
Online and Onsite Kiosk		

Table 2 presents all the identified functional requirements needed for the Registrar Transaction Management System on the side of the registrar client. These functional requirements were converted into system modules that perform the identified functional requirements. The researchers ensure that all the functional requirements specified by the staff for the client of the registrar's office are incorporated in the Registrar Transaction Management System.

Furthermore, through a questionnaire, a survey was conducted to evaluate the performance of the existing and developed transaction management of the office of the registrar in terms of speed and accuracy. The survey was conducted with 52 respondents. The result was further tested for its significant difference guided by the hypothesis as follows:

Ho: There is no significant difference in the performance between the existing and developed Registrar Transaction Management System in terms of speed and accuracy.

With this, the researchers follow the hypothesis testing steps and the data analysis displays the following result, with 5% as a level of significance ( $\alpha=0.05$ ).

**Table 3. Significant Difference Test Result**

<i>Criteria</i>	<i>p-value</i>	<i>Decision</i>
Speed	0.025	Reject $H_0$
Accuracy	0.604	Accept $H_0$

The result presented in Table 3 shows that in terms of speed,  $p=.025$ , it is less than  $\alpha=.05$ , therefore, the null hypothesis should be rejected. It can be said that there is a significant difference in the performance between the existing and developed Registrar Transaction Management System in terms of speed. On the other hand, in terms of accuracy, the result shows that  $p=.604$ , is greater than  $\alpha=.05$ , therefore, the null hypothesis should be accepted. It can be said that there is no significant difference in the performance between the existing and developed Registrar Transaction Management System in terms of accuracy.

The result only implies that in terms of speed, the developed Registrar Transaction Management System significantly improves the transaction management in the office of the registrar. Aside from the significant difference result, this implication can be also supported by the higher level of performance of the Registrar Transaction Management System in terms of speed. However, in terms of accuracy, the result implies that the developed Registrar Transaction Management System maintains the accuracy of the existing system.

Further, the system’s level of acceptability based on the perception of the end-users was determined also. Acceptance testing was conducted and the developers provide the client or end-users with the procedure of how to operate the system along with demonstrations. The table that follows presents the level

of acceptability result based on ISO 25010 criteria: performance efficiency; reliability; functional suitability and usability.

**Table 4. Level of Acceptability Summary of Result**

<i>Acceptability Indicator</i>	<i>Weighted Mean</i>	<i>Level of Acceptability</i>
Performance Efficiency	4.29	Highly Acceptable
Reliability	4.18	Moderately Acceptable
Functional Suitability	4.33	Highly Acceptable
Usability	4.27	Highly Acceptable
<b>Average</b>	<b>4.27</b>	<b>Highly Acceptable</b>

In summary, the overall result of acceptability testing as shown in Table 11 is Highly Acceptable (4.27) with the following weighted mean 4.29, 4.18, 4.33, 4.27 for performance efficiency, reliability, functional suitability, and usability respectively.

This result shows that overall, RTMS is highly acceptable to the end-users. In terms of performance efficiency, RTMS has the ability to use computing resources efficiently while performing its functionalities. In terms of reliability, RTMS has the ability to perform its functions under specified conditions for a specified period of time wherein it can withstand or recover once failure happened. In terms of functional suitability, RTMS provides functions that meet the stated functional requirements under specified conditions. Lastly, in terms of usability, RTMS is learnable, easy to operate and control, and provides a satisfying and pleasing interaction for both expert and novice users.

It only suggests that the system is good enough that it satisfies all the identified needs and functional requirements set by the end-users. It was obtained since the researcher carefully examine the transaction process in the office of the registrar in terms of credential or record requests and carefully identify the functional requirements to automate the transactions. Further, the end-users were well informed about the problem to be solved and how the new RTMS will be able to solve these problems.

This interpretation is being supported by Vlassenroot, Sven, and Karel Brookhui(Vlassenroot & Karel Brookhui, 2008). The two researchers stated that “the level of acceptability can depend on how well informed the respondents are about the problem and about the (new) device that is introduced to solve the problem”. Indeed, the RTMS earned a Highly Acceptable result.

However, due to time constraints, the scope of the respondents who shared their perceptions on the level of acceptability of RTMS was only limited. The researcher can still further validate the result of this study by extending the scope of respondents who will try to assess the system’s level of acceptability.

Therefore, RTMS meets the end user's functional requirements thereby giving satisfaction to the end-user in terms of performance efficiency, reliability, functional suitability, and usability.

## CONCLUSION

Anchored on the objectives, results and interpretations presented, the researchers came up with the following conclusions:

1. The Extreme Programming as software development methodology fits the development of Registrar Transaction Management. Therefore the same methodology can be adopted with system developments similar to RTMS.
2. The existing and developed system in the registrar's office for transaction management in terms of credential or record requests turns out to be both fast and accurate. However, notification on the transaction update is perceived to have a lowest rating in terms of speed and both tracking details and notification have a lowest rating in terms of accuracy. Therefore, speed and accuracy needs to be improved in terms of notification and tracking details of transaction.



3. The existing and the developed system both turn out to be fast and accurate but it is observed that the rate for the developed RTMS is slightly higher than the existing system. Therefore the developed system maintain and slightly improves the speed and accuracy of the existing system.
4. The developed Registrar Transaction management system turns out to be Highly Acceptable to the end-user. Therefore, the developed RTMS system satisfies the end-users need and requirements.

### **RECOMMENDATIONS**

Based on the conclusions drawn, the researchers came up with the following recommendations:

1. Extreme Programming shall be used as a software development methodology for the development of relevant systems.
2. The developed Registrar Transaction Management System can be further developed to further improve its performance and be further evaluated using other system performance criteria aside from accuracy and speed.
3. The registrar's office shall continue to maintain the accuracy of transaction management in terms of credential or record requests.
4. Further comparison can be done between the existing and developed Registrar Transaction Management System using other comparison criteria such as security.
5. Further, validate the generalization of the result, a number of respondents can be increased to at least 10% to 15% of the Camarines Sur Polytechnic Colleges' population.
6. The office of the registrar shall procure the required hardware resources needed for the full implementation of the Registrar Transaction Management System.

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# THE CRIMINOLOGY MASTERS AND THEIR EXPERIENCES IN TEACHING LABORATORY COURSES

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## ABSTRACT

The pandemic Era gave a new experience to all educators, especially in delivering courses or subjects without meeting the students face-to-face, especially in subjects with laboratory. All educational systems adopted the New Normal of delivering knowledge and skills where the application of New Learning Modalities like blended learning is integrated into their curricula. These new involvements of educators paved way for the creation of this study to be able to identify the experiences of Criminology Instructors in teaching Criminology Courses specifically with laboratory. It also includes the problems that they have encountered and the coping mechanisms that they have used to give possible and tangible solutions to these problems. This study is qualitative research involving six (6) key informants that had taught Criminology courses with laboratory at ISU and the responses were thematically analyzed. Based on the finding of this study, the researchers were able to identify experiences and problems encountered by Criminology instructors. Before the start of classes integrating the new learning modalities of blended and hybrid learning as it was integrated into their syllabus. Problems regarding internet connection were coped up with the supplementary data connection in cases Wi-Fi is not accessible. For student's assessment problem, it was coped up with the utilization of synchronous mode of learning and integration of pre-uploaded videos online. With the monetary problem, it is coped up with an allocation of budget for data allocations. Lastly, gadget problems was coped up with technical help of co-instructors who provides pre-made presentations and basic troubleshooting tips.

*Keywords: COVID-19, Pandemic, Criminology Course, Criminology Instructors, Laboratory*

## INTRODUCTION

This pandemic era gave a struggle to the educational system. But despite this, education had adopted to the new normal since education needs to be stabilized the learners in times of emergency. In order to move forward in these challenging times, the education sector needs to demonstrate resilience – the ability to overcome adversity, a lifelong skill that it purports to develop among learners (Buenviaje, et.al , 2020).

In the study of R.K. Kavitha, and W. Jaisingh (2018) entitled “A Study on the Student Experiences in Blended Learning Environments,” it was found out that the blended learning approach is more beneficial for students who are skilled in using certain computer programs and applications. The study results also provide new insights into the student preferences for learning in such knowledge sharing collaborative environments. Thus, problem still arises for students that are not computer literate.

Another study was conducted by Rubia Cobo-Rendon, et. Al (2022) entitled “Return to University Classrooms with Blended Learning: A Possible Post-pandemic COVID-19 Scenario.” As a result, there were recommendations presented for building institutional frameworks that enable the implementation of high-quality blended learning models in the context of a gradual return to face-to-face courses in higher education. And it was concluded that the current post-pandemic era constitutes a crucial moment for determining the way education is delivered in higher education.

The Bachelor of Science in Criminology was created by virtue of the Commission on Higher Education Memorandum Order (CMO) 21, series of 2005 which was revised by CMO 05, series of 2018 which is also known as Policies, Standards and Guidelines for the Bachelor of Science in Criminology (BS Criminology) Program.

This program has a total of 177 units composed of General Education, Professional Courses, and Practicum which is also known as On-the-Job Training and Community Immersion. There are a total of 121 credit units for Professional Courses with a total of twenty-three (23) units for courses with laboratory for a total of 7 courses. These courses are Forensic 1 – Forensic Photography, Forensic 2 – Personal Identification Techniques, Forensic 3 – Forensic Chemistry and Toxicology, Forensic 4 – Questioned Documents Examination, Forensic 5 – Lie Detection Techniques, Forensic 6 – Forensic Ballistics, and CDI 9 – Introduction to Cybercrime and Environmental Laws and Protection.

Teaching these Professional Courses is not that simple due to different factors which include external influences like various television shows and movies like CSI, FBI Files, and CID; and time allotment to teach which is only one (1) Forensic course per semester (Shukla, 2021). Thus, innovative teaching modalities and strategies are highly needed to impart technical skills, knowledge, and abilities of Forensic to Criminology students. This is made possible and visible by our great instructors in the field of Criminology producing graduates that were well-oriented and versed in Forensic Sciences.

Problems in teaching Forensic Science came through when COVID-19 broke out in March 2020. This paved way to a new-normal educational system where synchronous and asynchronous learning modalities and blended learning were adopted. According to Shank, P. (2020) Synchronous learning modality is real-time for both instructors and students to meet virtually using online video conferencing software like Google Meet, Zoom, Microsoft Teams, Skype, and the like; Asynchronous is self-paced meaning the students are provided with modules, online audio and video and discussion forms that were provided by their instructors and where students could access anytime. Blended learning, on the other hand, is the combination of asynchronous and synchronous.

With this new-normal educational system, instructors teaching professional Criminology subjects have a hard time adopting especially in courses with laboratories. This is the core reason for this research to be made possible, to be able to identify and determine the experiences of criminology instructors in teaching professional Criminology courses with Laboratory in synchronous learning modality and asynchronous learning modality.

## LITERATURE REVIEW

The COVID-19 pandemic has presented extraordinary challenges and made an impact on the educational sectors of our country. Every Higher Educational Institution (HEIs) is tasked and expected to sustain and provide quality education despite lockdowns and community quarantine. With the implementation of New Learning Modalities to the so-called “New Normal” in education, HEIs integrated Blended Learning and Hybrid Learning into the programs that they offer.

Blended Learning is a New Learning Modality where the use of asynchronous and synchronous learning is implemented (Barbour, et. al, n.d.). Synchronous learning is using of real-time online interaction between the instructors and students. It is where the students and the instructors meet virtually using social interactive platforms like Google Meet, Zoom Meeting, and the like. This is also where the instructors will discuss topics that were integrated into their educational curriculum. While Asynchronous learning is made offline where students are given time to do their modules and activities. This is also where students can just look at their online educational platforms for posted quizzes, assignments, and activities without the instructors meeting the students virtually. Hybrid Learning, on the other hand, is also online and offline but offline is through face-to-face.

Isabela State University (ISU) as one of the leading state universities in our country offers the Program Bachelor of Science in Criminology. In this program, courses offered are both pure lectures and a combination of lectures and laboratory. The problem arises when instructors deliver their topics with courses having both lectures and laboratories. Thus, paving the way for the creation of this study.

In the study conducted by Busko and Bezinovic (2021) entitled “Experiences With Online Teaching and Psychological Adjustment of High-School Students at the Onset of the COVID-19 Pandemic in Croatia.” The study is about the stress level that students encounter during online classes, the frustrations

they face while they are living in social isolation, and how the students adjusted their emotional and psychological well-being. This study focuses on students' academic experiences during the pandemic focusing on their stress levels.

Another study was conducted by Wu (2021) entitled "How Teachers Conduct Online Teaching During the COVID-19 Pandemic: A Case Study of Taiwan" which is focused on teachers. This study aims to explore how online teaching activities and online teaching processes were adopted by teachers at all levels during the pandemic in Taiwan. And it was found that College and Secondary teachers used synchronous and asynchronous modes of learning while elementary teachers made use of homemade videos to share with their students.

An additional study was also made by Lixian Yan, et. al (2021) entitled "Students' experience of online learning during the COVID-19 pandemic: A province-wide survey study." The objective of this study is to focus on the experiences of students at different stages of their K-12 education who reacted to the mandatory full-time online learning due the COVID-19 in China through a quantitative approach. As for the result, there is a significant difference between the student's online learning experiences and their school years.

In the Philippines, the study entitled "Faculty Perception toward Online Education in a State College in the Philippines during the Coronavirus Disease 19 (COVID-19) Pandemic" by Rome B. Moralista, and Ryan Michael F. Oducado (2020) is aimed to determine the perception towards online education among faculty in state colleges. As a result of the quantitative study, the majority of faculty had intermediate computer knowledge or competency and had no training in online teaching, with only a few having a very stable internet connection which is very essential in online teaching. The respondents of the study also considered online education will result in more academic dishonesty, impersonal, and lack of feeling, unlike face-to-face classes.

Most of the studies are made in quantitative research of either perception and level of knowledge of using the internet in teaching their courses or subjects. That is the reason for this study to be conducted since it was aimed to identify and determine the experiences of Criminology Instructors in teaching courses or subjects that have both lecture and laboratory.

## OBJECTIVES

The general objectives of this study intend to determine the experiences of Criminology Instructors in teaching Criminology Courses with laboratory.

### Specific Objectives:

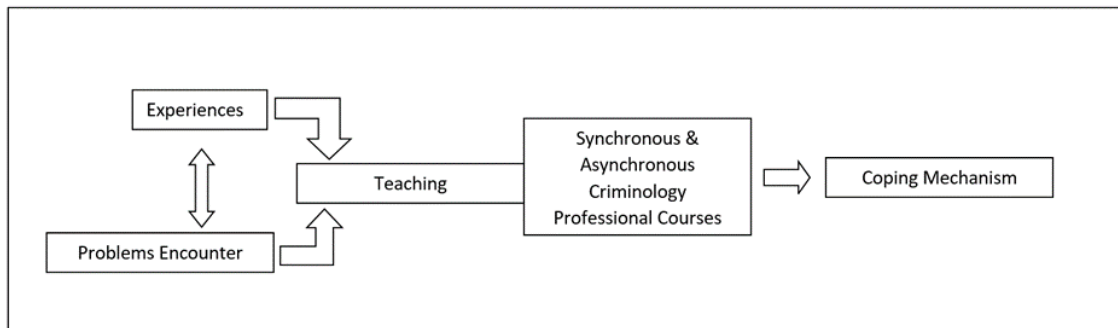
Specifically, this study has the following objectives:

1. To identify the experiences of Criminology Instructors in teaching Criminology Laboratory Courses;
2. To identify the problems encountered in teaching Criminology Courses; and
3. To identify coping mechanisms used by Criminology Instructors in addressing the problems encountered.

## METHODOLOGY

*Research Design.* This study used a descriptive qualitative case analysis because it will describe the personal experiences of the Criminology Instructors in Teaching Criminology Courses with laboratory, including the challenges encountered and the coping mechanism they used to face their stated problems. In identifying the key respondents, the researchers used aliases specifically the names of the father's in the field of Criminalistics namely Talbot, Galton, Goddard, Osborn, Larson, and Lombroso. Before the actual interview, the researchers handed out informed consent (Appendix) to six (6) key informants from the Isabela State University (ISU) System offering the program Bachelor of Science (BS) in Criminology. During the data gathering, the researchers personally interviewed the respondents face to face and using online video conferencing like Facebook Messenger. A self-constructed interview (Appendix) was used by the researchers to made specifically answer the general and specific questions and objectives. Lastly, all gathered data were treated using Thematic Analysis. Thematic Analysis is done by identifying

the common denominator in the answers of the key informants and by identifying patterns in meaning across the data to derive themes (Braun, V., & Clarke, V., 2006). The first step in Thematic Analysis is an analysis of the responses of the instructors, then creating codes based on similar responses with supporting data, and lastly, the similar responses that were coded will be grouped into themes.



## FINDINGS

Bachelor of Science in Criminology is a four (4) year course program with six (6) core areas including Criminal Law and Jurisprudence, Law Enforcement Administration, Crime Detection and Investigation, Criminal Sociology or Criminology, Correctional Administration, and Criminalistics or Forensic Science. Under Forensic Science there again are six (6) areas including Dactyloscopy, Forensic Photography, Ballistics, Questioned Document Examination, Polygraphy, and Lie Detection, and Forensic Chemistry. The key informants of this study have experience teaching during the pandemic era from 2020 up to now.

### Experiences of Criminology Instructors in Teaching Criminology Laboratory Courses

Before the classes starts, many seminars have been conducted to guide and orient the faculty handling different courses including courses with laboratory. Most of the key informants had undergone including seminars and training with the use of different online platforms like Edmodo, Google Classroom, and ISU Orange but newly hired key informants were not able to undergo such training and seminars but they were taught and supplemented by their co-instructors on what is the best platforms to be used. Thus, Faculty Trainings and Seminar was either implemented or not implemented to all Criminology Instructors handling Criminology Laboratory Courses.

When it comes to **Learning Modalities**, all of the key informants used Blended Learning in delivering Criminology courses with Laboratory. Blended Learning, also known as the “New Traditional Model,” according to Graham (2013) it is widely adopted across higher education. This includes the use of Synchronous or Online and Asynchronous Learning or Offline. And currently, most of the key informants are using Hybrid Learning. Hybrid Learning, on-the-other hand, is a combination of face-to-face and online learning of either synchronous or asynchronous while some of the key informants have gone back to full face-to-face. This two (2) learning modality can be both termed as the New Learning Modality.

When it come to the **Preparation of the Course Syllabus**, there were meetings conducted by the whole ISU System offering BS Criminology during the First Semester of Academic Year 2020-2021 where each campus is designated to create a Syllabus that is adoptive to the New Normal which was adopted by each campuses offering BS Criminology based on the trainings and seminars that the Criminology Instructors had undergone. During the Adaptation of the New Normal to the Syllabus, Key Informants check each topic per course and matched if the topic is for asynchronous or synchronous, as stated by Talbot:

*“I checked the topics in my subject, for example Photography. Then, matched if the topic is for discussion online or offline or playing of video if it is available in YouTube.”*

Some key informants just Adopt the Created Syllabus that was created by the other campus, as stated by Goddard:

*"I just adopted the syllabus that was made by Cauayan"*

and by Galton

*"I used the syllabus sent to me in the GC (Group Chat) that is already made to adopt with the online-offline class."*

Adopting to the New Normal is something new to both parties including the Instructors and the Students. Each experiences difficulties and convenience in using the internet in learning. The difficulties or problems that were encountered by the key informants are internet connection, gadget, money, students' assessment, and skills demonstration.

### **Problems Encountered in Teaching Criminology Laboratory Course**

**Internet Connectivity** is the most common problem encountered by the key informants while teaching Criminology Laboratory Courses as mentioned by Talbot, Galton, Goddard, Osborn, and Larson. As stated by Talbot:

*"Weak data connection."*

Most of the key informants does not have the Wi-Fi Connection which is faster compared to Data Connection due to the non-coverage of the Wi-Fi access to the residence of the Key Informants especially those that were residing on the Barrios. Internet connectivity is very essential in the New Learning Modality of Blended and Hybrid since the delivery of instructions by the instructors to the students are through the use of Internet. If there is a slow internet connection, of either on the instructor part or of the students, the delivery of instruction and knowledge will be hindered.

Another common problem that the key informants stated is the **student's assessment**. This includes the key informants feeling of assurance if the students have really studies, have read their notes, and have understand the topic. The key informants have the feeling of self-doubt as stated by Goddard

*"I am not really sure if my students have understood the topics especially that it is very technical..."*

Another statement by Galton:

*"because I cannot see the students, there is no enough interaction...I always ask if they understand me..."*

Key informants tend to constantly ask their students if they have understanding the topic to convince their selves that they have delivered well the topic to the students.

**Skills Demonstration** as a problem includes teach-in or instruction of laboratory skills to the students that is easier and accurately done during face-to-face which is difficult to do and explain online. As stated by Lombroso:

*"...it's hard to teach lab subjects since its focused-on practice and application which are not achieved in online learning."*

During Laboratory classes, the instructors are expected to provide a teach-in and hands-on experience to the students. Another statement by Goddard stating:

*"there is no enough skills development and familiarization of laboratory equipment..."*

Skills development and familiarization if very important for Criminology students since they need these in their future careers of law enforcement, crime detection and investigation and criminalistics.

Another problem that the key informants encountered is with the **Gadgets**. Meaning, the key informants does not have the necessary equipment or gadget like Laptops or high-end smart phones to create their modules, prepare their PowerPoint presentations, encoding and uploading of their grades. As stated by Talbot:

*"I don't have laptop for PowerPoint, I only use my phone that sometimes it freezes or hung."*

Aside from the internet connection, gadgets are very important in delivering topics and lessons using New Learning Modality. Gadgets are essential to interact with the students even though there is no interaction. It is also used to create interactive slideshows and video presentations for the students to view in leu of actual face-to face interaction.

Last is **Money**, which is a common problem especially to the key informants that were under the Contract-of-Service where the some of the salary of the key informants have to be allotted to buy load for their phones to use for the chosen learning modality. As stated again by Talbot:

*"My week load allowance is not enough for a week especially if I will have asynchronous. It's very data consuming."*

Data Connection is the only available internet connection for those instructors that does not have internet connection through Wi-Fi. Instructors uses their own money for the bigger data allocation since

it is more consuming when using Online Platforms like Google Meet and Zoom Meeting. Another statement of Goddard stated:

“If the Wi-Fi is not working, I need to spend for load to connect to the students.”

Key Informants needs to spend extra to have an established connection to the students during the New Normal. Another financial burden for the instructors.

With all of the stated problems, Criminology Instructors devised a plan to give a solution to each of these problems. From allocating more budget for staying online, utilization of more Asynchronous Mode of Learning, searching for available videos online, and asking help from colleagues.

### **Coping Mechanisms to Address the Problems**

Criminology Instructors are said to be innovative and resourceful since Forensic Science equipment are expensive and not always available. Thus, with the problems that Criminology Instructors encountered there are many coping mechanisms that helped and facilitated in the adoption of the New Learning Modalities.

Criminology Instructors had **allocated more budget for staying online**. This means instructors allotted their extra or additional money for their internet connection. In times that their Wi-Fi Connection is not functioning, Key Informants needs to load their sim card to have additional internet access to connect to the students during their class. As stated by Goddard:

*“I use two (2) internet access. Wi-Fi and load-data for sim.”*

Due to slow internet connectivity, instructors need to devise a way to connect to students and that is to have a back up load or data allocation in cases that their Wi-Fi is not working. For instructors that were not provided with Wi-Fi access due to their residence, the best way to solve this problem is to use data connection that even though it is more expensive than having a monthly bill through Wi-Fi connection.

When Criminology Instructor have a problem with the assessment of students, the best remedy that the instructors do is to **Utilized Asynchronous Mode of Learning**. This means to do more offline activities for the students which includes answering their modules, quizzes, and activities. As supported by the statement of Goddard:

*“I always send quizzes to assess if the students understand the lesson.”*

Another way of utilizing asynchronous is by using recorded lectures that will be posted and available anytime to students during the semester. As stated by Lombroso”

*“...using of recorded lectures illustrating the key principles of the subject”* and by Galton:

*“...using of recorded lectures they (students) can play anytime even though we are offline.”*

Instructors gives an extra effort of recording their lectures and uploading it on their chosen platforms for students to view or watch anytime. This is convenient since it supplements the lack of knowledge of students.

**Searching of Available Videos Online** is also one of the coping mechanisms of the Criminology Instructors in dealing with their problem regarding skills demonstration. As stated by Galton:

*“...there are available videos online which I share to students ...I may be able to personally demonstrate it, but there are YouTube videos showing the laboratory side of the course.”*

Using of videos that are available in the internet provides the knowledge and skills to students that is necessary of the Laboratory course that the students are enrolled to. Criminology instructors may not be able to deliver the skills face-to-face but with the aid of online videos posted, it was made possible.

Lastly, advices from their co-instructors are also a big help in the instructor’s problem regarding gadgets. **Asking help from their colleagues** who were familiar with the technical side of gadget use like creating schedule in Google Meet or Zoom Meeting, creating of virtual classroom using Google Classroom or Edmodo, and sharing of PowerPoint Presentation or modules. As stated by Talbot:

*“I always got help from you and with ma’am \*\*\* and sir \*\*\* and sir \*\*\*. You give me with what I need to teach the subject.”*

Another statement from Goddard, *“I am not good with gadgets, but it’s a good thing that sir \*\*\* is one call away.”* Criminology instructors always lends a helping hand to their co-instructors that are in need of help with either the modules that they need, PowerPoint presentations, or any technicality with the software, programs, or gadgets that are highly need with the new learning modality.



The experiences of Criminology Instructors in teaching Criminology courses with laboratory this pandemic era starts with the preparation of the ISU system offering Bachelor of Science in Criminology of integrating the New Learning Modality of Blended Learning and Hybrid Learning to the curriculum of Criminology specifically the syllabus of Laboratory courses. Others, adopted the made syllabus of the system. When it comes to the problems that was experienced by the Criminology instructors, the key informants experienced problems with internet connection, gadget, money, students' assessment, and skills demonstration. As to the coping mechanism, key informants allocating more budget for staying online, utilization of more Asynchronous Mode of Learning, searching for available videos online, and asking help from colleagues.

## SUMMARY AND CONCLUSION

Criminology instructors during this COVID-19 period have had a roller coaster ride since it is new with the use and utilization of the New Learning Modality specifically using Blended Learning and Hybrid Learning that is easily integrated into the curriculum of the Bachelor of Science in Criminology specifically in the course syllabus of courses with Laboratory like Dactyloscopy, Forensic Photography, Ballistics, Legal Medicine, Questioned Document Examination and Polygraphy. During this time, Criminology instructors also encountered problems like internet connectivity, use of gadgets or devices to be used in delivering the course, monetary problems, and lack of assessment to students which leads to self-doubt regarding whether the students understand or learn the knowledge and skills needed for the laboratory course. But regardless of these challenges, the Criminology instructors devised a way to counter and give a solution to these problems which includes adjusting their budget for data connections, learning that asynchronous mode of learning can assess the knowledge and skills of students, gathering video presentations that will supplement the face-to-face demonstration of skills needed and lastly, getting support from their co-instructors that were willing to lend a helping hand with the technicalities of New Learning Modalities.

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# STUDENTS' LEVEL OF SATISFACTION AT THE COLLEGE OF COMMERCE, UNIVERSITY OF SAN AGUSTIN

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## ABSTRACT

The quality of educational services provided by a university is a crucial aspect of the administrators' strategy in the customer-driven education context. Quality assurance is an essential element considered by students in their choice for institutions. Students' evaluation of the educational services is one of the most significant educational management tools used for stimulating quality enhancement. Understanding the student satisfaction determinant factors provide university administrators best possible solutions to improve service quality. Hence, assessment of the level of importance of institutional services provided by the University of San Agustin and level of student satisfaction to determine the performance of the university was conducted in 2018. This paper presents the results of the study conducted among the College of Commerce students who were chosen through stratified sampling techniques. Using Importance-Performance Analysis (IPA), strengths were identified and strategies were recommended to enhance students' satisfaction. The descriptive statistical analyses were obtained through Statistical Package for Social Sciences (SPSS). The institutional services were mostly important and students are mostly satisfied. Although there is no great discrepancy between importance and satisfaction, results are not equal. Hence, performance gap still exists. The university's strengths are the employability essentials integrated in general education courses and business core/major courses and campus life. The university should know where to focus resources to maintain quality management practices for continual improvement.

*Keywords: Importance-Performance Analysis (IPA), level of satisfaction, level of importance, performance, university services*

## INTRODUCTION

Student perceptions of the quality of their learning experience represent a very important element of effective assessment, particularly when they are systematically collected from a representative sample of students. Determining the level of importance of the University of San Agustin (University) services and the level of the students' satisfaction towards these services to determine the performances of the University in order to address possible opportunities for improvement is a strategic approach to remain competitive in the industry.

Every day college students make value judgments not just about their overall educational experience, but the elements that contribute to it as well. Academic advising, campus support services, instructional effectiveness, registration effectiveness, recruitment and financial aid, service excellence, concern for individual, student centeredness, campus life, safety and security, campus climate, and employability essentials; these and many other factors contribute to overall student satisfaction.

The researcher conducted the level of satisfaction at the College of Commerce, University of San Agustin, AY 2017-2018 survey as an effort to gather feedback from students across the College. Understanding students' experiences and satisfaction is important in our efforts to enrich the student experience and to make College of Commerce a more student-centered college. The results of this effort provide the College and the University with valuable information that will be used for student success initiatives, strategic planning and continuous improvement.

### **General Objectives of the Study**

The intent of this study was to evaluate student satisfaction with University services and the importance of these services to determine the performances of the University and recommend strategies in order to address possible opportunities for improvement. Viewing an individual situation from multiple perspectives enables the researcher to identify patterns of evidence that are consistently pointing to an issue that needs improvement.

### **Specific Objectives of the Study**

1. To determine the level of importance of the institutional services in terms of academic advising, campus support services, instructional effectiveness, registration effectiveness, recruitment and financial aid, service excellence, concern for individual, student centeredness, campus life, safety and security, campus climate, and employability essentials
2. To determine the level of students' satisfaction towards the institutional services in terms of academic advising, campus support services, instructional effectiveness, registration effectiveness, recruitment and financial aid, service excellence, concern for individual, student centeredness, campus life, safety and security, campus climate, and employability essentials
3. To determine the performance gap (Importance–Satisfaction) in terms of academic advising, campus support services, instructional effectiveness, registration effectiveness, recruitment and financial aid, service excellence, concern for individual, student centeredness, campus life, safety and security, campus climate, and employability essentials
4. To identify the University's strengths and areas for improvement.

## **METHODOLOGY**

The researcher conducted the study with the intention of collecting representative data about students' satisfaction with their experiences in the University of San Agustin. The survey was generated and administered by the researcher among the students who were enrolled in the College of Commerce. There were three hundred sixty-three (363) students who completed the survey which contained items where they rated importance and satisfaction. The students-respondents are representative of the College population and were determined using stratified random sampling technique.

Students responded twice to each of the items in Part IV – first by indicating how important it is that the expectation be met, and then again to indicate how satisfied they are that the expectation is being met. These are indicated on a 1 to 7 scale with 7 being high. A performance gap is then calculated, which is importance minus satisfaction. The smaller the performance gap, the better the college is doing at meeting students' expectations; the larger the performance gap, the more room for improvement there is to meet students' expectations. Hence,

$$\text{Importance} - \text{Satisfaction} = \text{Performance Gap}$$

### **Research Design**

Based on the nature of the study and its objective of describing the extent of importance of the University services and the extent of the students' satisfaction towards these services to determine the performances of the University and identify possible opportunities for improvement and taking actions for continuous improvement, the research design appropriate for the study is the descriptive research method. Descriptive study typically seeks to ascertain respondents' perspective or experiences on a specified subject in a predetermined structured manner.

In this study, the information was collected through questionnaires which were adopted from Noel Levits Student Survey Index and modified by the researcher. The survey instrument was administered and distributed personally by the researcher among the chosen respondents.

### **Population and Samples**

This study is considered as one of the multiple elements considered in evaluation of student satisfaction with College and University's services and facilities. Viewing an individual situation from multiple

perspectives enables the researcher to identify patterns of evidence that are consistently pointing to an issue that needs improvement.

With this perspective, the study population covers the 1st year, 2nd year, 3rd year, and 4th year students of the University on the undergraduate programs of the College of Commerce (COC) only. These include academic programs such as Bachelor of Science in Accountancy (BSA), Bachelor of Science in Accounting Technology (BSAcT), Bachelor of Science in Business Administration major in Marketing Management (BSBA MM), Bachelor of Science in Business Administration major in Financial Management (BSBA FM), Bachelor of Science in Hotel and Restaurant Management (BSHRM), Bachelor of Science in Tourism Management (BSTM) and Certificate in Culinary Arts (CCA). In order to determine the study's sample with this known population, the researcher used stratified sampling technique, a probability sampling technique of selecting a sample in such a way that identified subgroups or strata in the population that they exist. The sample size was determined using Slovin's formula and the margin of error (e) was set at 0.05.

### **Sampling Technique**

The researcher used stratified sampling technique, a probability sampling technique of selecting a sample in such a way that identified subgroups or strata in the population and represented in the sample in the population that they exist.

The number of samples in every subgroup or strata, college/department in this case, was derived by simply dividing the total samples from the total population, and then the quotient was multiplied to the total population of each subgroup. After determining the number of respondents from each subgroup, simple random sampling was conducted. The researcher personally distributed the questionnaire to those respondents who were selected after the said method was executed.

### **Research Instruments**

In order to assess the extent of importance of the University services and the extent of the students' satisfaction towards these services to determine the performances of the University in order to address possible opportunities for improvement which is a strategic approach to remain competitive in the industry, the research instrument was divided among various parts to gather data for comprehensive analysis.

Part I of the research instrument contained personal information about the respondents such as age, sex, home residence, high school graduated from, type of student, program and year level.

Part II of the research instrument describes an expectation about students experiences on the University of San Agustin towards the institutional services offered. These institutional services include academic advising, campus support services, instructional effectiveness, registration effectiveness, recruitment and financial aid, service excellence, concern for individual, student centeredness, campus life, safety and security, campus climate, and employability essentials among other services. Students responded twice to each of the items in this part – first by indicating how important it is that the expectation be met with the identified institutional services, and then again to indicate how satisfied they are that the expectation is being met with these identified institutional services. These are indicated on a 1 to 7 scale with 7 being high. A performance gap is then calculated, which is importance minus satisfaction.

Part III of the research instrument gathered data on how students' college experience met their expectation, their over-all satisfaction with their experiences in the University and the probability of enrolling again in the University of San Agustin.

Part IV, solicited comments and suggestions from the students for continual improvement of the University's delivery of educational services to the students and other stakeholders.

The questionnaire was presented to experts on this field of study for corrections/comments/suggestions. Those comments and suggestions provided were integrated for the research instruments' improvement. The improved instrument, then were presented to the experts for further deliberation of its validity. After the thorough discussions and deliberations, the research questionnaire was revalidated until be declared valid by the validators.

The validated questionnaire was administered for trial-testing to the thirty-five (35) students of the University enrolled in other colleges using survey questionnaire. This was conducted to measure if the questionnaire was reliable or not. The measure was encoded and data were statistically treated using the Statistical Package for Social Sciences (SPSS) and the results should be more than an alpha of 0.70. Ac-

ording to Garcia and Reganit (2010), each item must have an alpha of at least 0.70 to be considered reliable.

### **Definition of Performance Gap**

Each scale contains three areas of measurement: importance, satisfaction, and performance gap. The performance gap is simply the importance score minus the satisfaction score. The larger the performance gap, the greater the discrepancy between what students expect and their level of satisfaction with the current situation. The smaller the performance gap, the better the University is doing at meeting student expectations. It is important to consider all of the information provided. Focusing on only one area of measurement (such as the performance gap) likely will result in overlooking areas of students' experiences that they value most.

### **Data Gathering Procedure**

Stratified random sampling technique was used in this study. To identify the number of percentage of the sample size, the researcher got the total population of the College and each academic program, specifying the number of 1st year, 2nd year, 3rd year and 4th year students from the Office of the Dean of the College of Commerce after securing the necessary permit from the Dean.

Next, the researcher secured permit from the Office of the Dean to consider the students as the respondents of the study. After the necessary permit was granted, the researcher identified the class schedule of the identified respondents with the help of the Office of the Dean of the College of Commerce.

Then, the researcher personally administered the survey. The purpose of the study was explained clearly to the respondents as well as the manner of accomplishing the survey questionnaire.

The researcher conducted the survey with students in sample of core programs such as Bachelor of Science in Accountancy (BSA), Bachelor of Science in Accounting Technology (BSAcT), Bachelor of Science in Business Administration major in Marketing Management (BSBA MM), Bachelor of Science in Business Administration major in Financial Management (BSBA FM), Bachelor of Science in Hotel and Restaurant Management (BSHRM), Bachelor of Science in Tourism Management (BSTM) and Certificate in Culinary Arts (CCA).

After the answered questionnaires were retrieved, the data were statistically treated using Statistical Package for Social Sciences (SPSS).

The mean ranges of the results or answers given were determined, for analysis of the study.

### **Data Processing and Analysis**

The data gathered for this study were subjected to appropriate computer-processed statistics employing the Statistical Package for Social Sciences (SPSS) software. For better understanding and analysis of data, the following statistical tool was used.

**Mean.** Mean was used to determine the extent of importance and students satisfaction of the institutional services offered by the University of San Agustin from the College of Commerce students' perspectives in terms of academic advising, campus support services, instructional effectiveness, registration effectiveness, recruitment and financial aid, service excellence, concern for individual, student centeredness, campus life, safety and security, campus climate, and employability essentials when taken as a whole and when grouped according to age, sex, home residence, high school graduated from, type of student, program and major and year level.

The survey results are summarized in an institutional summary of twelve scales (categories) to determine the satisfaction and school climate to provide an overview of the extent of importance of these factors and the extent of student satisfaction towards these factors. With these, performance gap was obtained.

## **RESULTS AND DISCUSSIONS**

### **Level of Importance of Institutional Services and Students' Satisfaction**

Table 1 shows the extent of importance of institutional services and students' satisfaction towards the institutional services and the University's performance.

All the institutional services are rated as mostly important. The top 5 institutional services perceived as mostly important in order of rank are employability essentials (general education courses), employability essentials (business core/major courses), campus life, campus climate, safety and security.

All the institutional services are rated as mostly satisfied. The top 5 institutional services rated as mostly satisfied in order of rank are employability essentials (business core/major courses), employability essentials (general education courses), campus life, safety and security, concern for individual.

Institutional services are perceived by the students as mostly important and they are also mostly satisfied by these services. However, there is still a performance gap that exists because there is still a discrepancy between the extent of importance of the institutional services and the extent of the students' satisfaction. Although the difference between importance and satisfaction is not that high yet they are not parallel. Hence, performance gap exists. The results presented according to rank indicate that concern for individual, business core/major courses and academic advising had the lowest gap. Meanwhile, service excellence, recruitment and financial aid and campus climate had the largest gap compared to the rest.

**Table 1. Level of Importance of Institutional Services and Students' Satisfaction towards the Institution Services and The University's Performance**

Institutional Services	Importance	Description	Satisfaction	Description	Gap
Service Excellence	6.135	Mostly Important	5.888	Mostly Satisfied	0.247
Recruitment and Financial Aid	6.124	Mostly Important	5.904	Mostly Satisfied	0.220
Campus Climate	6.162	Mostly Important	5.945	Mostly Satisfied	0.217
Instructional Effectiveness	6.140	Mostly Important	5.926	Mostly Satisfied	0.214
General Education Courses	6.193	Mostly Important	5.985	Mostly Satisfied	0.209
Campus Support Services	6.094	Mostly Important	5.887	Mostly Satisfied	0.206
Campus Life	6.170	Mostly Important	5.971	Mostly Satisfied	0.199
Safety and Security	6.151	Mostly Important	5.968	Mostly Satisfied	0.184
Registration Effectiveness	6.102	Mostly Important	5.919	Mostly Satisfied	0.184
Student Centeredness	6.132	Mostly Important	5.962	Mostly Satisfied	0.170
Academic Advising	6.094	Mostly Important	5.927	Mostly Satisfied	0.167
Business Core/Major Courses	6.190	Mostly Important	6.034	Mostly Satisfied	0.155
Concern for Individual	6.119	Mostly Important	5.966	Mostly Satisfied	0.153

With these results of the study, the Strengths and the areas for improvement of the university are identified as follows:

### Strengths

Strengths equal high importance and high satisfaction. The institutional services ranked in the top half of importance and the top 25% of satisfaction scores are employability essentials (business core/major courses) and general education courses and campus life. Employability essentials are the skills and behaviors employers want to see demonstrated in the workplace, and they are incorporated into all university course offerings both in business core/major courses and general education courses such as the abilities to adapt to change, think critically and creatively, communicate effectively and respectfully, work collaboratively and act responsibly. Campus life assess the effectiveness of student life programs offered by the university covering issues ranging from co-curricular and extra-curricular activities as well as their entire campus life as they stay in the university. This category also assessed campus policies and procedures to determine students' perception of their rights and responsibilities.

### Areas for Improvement

All of the institutional services understudy are of mostly important to the students and their satisfaction towards them are mostly satisfied, yet there are still gaps between importance and satisfaction. In other words, even though satisfaction levels on these services seem fairly high and their importance are fairly high and the difference between the level of importance and satisfaction is not too big, yet they are not equal. Ideally, the level of satisfaction should be parallel to the level of importance. The institutional services pertaining to service excellence, recruitment and financial aid and campus climate have the

largest gap between importance and satisfaction. Service excellence is the perceived attitude of the university staff, especially front-line staff, toward students. This scale pinpoints the areas of the campus where quality service and personal concern for students are rated most and least favorably. Recruitment and financial aid are the services pertaining to the ability to enroll students in an effective manner. This scale covers issues such as competence and knowledge of admissions counselors, as well as the effectiveness and availability of financial aid programs. Campus climate is the extent to which the university provides experiences that promote a sense of campus pride and feelings of belonging. This scale also assesses the effectiveness of institution's channels of communication for students. As a result, focusing attention on enhancing these areas may improve the student experience.

The smaller the performance gap, the better the institution is doing at meeting student expectations. It is important to consider all of the information provided. Focusing on only one area of measurement (such as the performance gap) likely will result in overlooking areas of students' experiences that they value most.

The intent of this study is for use as one of the multiple elements considered in evaluation of student satisfaction with the University services and facilities. Using this approach, the University administrator is encouraged to consider these results along with other quantitative sources of feedback from other surveys or metrics related to a particular area of the University, as well as qualitative sources of feedback such as observation, focus groups, interviews and contacts of a non-metric nature (e.g., complaints). Viewing an individual situation from multiple perspectives enables the University Administrators to identify patterns of evidence that are consistently pointing to institutional services that needs improvement. This would help increase customer satisfaction in the future and fill-in the gap between institutional services extent of importance and satisfaction.

## CONCLUSION

1. All the institutional services are rated as mostly important. The top 5 institutional services perceived as mostly important in order of rank are employability essentials (general education courses), employability essentials (business core/major courses), campus life, campus climate, safety and security.
2. All the institutional services are rated as mostly satisfied. The top 5 institutional services rated as mostly satisfied in order of rank are employability essentials (business core/major courses), employability essentials (general education courses), campus life, safety and security and concern for individual.
3. Institutional Services are perceived by the students as mostly important and they are also mostly satisfied by these services. However, there is still a performance gap that exists because there is still a discrepancy between the level of importance of the institutional services and the level of the students' satisfaction. Although the difference between importance and satisfaction is not that high yet they are not parallel. Hence, performance gap exists. The results as presented according to order indicate that concern for individual, employability essentials (business core/major courses) and academic advising had the lowest gap.
4. Service excellence, recruitment and financial aid and campus climate had the largest gap compared to the rest. Students' college experience is quite a bit better than they expected and they rated their over-all satisfaction as mostly satisfied. All in all, if they had to do it over, they would probably enroll in the University of San Agustin.
5. Utilizing Importance-Performance Analysis (IPA), the disparity between importance and performance was established. It provides indication on the level of the customer satisfaction on the attributes of service consumed. Further analysis of IPA by locating each attribute into appropriate quadrant in order of its relative importance and performance (satisfaction), moving from the top to the bottom of the quadrant, the placement of attributes translate different impact upon the strategic interpretation within each quadrant.
6. All institutional services understudy belongs to Quadrant I: Keep up the Good Work. They have high importance and high performance. It indicates that the customers value such attributes as relevant to the services they consumed and they are mostly satisfied on how the attributes enhance the delivery of services. These must be maintained and exploited to achieve their maximum benefits as



potential competitive advantage of University of San Agustin. Hence, it is important to sustain optimum level of resources to suffice their maximum benefits.

7. In general, the student responses in measuring the level of the importance of the institutional services indicate that these institutional services are mostly important and in measuring the level of their satisfaction towards these services indicate that they are mostly satisfied. However, it seems that there is room to enhance these services in order to obtain completely satisfied response to these items from students.

## RECOMMENDATION

This study provides useful and comprehensive information to guide the universities decision-making efforts and action planning. They will identify overall strengths, which provide a foundation from which to build to continually improve. The information from this study will be further analyzed, specific strengths and areas of improvement will be further studied for their implications on the universities; and detailed information will be shared with all concerned individuals and offices. The information from this study provides direction for student success initiatives, guidance in strategic planning efforts, input as part of continuous quality improvement efforts and offer information for accreditation requirements. Hence, this kind of study should be conducted regularly to document change over time and to facilitate improvement in student experiences and satisfaction and among the University students across all departments/colleges.

Further research may be employed by university administrators in creating their own wide-ranging scheme for assessment of the educational environment in the context of assuring service quality in higher education, the emphasis being put on student satisfaction to better focus their activities and the available resources in the framework of implementing a set of strategies aimed at achieving competitive advantage and academic excellence.

This study suggests that in ensuring the acquisition of disciplinary knowledge which remains a central component of university education the universities should continuously improve their curricula and pedagogies as ensuring the transformation of students requires a re-examination of curricula and pedagogies. The university administrators and personnel should also recognize that student satisfaction with and the image of the institution is also dependent on the level of service quality. The universities should therefore maintain to put in place quality management practices such as benchmarking so as to continuously improve the quality of service delivery processes.

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# ASSESSING THE DISASTER PREPAREDNESS OF ELEMENTARY PUPILS IN THE SCHOOLS DIVISION OF ISABELA

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## ABSTRACT

The mixed method of research was used in this study to assess the disaster preparedness of the one hundred fifty selected elementary pupils in the schools division of Isabela. Specifically, this study aimed to evaluate the disaster preparedness activities performed by elementary pupils, their attitudes in performing disaster preparedness activities, and the roles of schools in helping students in preparation to disasters. The researcher used a self-made questionnaire which underwent validity and reliability testing as the primary instrument of this undertaking. The data gathered were analyzed using simple mean, Likert scale and thematic analysis. Results revealed that the elementary pupils in the schools division of Isabela are not yet fully prepared in the occurrence of a disaster or calamity since they do not have that serious attitude towards this issue particularly in following instructions and rules and taking things funny when drills are performed. Schools have important roles in bringing the students better knowledge and discipline. It is also their duty and obligation to develop, improve, and discipline the students especially in taking things seriously since calamity or disaster is a serious matter. Likewise, schools have the responsibility of providing the necessary equipment like safety equipment, posters and flyers, and other significant materials that can help and prepare the students during hazardous phenomena.

*Keywords: assessment, attitudes, preparedness, disaster, roles of school*

## INTRODUCTION

Nowadays, the country suffers from various kinds of disasters such as heavy floods, typhoons, landslides, earthquakes and many others and it continuously affect the lives of every citizen. Philippines is one of the countries that are most highly vulnerable to natural hazard. Being a Filipino is not that easy, hazards can happen anytime and anywhere, and it may cause serious damages to everyone which dictates that everyone needs to be alert when natural or manmade hazards occur.

A disaster can be defined a tragic-event in one's life, with great loss of life, property and damage to infrastructure from events such as earthquake, floods, accident, fires, cyclones or typhoon (Role of Students in Disaster Management, 2017). On the other hand, United Nation International Strategy for Disaster Reduction (2017) defined disaster as a serious disruption of the functioning of a community or a society at any scale due to hazardous events interacting with condition of exposures, vulnerability and capacity, leading to one or more of the following: human, material, economic, and environmental losses and impact.

Meanwhile, hazards such as typhoons, earthquakes, and floods can turn into deadly disasters if they occur in vulnerable areas inhabited by people, especially those with few defenses (Tulloch 2010).

All over the world, there has been an upward trend in the number of school children dying or getting injured in school violence, disasters, and emergencies that would be avoided if safety policies were strictly adhered (Simatwa, 2007). Disaster incidences in schools were reported to have long term and short-term impacts depending on the magnitude and severity of the disaster itself. Among the common

effects noted were temporary closure of schools, disruptions of lessons, loss of teaching notes, and loss of morale amongst teachers and pupils and negative publicity of the school (Arson Control Forum, 2006). Natural and man-made disasters cannot be prevented, but at least communities can plan for them through disaster management involving preparedness and mitigation measures as indicated by UNESCO (2010).

On October 16, a 6.3-magnitude earthquake was recorded in Tulunan, North Cotabato followed by a 6.6-magnitude quake on October 29 and a 6.5-magnitude quake on October 31. On November 18, Phivolcs reported that a magnitude-5.9 earthquake also struck Bukidnon. At least one million learners have been affected and over 70 schools damaged in the aftermath of the 6.9 magnitude earthquake which struck Davao del Sur last weekend, the Department of Education (DepEd) said. In a latest education cluster update issued by DepEd, it cited that 969, 501 learners in 1, 608 schools under two regions (Regions XI and XII) in nine (9) divisions were affected by the magnitude 6.9 earthquake in Matanao, Davao del Sur. Based on the summary of damages, DepEd noted that there are currently 76 schools with reported damages in six division directly affecting 54,743 enrolled learners. DepEd reported that 72 classrooms were totally damaged, 152 classrooms with major damage, and 276 classrooms with minor damage.

While Isabela was flooded by Bagyong Tisoy last December 2019, classes were suspended because 16 bridges are not passable and the flood is deeper than people's height. According to the report, The Department of Education (DepEd) said Typhoon "Tisoy" which battered the Bicol region From Monday to Tuesday, destroyed 240 classrooms and damaged 543 others.

Preparedness is commonly viewed as consisting of activities aimed at improving response activities and coping capabilities. However, emphasis is increasingly being placed on recovery preparedness – that is on planning not only in order to respond effectively during and after disaster. But also, in order to successfully navigate challenges also associated with short and longer-term recovery (Waugh, 2000). In the study entitled "How to Measure Disaster Preparedness of Communities" (Almirol et.al., 2015), they concluded that it is essential to increase disaster preparedness as it mitigates the negative effects of natural hazards, which in turn reduces the negative impact of disasters. Reduction in disaster risk mitigates the number of deaths, injuries, and damaged property. Preparedness actions are influenced by a broad range of factors. Risk perception is strongly associated with disaster preparedness because individuals must perceive a risk to be motivated to initiate preparedness actions (Sattler et al. 2000, Miceli et al. 2008). According to Ministry of Education (2008) it is important to note that not all disasters are rapid or sudden. Some disasters develop over time and there is usually a lead time to receive information and react to early warnings. Careful monitoring and early warning are useful only if they help to avert potentially dangerous events or circumstances that can lead to emergency or disaster or if they lead to actions taken to minimize damage.

The province of Isabela is one of those places in the Philippines that are typically affected by numerous calamities of disasters where the most vulnerable sectors of the society are the most affected ones when calamities strike. Aside from these sectors, the students of the Department of Education are not exempted of these vulnerabilities. With this, the department and other government and non-government agencies work hand-in-hand to prepare and spare each Filipino learner to the severe impacts of various calamities.

From the above literature, studies, and explanation, the researcher as the school disaster risk reduction and management coordinator conceptualized this study to assess the disaster preparedness of elementary pupils in the schools division of Isabela for school year 2019-2020.

### **Statement of the Problem**

This study assessed the disaster preparedness of elementary pupils in the schools division of Isabela when disasters occur.

Specifically, it sought to answer the following questions:

1. What are the disaster preparedness activities of the elementary pupils in preparation to disasters?
2. What are the attitudes of elementary pupils in disaster preparation activities?
3. How do schools help students in preparing themselves when disasters occur?

## METHODOLOGY

The mixed method of research was used in this study to assess the disaster preparedness of elementary pupils in the schools division of Isabela when disasters/calamities occur. A quantitative research method deals with quantifying and analysis variables in order to get results. It involves the utilization and analysis of numerical data using specific statistical techniques to answer questions like who, how much, what, where, when, how many, and how. Expanding on this definition, Aliaga, and Gunderson (2002), describes quantitative research methods as the explaining of an issue or phenomenon through gathering data in numerical form and analyzing with the aid of mathematical methods; in particular statistics. On the other hand, qualitative descriptive approach is a comprehensive summarization, in everyday terms, of specific events experienced by individuals or groups of individuals (Colorafi, 2016) where data are typically collected through a questionnaire, an interview, or through observations.

The respondents of this study were the one hundred fifty selected elementary pupils in different elementary schools in the province of Isabela. Purposive sampling technique was used in selecting the respondents for the quantitative part to answer the survey questionnaire. From the one hundred fifty respondents, nineteen were randomly selected for the qualitative part through an interview to countercheck the validity of their responses in the floated questionnaire.

In gathering the data of this study, the researcher used the self-made questionnaire which underwent validity and reliability test for the respondents to answer. The survey questionnaire consists of two parts; Part I focused on the preparation of elementary pupils in the occurrence of disasters, their behavior towards disaster preparedness activities, and the roles of the schools in helping the students in preparation to disasters while and Part II centered on the student preparedness when disasters occur, as part of the qualitative design.

To analyze the information gathered in this study, simple mean, Likert Scale, and thematic analysis were used.

## FINDINGS

**Table 1. Disaster Preparedness Activities of the Elementary Pupils in Preparation to Disasters**

	Statements	Mean	Description
1.	I practice duck, cover and hold technique.	3.87	Often
2.	I attend/participate disaster drills conducted by school and LGU.	4.22	Always
3.	I prepare medicines or first aid kit, foods, and other important materials.	3.43	Often
4.	I read posters and flyers about disaster preparedness guide given by the school.	3.65	Often
5.	I listen properly when LGU/school personnel are explaining/teaching about disaster preparedness in our school.	3.94	Often
6.	I participate in cleaning our school surroundings before typhoon or other disasters occur.	3.94	Often
7.	I bring DRRM equipment like safety helmet required by our school.	3.10	Sometimes
8.	I can perform first aid to an injured person just what the authorities have taught us during the disaster drills.	2.96	Sometimes
9.	I participate in tree planting conducted by the school/LGU.	3.31	Sometimes
10.	I execute properly the knowledge and information I have learned from the disaster drills.	3.59	Often
11.	I got a high score in quiz about disaster preparedness conducted by our adviser which is an indication that I am prepared during disasters.	3.36	Sometimes
12.	I perform disaster drills properly to train myself and to help others during disasters.	3.75	Often
	<b>OVER ALL MEAN</b>	<b>3.59</b>	<b>Often</b>

*4.20-5.00-Always 3.40-4.19-Often 2.60-3.39-Sometimes 1.80-2.59-Rarely 1.00-1.79-Never*

Table 1 shows the disaster preparedness activities of the elementary pupils in the schools division of Isabela.

It is disclosed in the table that the respondents answered that they “always” participate/attend disaster drills conducted by school and LGU. This answer corroborates to the answers of most of the respondents during the interview for the following reasons: being prepared; having new knowledge; preventing different kinds of disasters; being updated in case of the occurrence of a disaster; being aware on what to

do when disaster occurs; understanding and knowing better how to practice preparedness when disaster occurs.

On the other hand, they “often” practice duck, cover and hold technique; prepare medicines or first aid kit, foods, and other important materials; read posters and flyers about disaster preparedness guide given by the school, listen properly when LGU/school personnel are explaining/teaching about disaster preparedness in school; participate in cleaning the school surroundings before typhoon or other disasters; execute properly the knowledge and information they learned from the disaster drills, and perform disaster drills properly to train them and to help others during disasters.

Furthermore, they “sometimes” bring DRRM equipment like safety helmet required by the school; perform first aid to an injured person just what the authorities have taught them during the disaster drills; participate in tree planting conducted by the school/LGU, and got a high score in quiz about disaster preparedness conducted by their adviser which is an indication that they are prepared during disasters. It was also proven in the interview that some of the respondents’ answered “seldom” for the reasons of: they are too busy; it help them a lot, and they need it for their own sake.

The result corresponds to the description of “often” which means that the elementary pupils are quite prepared towards disasters. (Almirol et.al., 2015) concluded that it is essential to increase disaster preparedness as it mitigates the negative effects of natural hazards, which in turn reduces the negative impact of disasters. According to a report by UNESCO (2007), education for disaster preparedness is a never-ending process that requires constant collaboration efforts by all parties concerned. In (2010) UNISDR also reported that Disaster Risk Reduction (DRR) education requires schools to implement safety, emergency, and disaster preparedness plans to prepare learners and educators to know what to do during and after a disaster has occurred.

**Table 2. Attitudes of Elementary Pupils towards Disaster Preparedness Activities**

	Statements	Mean	Description
1.	I follow instructions properly, when we do the duck, cover and hold techniques.	4.48	Always
2.	I finish the proper executions of duck, cover, and hold technique until we go to our lines.	4.19	Often
3.	I follow rules strictly and I keep my mind to be aware and serious in practicing disaster preparedness.	4.27	Always
4.	I listen carefully and have interest in learning disaster preparedness.	3.89	Often
5.	I am bored in practicing/performing disaster drills like earthquake drill.	2.72	Sometimes
6.	I am excited to practice/perform disaster preparation activities.	3.64	Often
7.	Disaster preparedness activities make me feel tense/nervous and uncomfortable.	3.02	Sometimes
8.	I maintain my discipline and my line in performing and listening about disaster drills.	3.99	Often
9.	I have become more familiar with this disaster preparedness activity through my previous experience.	3.95	Often
10.	I have a lot of self-confidence in performing disaster preparedness activities.	3.67	Often
11.	The challenges of learning about disaster preparedness is exciting.	3.70	Often
12.	I laugh and stand in my line without appropriate reasons because attending a disaster drill makes me uneasy.	2.70	Sometimes
13.	I can't perform the previous knowledge about disaster preparedness because I don't have the interest to memorize and internalize it.	2.42	Sometimes
	<b>OVERALL MEAN</b>	<b>3.59</b>	<b>Often</b>

*4.20-5.00-Always 3.40-4.19-Often 2.60-3.39-Sometimes 1.80-2.59-Rarely 1.00-1-79-Never*

Table 2 shows the attitude of elementary pupils towards disaster preparedness activities.

As indicated in the table, the respondents “always” follow instructions properly when they do the duck, cover and hold techniques and follow rules strictly and keep in mind to be aware and serious in practicing disaster preparedness.

Similarly, they “often” finish the proper executions of duck, cover, and hold technique until they go to their lines; listen carefully and have interest in learning disaster preparedness; excited to practice/perform disaster preparation activities; maintain discipline in performing and listening about disaster drills; have become more familiar with this disaster preparedness activity through their previous experience; have a lot of self-confidence in performing disaster preparedness activities, about disaster preparedness is exciting.

Moreover, they are “sometimes” bored in practicing/performing disaster drills like earthquake drill; they feel tense/nervous and uncomfortable; they laugh and stand in their line without appropriate reasons

because attending a disaster drill makes them uneasy and they can't perform the previous knowledge about disaster preparedness because they don't have the interest to memorize and internalize it.

The table correspond to the description of "often" which means that the elementary pupils have a good disposition and attitude towards disasters. Fothergrill and Peek (2002) maintaining that behavior includes a variety of action taken by families, households and communities to get ready for disasters.

Preparedness activities may include devising disasters plan, gathering emergency supplies, training response teams, and educating residents about potential disasters. Nevertheless, there are few empirical studies that consider the interplay between formal education and disaster education in shaping preparedness behaviors. The behavior and response of people and the community to disaster is very paramount in the planning of emergencies and disaster, as well as the collaboration and teamwork in handling the "after shock" of these disasters for a vigorous and efficient recovery. Positive attitude, behavior, response in an organization is needed for competent, efficient and well-organized plan for preparing for future emergencies and disasters.

**Table 3. Roles of the School in Helping the Students in Preparation to Disasters**

	Statement	Mean	Description
1.	Teachers give ideas or knowledge about disaster preparedness activities.	4.41	Strongly Agree
2.	The school helps the students in preparing and providing materials and equipment that will use when disaster occur.	4.34	Strongly Agree
3.	The school invites the BFP/PNP officials and other government agencies to give and share information about disaster preparedness.	4.51	Strongly Agree
4.	Teachers guide students in participating and performing disaster drills.	4.37	Strongly Agree
5.	The school requires safety equipment like fire extinguisher, pamatay sunog etc.	4.34	Strongly Agree
6.	The school gives flyers and brochures on disaster preparedness.	3.16	Agree
7.	The school posts posters on the school surroundings, classrooms, etc. about disaster preparedness.	3.92	Agree
8.	The school provides medical kits, first aid kits, and etc.	4.34	Strongly Agree
9.	The school trains students for the medical and rescue team for the school preparedness and awareness.	4.17	Agree
10.	Teachers prepare quiz about previous disaster preparedness activities to retain the knowledge of students.	3.66	Agree
11.	The school's DRRM coordinator visits classrooms and other buildings to check if it is damaged.	3.82	Agree
12.	The school personnel and staff participate/attend seminars about disaster preparedness.	4.02	Agree
	<b>OVERALL MEAN</b>	<b>4.08</b>	<b>Agree</b>

*4.20-5.00-Strongly Agree 3.40-4.19-Agree 2.60-3.39-Uncertain 1.80-2.59-Disagree 1.00-1.79-Strongly Disagree*

Table 3 shows the agreement of the respondents on the roles of the school in helping the students to disasters which is obvious in the overall mean of 4.08.

It is revealed in the table that the respondents "strongly agreed" on the following: teachers give ideas or knowledge about disaster preparedness activities; the school helps them preparing and providing materials and equipment that will use when disaster occur; the school invites the BFP/PNP officials and other government agencies to give and share information about disaster preparedness; teachers guide students in participating and performing disaster drills; the school requires safety equipment like fire extinguisher, pamatay sunog etc, and the school provides medical kits, first aid kits, and etc. It was proven in the interview that almost half of the respondents answered "strongly agree" for the following reasons: by giving trivia on how to be prepared; by practicing things needed to do; they allow everyone to participate to different preparedness activities and conducting disaster preparedness activities they invited those persons who have the rights to lead/teach those preparedness activities and they help the professionals to do the preparedness activities.

On the other hand, the respondents "agreed" on the following: the school gives flyers and brochures on disaster preparedness; posts posters on the school surroundings, classrooms, etc. about disaster preparedness; trains students for the medical and rescue team for the school preparedness and awareness; teachers prepare quiz about previous disaster preparedness activities to retain the knowledge of students; the school's DRRM coordinator visits classrooms and other buildings to check if it is damaged; and the

school personnel and staff participate/attend seminars about disaster preparedness. It was also proven in the interview that more than half of the respondents “agreed” for the same reasons as stated above.

The table corresponds the description of “agree” which means that the school is not fully responsive in helping the students in preparing to disasters. According to Grant (2002), disaster awareness in schools, can be incorporated in institution through strategically posting safety rules, installing fire-fighting equipment, evacuation exits, maintain buildings, organizing seminars on disaster awareness and involving child-to-child peer education, the use of electronic and print media, action learning and using science education as a means to introduce studies of disaster risk. The Government has created awareness to school children through providing fire safety education and give advice on fire prevention, risk assessment, evacuation and anti – arson measures (Arson Control Forum, 2006). According to Alberta Learning Special Education Board (1999) schools should invite the local fire department to give talks and demonstrations to learners about fire prevention in a school context. Students and staff should undertake periodic fire drills, at least twice a term. According to Ministry of Education (2008) the specific functions of this committee are to identify the safety needs of the school with a view to taking the necessary action; mobilize resources required by the school to ensure a safe, secure and caring environment for students, staff and parents; monitor and evaluate the various aspects of School Safety with a view to enhancing school safety; form sustainable networks with all stakeholders to foster and sustain School Safety; keep learners, parents and other stakeholders informed about School Safety policies and implementation activities; seek the support of parents and stakeholders and ensure their participation in activities relating to School Safety.

## **CONCLUSION**

Based from the findings of the study, the elementary pupils in the schools division of Isabela are not yet fully prepared in the occurrence of a disaster or calamity since they do not have that serious attitude towards this issue particularly in following instructions and rules and taking things funny when drills are performed.

It is concluded that schools have important roles in bringing the students better knowledge and discipline. It is their duty and obligation to develop, improve, and discipline the students especially in taking things seriously since calamity or disaster is a serious matter. Likewise, schools have the responsibility of providing the necessary equipment like safety equipment, posters and flyers, and other significant materials that can help and prepare the students during hazardous phenomena.

## **RECOMMENDATIONS**

Based on the results of the study conducted, the researcher highly recommends the following:

1. The elementary pupils must always practice/perform all the disaster preparedness activities. Also, they should always be guided by teachers in performing disaster preparedness activities and should be taught the dos and don'ts before the activities.
2. The school should pay more attention in increasing the disaster preparedness of each student for their preparedness.
3. Teachers should always guide and check the students in performing disaster preparedness activities.
4. Parents should also attend/participate disaster preparedness activities in their communities for the sake of their families.
5. The Department of Education should intensify their programs about disaster preparedness to ensure that zero casualty is attained when a disaster occurs.



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# **HYDROPONICS VEGETABLE GARDENING PROGRAM (HVGP) IN LOBO DISTRICT: ASSESSMENT OF OBJECTIVES, GARDENING PRACTICES, TOOLS AND MATERIALS, TYPES OF VEGETABLES, AND LAND AREA FOR GARDENING**

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## **ABSTRACT**

**This study aimed to determine the Vegetable Gardening Program (VGP) of public elementary schools in Lobo District with the following objectives such as to assess the Vegetable Gardening Program in public elementary schools in terms of: objectives, gardening practices, tools and materials, types of vegetables and garden area/ land area for gardening; determine the level of awareness of the VGP implementers on hydroponics; identify the challenges and constraints in implementation of hydroponics, and propose hydroponics method of vegetable gardening as alternative practice in GPP. The study utilized descriptive research design using the 23 program implementers and 23 school heads in all public elementary schools in Lobo District, Batangas Philippines as the respondents. This revealed that the respondents encounter problems in implementing their VGP. The objectives of the program are strongly attained as revealed by the respondents. With regards to gardening practices, tools and materials, garden area/land area for gardening, the respondents were in agreement on the indicators presented. It is also revealed that respondents are aware on hydroponics but still not knowledgeable about this. Moreover, it is revealed that the challenges and constraints that may be encountered in the integration of hydroponics includes the mistakes and systems malfunctions that affect plants faster. Meanwhile, it was recommended that a study on integration of hydroponics gardening may be conducted with the involvement of parents in the program in order to strengthen the support of the program.**

*Keywords: Gulayan sa Paaralan Program, vegetable gardening program, Hydroponics, vegetable gardening*

## **INTRODUCTION**

The population in different schools in the Philippines is still increasing, especially in the public schools, and the malnutrition is still increasing too. Likewise, the guidelines for implementing the school-based feeding program year 2018 revealed that over 532,000 students are classified as severely wasted, and another 1.25 million are classified as wasted. This data also revealed that Region 4-A has the highest number of undernourished students (Mateo, 2018). The prevalence of malnutrition is strong evidence that more and more schools lack the means to promote the pupils' health. Under the K to 12 curricula, the DepEd creates awareness among children about the importance of having more food on the table by vegetable gardening in the form of Home Economics and Livelihood Education (HELE) subjects in elementary school and Technology and Livelihood Education (TLE) subjects in high school, in order to foster resourcefulness and preservation of limited resources in localized and contextualized ways.

The DepEd implemented various programs to encourage learners, teachers, and parents to appreciate agriculture and provide vegetables for school feeding programs helping malnourished children. That is why on July 27, 2007, DepEd Memorandum No. 293 s. 2007 otherwise referred to as *Gulayan sa Paaralan Program (GPP)* or the *Vegetable Gardening Program (VGP)*, was devised and currently being implemented by the Department of Education in order to help and support the National Government and other organizations charged with alleviating the masses from hunger and poverty. The program sought to accentuate the school-based food and nutrition program to handle the hunger and malnutrition problems that hamper children in continuing education. Aside from that, program intends also to feed the students with the school produce (vegetables and root-crops), taking into account the teacher's Nutritional Status Survey findings to support their School-Base Feeding Program. It is indeed essential to possess good nutrition to acquire good learning.

The Vegetable Gardening Program's implementation is not easy since different problems are encountered to sustain it (Zoleta, 2010). The fundamental component of the implementation of program includes people who take on the gardening program's obligation, the accessibility of a location or garden area to develop and grow with sufficient gardening materials. Also, the availability of gardening equipment and the principal's never-ending support are stated to be very important for a school's gardening success. Sustaining VGP is challenging because of different problems such as space for planting, gardening tools, allocation budget, implementers' characteristics, and support from the community or other stakeholders.

DepEd was much challenged when it launched GPP or the VGP. Many constraints arise and it includes lack of funding, government support, garden spaces, workforce, and resources such as water, garden tools, soil supplies, and time for cultivation. Commonly most of the schools use traditional farming since it is a vital part of many people's lives worldwide. Traditional growing and planting are not often easy to come by, mainly attributed to a shortage of money. To yield a good harvest, conventional approaches necessitate much effort. These necessitate a significant amount of water, soil, manure, chemicals, and labor. With this, the introduction of hydroponics in vegetable gardening program will play a large part in the school. Hydroponics is among the fundamental concepts of 21st-century education as an alternative way to produce healthier crops and high yields. Hydroponics uses even less of these, even none of them at all (pesticides are rarely if ever used). Hydroponic systems, on the other hand, use up to 90% less water than soil cultivation. These remove several obstacles for people who are hungry and with little income. It can be planted everywhere even in urban places.

Furthermore, as per compliance to DepEd Memorandum No. 293 s. 2007 otherwise known as *Gulayan sa Paaralan Program (GPP)* or the *Vegetable Gardening Program (VGP)* the different elementary schools in Lobo District made their own school garden. They set objectives, and with the help of the parents, students, and other stakeholders, with the guidance of their program implementer, they plant varieties of vegetables and try to reach and accomplished the set objectives. Since Lobo is agricultural municipality, elementary schools used traditional farming. Specifically, Lobo has 23 public elementary schools and figuratively encountered numerous challenges in the implementation of the program. Aside from the fact that Lobo District also encounters challenges in implementing the gardening program, researchers choose Lobo, Batangas as the research locale of study since this is an agricultural municipality which means that people are already engaged in agriculture. Introducing hydroponics will be a more extensive input to the locality to widen their knowledge regarding it. It is believed that when teachers, learners, and other stakeholders applied this gardening system this will significantly impact the community. It would help to increase the production of some chosen vegetables in public elementary schools since it is proven that plants grow up to 30% to 50% faster in hydroponics system than those grown in soil with that, GPP can fully sustain and support each school School-Based Feeding Program (SBFP).

The researchers believe that introducing hydroponics in vegetable gardening program will be a significant help among implementer/coordinators to keep their gardening program rolling and successful. It is hoped that through this study, program implementers and all stakeholders will develop love and passion for gardening even better, especially learners. Researchers hope that the output of this study will offer great opportunities with regard to hydroponics and will help every school provide more comprehensive yields of vegetables in a more convenient way to sustain the needs of vegetables for SBFP beneficiaries easily.

## OBJECTIVES

This study aimed to determine the components of the vegetable gardening program in public elementary schools in Lobo District of Batangas Philippines in terms of objectives, gardening practices, tools and materials, types of vegetables, and garden area/ land area for gardening. Determine the level of awareness of the GPP implementers on hydroponics as alternative method of vegetable gardening. Identify the challenges and constraints in the integration of hydroponics. Propose an extension project to address the vegetable gardening program implementation with the support of the stakeholders

## METHODOLOGY

This study used the descriptive method of research to gather information with regard to introducing hydroponics in vegetable gardening in public elementary schools. Survey questionnaires and interview was used to gather data to acquire accurate and adequate facts for the study. Twenty-three (23) vegetable gardening program implementers and their respective public-school heads of all public elementary schools in Lobo District were the respondents of the study. Data collection was undertaken through a series of activities.

## RESULTS AND DISCUSSION

### 1. Description of Gulayan sa Paaralan Program

This study looked at the description of Gulayan sa Paaralan Program along with its components: objectives, gardening practices, tools and equipment, types of vegetables and gardening area. Data are presented in Tables 1 to 5.

**1.1 Objectives.** A strategic position to be attained or a purpose to be achieved by the institution or organization. Table 1 presents assessment on the description of GPP in terms of objectives. Respondents strongly agree that GPP raises awareness on the health and nutrition benefits of vegetables, as well as economic benefits, by encouraging more household and community gardens as it obtained the highest weighted mean. The lowest weighted mean indicated strongly agree in the GPP establishes vegetable nursery which is a vital part in ensuring the growth of seeds to be transplanted. As a whole, the composite mean indicated strongly agree in respondents' description of their GPP in terms of objectives.

**Table 1. Description of GPP in terms of Objectives**

Indicators	WM	VI
Raise awareness on the health and nutrition benefits of vegetables, as well as economic benefits, by encouraging more household and community gardens	3.82	Strongly Agree
Helps students understand concepts of nutrition and health, and connect children to the natural world	3.76	Strongly Agree
Inculcate among the learner's the values of gardening, good health and nutrition, love of labor, caring for others	3.76	Strongly Agree
Increase school children's knowledge of food systems and raise awareness about health and nutrition among students, teachers, parents, and community as a whole	3.73	Strongly Agree
Provide support and sustenance in the feeding program of schools	3.73	Strongly Agree
Provide vegetables which have rich source of protein, vitamins and minerals	3.71	Strongly Agree
Addresses malnutrition and promote vegetable production and consumption among pupils	3.67	Strongly Agree
Establishes and maintain vegetable gardens to serve as food basket	3.65	Strongly Agree
Addresses deficiencies in protein, energy, vitamin A and iron of the students	3.65	Strongly Agree
Establish vegetable nursery which is a vital part in ensuring the growth of seeds to be transplanted	3.6	Strongly Agree
<b>Composite Mean</b>	<b>3.70</b>	<b>Strongly Agree</b>

**1.2 Gardening Practices.** This includes the different types or methods of gardening that was being practiced in a certain place. Table 2 represents the description of Gulayan sa Paaralan program in terms of gardening practices. Respondents strongly agree in composting, recycling yard waste and using fertiliz-

ers and pesticides as an evident that gained highest weighted mean. With the lowest weighted mean, respondents agree in putting synthetic fertilizers or pesticides to the plants. All in all, the composite mean signifies agree in respondents' description of their GPP in terms of gardening practices.

**Table 2. Description of GPP in terms of Gardening Practices**

Indicators	WM	VI
Composting, recycling yard waste, and using natural fertilizers and pesticides were practiced	3.65	<i>Strongly Agree</i>
Soil bags are used as substitute for pots	3.63	<i>Strongly Agree</i>
Uses pots or any recyclable materials like empty containers, cans, tires etc. in planting	3.60	<i>Strongly Agree</i>
Plants are planted vertically wherein it uses support such as stake, trellis, cage or fence	3.56	<i>Strongly Agree</i>
Forms soil beds or garden beds that are made from wood, timbers, bricks or mounds that elevates the soil higher than the original level	3.52	<i>Strongly Agree</i>
Plants are grown in the ground in living soil	3.52	<i>Strongly Agree</i>
Avoids tilling and synthetic fertilizers and pesticides	3.39	<i>Agree</i>
Square frames and dividers were used in planting	3.36	<i>Agree</i>
Plants are planted in straw bales	3.34	<i>Agree</i>
Puts synthetic fertilizers or pesticides to the plants	3.23	<i>Agree</i>
<b>Composite Mean</b>	<b>3.48</b>	<b>Agree</b>

**1.3 Gardening Tools and Materials.** These are the different tools and materials that are used in gardening. Table 3 presents the description of Gulayan sa Paralan program in terms of gardening tools and materials. Respondents agree in gardening tools and materials in the school are suitable and appropriate that gained highest weighted mean. The lowest weighted mean indicated agree in materials and tools used for gardening are all new and in good condition. Over all, the composite mean indicated agree in respondents' description of their GPP in terms gardening tools and materials.

**Table 3. Description of GPP in terms of Tool and Materials**

Indicators	WM	VI
The gardening tools and materials in the school are suitable and appropriate	3.47	Agree
The gardening tools and materials in the school have an existing storeroom	3.41	Agree
Tools and materials that are defected or broken are immediately replaced or repaired to avoid accidents	3.34	Agree
The sizes of the tools are appropriate and proportion to the one who is using it.	3.34	Agree
Tools are properly clean or sterile before storing it.	3.32	Agree
The tools and materials are all durable and safe to use	3.30	Agree
The tools available in the school can withstand the toughest and dirtiest jobs in the garden	3.21	Agree
The tools have regular maintenance routine	3.19	Agree
The gardening tools are high-quality tools.	3.17	Agree
The gardening tools and materials in the school are complete and readily available	3.10	Agree
The materials and tools used for gardening are all new and in good condition	3.08	Agree
<b>Composite Mean</b>	<b>3.26</b>	<b>Agree</b>

**1.4 Types of Vegetables.** This pertains to the different types of vegetables planted in every GPP. Table 4 presents the description of Gulayan sa Paralan program in terms of types of vegetables. Based on the result, it reveals that the following vegetables got the highest frequency counts under their designated types of vegetables: papaya in fruits, okra in podded vegetables, pechay in leafy vegetables while cassava under the root crops. The following vegetable got the lowest frequency counts: chayote in fruits, lima beans in podded vegetables, cabbage in leafy vegetables while potato under the root crops.

**Table 4. Description of GPP in terms of Types of Vegetables**

Fruits	Frequency Count	Podded Vegetables	Frequency Count
Papaya	41	Okra	43
Bottle Gourd	36	Kibal Gabi	28
Tomato	29	String Beans	23
Squash	25	Sigarilyas	10
Bitter Gourd	16	Pigeon Pea	5
Loofah	6	Lima Beans	5
Eggplant	3	Hyacinth	4
Chayote	2		
Leafy		Root Crops	
Pechay	38	Cassava	31
Moringa	37	Gabi	23
Mustard	32	Ginger	21
Aluga bati	23	Sweet potato	20
Spinach	7	Onion	3
Cabbage	6	Potato	3

**1.5 Garden Area/Land Area for Gardening.** This is the area that is intended for the Gulayan sa Paaralan. Table 5 represents the description of Gulayan sa Paralan program in terms of garden area or land area for gardening. Respondents strongly agree that the school area for gardening is getting enough sun or at least eight full hours of sun each day as it obtained the highest weighted mean. The lowest weighted mean indicated agree that the school garden areas have a minimum of 200 square meters As a whole, the composite mean indicated agree in respondents' description of their GPP in terms of garden area/land area for gardening.

**Table 5. Description of GPP in terms of Garden Area/Land Area for Gardening**

Indicators	WM	VI
The school area for gardening is getting enough sun or at least eight full hours of sun each day	3.65	Strongly Agree
The garden area has no lead or other toxic contaminants	3.63	Strongly Agree
The area is accessible for the people in charge	3.58	Strongly Agree
The garden area is a hazard free area and secured for pupils and teachers	3.45	Agree
The land area for gardening is not a flood-risk area	3.41	Agree
The garden area has enough water supply	3.39	Agree
The area has a good drainage and air circulation	3.36	Agree
The land area is not rocky and easy to cultivate	3.32	Agree
Garden areas have a flat level surface and have minimal slope area	3.28	Agree
The garden area has a healthy soil enough to grow any types of plants	3.23	Agree
The school garden areas have a minimum of 200 square meters	3.23	Agree
<b>Composite Mean</b>	<b>3.41</b>	<b>Agree</b>

## 2. Awareness of the GPP implementers and School Heads on Hydroponics

In the last decades, the popularity of hydroponics has grown exceedingly with an increasing awareness of unfavorable growing conditions creating a necessity to utilize more efficient growing technique. As hydroponics become popular, not all people became aware with it, other remains to have no idea with this while some becomes fully aware and knowledgeable with it. Table 6 presents the awareness of GPP implementers and school heads on hydroponics. A notable weighted mean showed respondents were aware that hydroponics allows us to grow and produce more vegetables in an efficient way. Lowest in rank marks a weighted mean where students were aware that hydroponics is less expensive. Over all, the composite mean of indicated that the respondents were aware of hydroponics.

**Table 6. Awareness of the GPP implementers and School Heads on Hydroponics**

Indicators	WM	VI
Hydroponics allows us to grow and produce more vegetables in an efficient way	3.43	Aware
Hydroponics is environmentally friendly on which it can help to conserve water, time and energy	3.39	Aware
Hydroponics allows food to be grown and consumed in areas of the world that cannot support crops in the soil	3.39	Aware
Some vegetables like spinach, mustard, lettuce and cabbage can be grown through hydroponics	3.39	Aware
Hydroponics eliminates the need for massive pesticide use (considering most pests live in the soil), effectively making our air, water, soil, and food cleaner	3.36	Aware
Hydroponic nutrients contain elements like Nitrogen (N), Potassium (K), Phosphorus (P), and other important elements that are vital to the survival of any living plant	3.30	Aware
In hydroponic system, the vegetables produced are pesticide free products through biological pest control	3.34	Aware
Hydroponics eliminates consumption of artificial ripening agents and pesticides used on imported produce	3.34	Aware
In hydroponics system, Liquid Simple Nutrient Addition Program (SNAP) is what is added in the water and used as the hydroponic nutrient solution	3.34	Aware
Hydroponics have better nutritional value	3.32	Aware
Hydroponics requires less space therefore it allows for a high density of plants in the same area	3.32	Aware
In a hydroponics system, nutrient solutions may be recycled or re-used in other areas such as potted plants and turf management	3.32	Aware
Based on studies crops from hydroponics are healthier and more nutritious than soil-based crops	3.30	Aware
Hydroponics have the ability to produce higher yields than traditional, soil-based agriculture.	3.30	Aware
Through hydroponics non-arable land may easily be facilitated	3.30	Aware
Hydroponics can be done with accessible and recyclable materials like styrofoam box, plastic cups and coco pit	3.30	Aware
Hydroponic systems don't require crop rotation, which makes them ideal for larger scale fruit or vegetable production	3.28	Aware
Hydroponic plants have a higher pest resistance	3.28	Aware
Production from hydroponics increases from 3-5% with same space from other method	3.23	Aware
Hydroponics is less expensive	3.21	Aware
<b>Composite Mean</b>	<b>3.32</b>	<b>Aware</b>

### 3. Challenges and Constraints in the Integration of Hydroponics

There is nothing that depicts perfection. There are also problems and countermeasures in the preparation and implementation of hydroponics. Table 7 presents the challenges and constraints in the integration of hydroponics in GPP. Respondents were agree that mistakes and system malfunctions affect plants faster, without soil acting as buffer as it gained the highest weighted mean. With the obtained lowest weighted mean, respondents were agree that in a hydroponic system diseases and pests may spread quickly. The composite mean revealed that respondents were agree that all of the items presented are really significant constraints and challenges in the implementation of hydroponics.

**Table 7. Challenges and Constraints in the Integration of Hydroponics**

Indicators	WM	VI
Mistakes and system malfunctions affect plants faster, without soil acting as buffer	3.5	Agree
A hydroponic garden requires constant monitoring	3.45	Agree
Hydroponics requires necessary expertise for what plants to grow and the whole process	3.45	Agree
Because it is new, support from school administration is varied	3.45	Agree
Availability of materials and other necessary materials like liquid solution (SNAP).	3.41	Agree
System failure threats in managing the hydroponic garden	3.39	Agree
Area for setting up hydroponics system	3.34	Agree
Hot weather and limited oxygenation may limit production and can result in loss crops	3.32	Agree
High initial expenses and long, uncertain return of investment	3.28	Agree
Setting up hydroponics is expensive	3.15	Agree
In a hydroponic system diseases and pests may spread quickly	3.10	Agree
<b>Composite Mean</b>	<b>3.34</b>	<b>Agree</b>

## CONCLUSIONS

Based on the findings, the following conclusions are drawn:

1. The objectives in the Gulayan sa Paaralan Program are strongly agreed by the respondents, in terms of gardening practices, tools and materials, garden area/land area for gardening in Gulayan sa Paaralan Program were agreed by the respondents.
2. The respondents are aware on hydroponics.
3. The challenges and constraints that may be encountered in the integration of hydroponics includes the mistakes and systems malfunctions that affect plants faster, without soil acting as buffer.
4. Introducing hydroponics in public elementary schools be proposed to enhance the Gulayan sa Paaralan Program among GPP Implementers/coordinators in Lobo District.

## RECOMMENDATIONS

Based on the conclusions drawn from the collected data, the researcher recommends the following:

1. The proposed extension service project be highly considered by the coordinator and director of extension services for review, comments and approval in order to implemented to the concerned elementary schools
2. A partnership between the concerned institution of Local government units may be develop in relation to hydroponics gardening may be established in order to strengthen the support of Gulayan sa Paaralan Program.
3. To strengthen the implementation of the program, support and involvement of the parents and other stakeholders are highly recommended

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# MATHEMATICS TEACHING MODALITY UNDER A QUARANTINED COMMUNITY: AN ACTION RESEARCH

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## ABSTRACT

The global spread of Corona Virus Disease 19 (COVID19) has undergone significant changes to the teaching and learning process. This brought challenges to the teachers as they address the needs of the students during the pandemic years. In order to come up with improved techniques that will assist students achieve their learning goals, teachers implemented strategies that would suit to the learners' circumstances. With the implementation of blended learning in tertiary education under the Modified General Community Quarantine (MGCQ), teachers have the greater control on how to deliver their lessons. However, primary considerations must be on the learners' side. There were concerns about the new normal way of delivering lessons as it caused difficulty in learning. Moreover, the presence of internet is supposed to be of great help but for reasons, struggles were encountered upon the implementation. The focus of this study is on the introduction of Small Group Discussion teaching modality as additional mode of instruction to Bachelor in Secondary Education major in Mathematics students. A survey was given to find out which modality in teaching Mathematics major subjects will they prefer in time of pandemic. Through this action research, it was found out that majority of the respondents preferred Small Group Discussion as an added teaching modality. The data gathered showed SGD is effective for learning, most convenient, and less costly.

*Keywords: mathematics teaching modality, blended learning, small group discussion, COVID-19 pandemic, action research*

## INTRODUCTION

Strategies for teaching Mathematics had already been developed to make lesson delivery easier, but the greatest challenge encountered was during the emergence of the COVID-19 pandemic. Since the pandemic has resulted in a public health emergency, flexible learning is being pursued in order to continue teaching and learning beyond the traditional face-to-face instruction (CHED Memorandum Order No. 04, series of 2020). Although "chalk and talk" instruction may still be the most effective method for teaching math (Donnelly, 2014). Similarly, the researcher preferred the "chalk and talk" method of teaching Mathematics-related main courses like Calculus and Statistics. However, due to the limitations of the typical arrangement of more than 40 students in a classroom, alternate methods of instruction must be searched out to provide the lessons in the most effective manner. Activities conducted online or through different platforms have expanded significantly as a result of the COVID-19 pandemic (Petrila et al, 2022).

Synchronous and Asynchronous Mode of instructions were utilized to Bachelor of Secondary Education major in Mathematics during the initial implementation. In Synchronous mode of instruction, google meet was but settled with Facebook Live to avoid delay and unwanted movements during discus-

sion. While in the middle of the live video, some errors in connections appeared on the screen. Take two to five became normal in FB live. Aside from that, students were complaining for blurry videos and delays when the connection is weak. The advantage though of FB Live is they can watch the video again during their convenient time. The other one used, was the Asynchronous mode of instruction. In this, students have to read their references given ahead of time and then they will answer the exercises at their own pace. The instructor then checks the output of the students and posts the result on Facebook Group. The problem encountered by the students in this modality was in their comprehension of the ones written in the reference copy. It is an important thing to consider as reading comprehension skill was a predictor of problem-solving ability and it indicates that students' ability to solve problems depends on their reading abilities (Timario, 2021).

Higher Mathematics contains terminologies that are unfamiliar to students. They struggled to read or interpret symbols and expressions. Chin and Pierce (2019) hypothesized that the difficulty in comprehending mathematical symbols causes students to avoid taking mathematics classes. Learners' worries led to request for help and the instructor's presence during the delivery of lessons. As a result, for the purpose of this study, the researcher introduced the Small Group Discussion teaching modality as an additional mode of instruction to BSED-Mathematics students while adhering to the protocols established in a quarantined community.

## **OBJECTIVES OF THE STUDY**

Mathematics learners, in particular, experienced difficulties in the transition from chalk dust-covered and wide back-to-back green boards to virtual motion picture and narrow screens on their laptops and cell phones. The researcher chose to conduct this study by the need to act on the plight of students to alleviate their anxiety about the new normal education. Despite the fear of the 2019 corona virus, effort was done to make sure that the students will survive and continuously learn. This action research was conducted to implement an additional teaching strategy that may be beneficial and advantageous to students as they fight the war brought on by stress in coping with the new arrangement.

## **METHODOLOGY**

The new learning modality of instruction tried, other than the Synchronous and Asynchronous modes, was the Small Group Discussion (SGD). This happened after hearing the plea of the students on their difficulty on particular lessons in Calculus. With the intermittent internet connections and the costly data for viewing videos or Facebook live, the class opted in trying a new mode.

The class was categorized according to their residences. It ended up dividing them into six (6) groups. Salvacion, Manalo, Union, Pasian, Poblacion East, and Poblacion West were the identified groups which are all barangays or little community in the town of Monkayo, Davao de Oro, Philippines. Each group selected one representative to join the Small Group Discussion with the instructor. The said representative reported back to his/her group, which was identified as neighborhoods. The representative then performed another Small Group Discussion with the rest of the members echoing the discussion of the instructor. In case that the representative forgot a portion of the discussion, a video taken during the SGD with the instructor served as back up. It can also be utilized for those who can't join the SGD like locally stranded student who went back to school, those who have relatives who just went home during the community quarantine period, or those who have ordinary cough, colds, and flu for safety precautions.

The protocols set by the Inter-agency Task Force (IATF) were followed all the time. Social distancing, wearing of mask, hand washing and the like are practiced during the SGD. With the population of less than 10 inside a place, no violation has been done with the IATF Protocols. IATF Resolution No. 75 -A dated September 28, 2020 under section 7 allowed places under Modified General Community Quarantine (MGCQ) for limited face-to-face classes in Higher Education Institutions (HEI) provided minimum health standards are observed.

## Research Design

The individual action research design was used in this study, in which the teacher alone, which is the researcher, conducts an activity for a set period of time, evaluates the results, makes changes as needed, or discards the program entirely if it is found to be ineffective (VanBaren, 2019). It is also guided by the action research in education, in which teachers take on the role of researchers and study their own practice within their classrooms and schools. The research questions arise from the problem that the teacher deem important and carry out the investigations systematically, reflectively, and critically using strategies that are appropriate for the field of study (Efron & Ravid, 2022). Moreover, the data collection was directed by a survey design (Creswell, 2012). The survey was used to register the preference of the respondents as to the modality of instructions that they considered as the best in achieving the learning objectives in Mathematics major subjects. Data were collected thru google forms, where there were only two questions asked. The first question was, “Which among the learning modalities do you most prefer?” with the options: Synchronous Mode, Asynchronous Mode, Small Group Discussion, and Others. If they had chosen Others, they had to specify their answer in the subsequent question. The second was, “Pick one or as many as in the choices on the reason why you chose such modality...” with choices: less costly, most convenient, effective for learning, and others. Same with the first question, the answer “others” must be specified in the subsequent question.

## Research Respondents

Convenience sampling technique was used as it is the fastest way to get information (Parreño & Jimenez, 2014). Forty (40) students from the third year of Bachelor in Secondary major in Mathematics of the Monkayo College of Arts, Sciences and Technology responded the survey. As to the time of study, the academic year 2020~2021, they are the researcher’s students taking Calculus and Advanced Statistics subjects.

## FINDINGS

The presentation of the results was done according to the sequence of the question in the survey.

**Table 1. Result of Students’ Preference Among the Learning Modalities**

Teaching Modality	Number of Respondents	Percentage
Synchronous Mode	4	10%
Asynchronous Mode	9	22.5%
Small Group Discussion	35	87.5%
Others	0	0%

Based on Table 1, the highest preference is Small Group Discussion, followed by the Asynchronous Mode, and then the Synchronous Mode with percentages 87.5%, 22.5%, and 10% respectively. It can be noticed the total percentage went beyond 100% as some preferred not only one but two or all of the modalities. When I checked their individual responses, there were five students who preferred both SGD and Asynchronous Mode, one student who preferred both Synchronous and Asynchronous Mode, and one student who preferred all three.

In many educational environments, collaborative learning has become well-established. There is broad consensus that group work is a successful teaching strategy, and even the most rigorous curricula should have at least some time devoted to it (Cohen, 2020). Furthermore, Clinton and Kelly (2017) cited that student engagement and learning can be improved through group discussions, in which small groups of students respond to questions concerning the course material. The preference of the Math students to have the small group discussion during pandemic, which is a different setup showed their desire for the continuity of learning in spite of the threats brought by the corona virus.

**Table 2. Students' Reason for Their Modality Preference**

<b>Student's Reason</b>	<b>Number of Respondents</b>	<b>Percentage</b>
Less costly	16	40%
Most Convenient	22	55%
Effective for Learning	33	82.5%
Others	1	2.5%

As reflected on Table 2, 82.5% chose the reason effective for learning. These were the same respondents who preferred Small Group Discussion as learning modality. 55% for most convenient, 40% for less costly, and 2.5% or 1 response for others (for safety purposes). Majority of the respondents who preferred SGD chose both effective for learning and most convenient as their reasons. The one response who answered for safety purposes lived in a different region, which is quite distant from the locality of the study. That said respondent also preferred Synchronous mode of instruction.

Small group discussions became quite popular during the time of rapid change in educational approaches because of their broad impact on student learning from many perspectives (Sarraz, et al., 2021). Conscientious students who are after their learning would really look up to teaching strategies that would make them learn more. They have seen that small group discussion can help them to have continuity of learning in time of the pandemic crisis. Based on the result, aside that the small group discussion is effective for learning, they also find it as most convenient and less costly compared to the other modalities used.

## **CONCLUSION**

Interpreting all gathered data, it can be concluded that Mathematics students most preferred Small Group Discussion learning modality as an alternative to face-to-face instructions. The primary reasons were, it is effective for their learning, it is most convenient for them, and less costly.

Teachers ought to provide differentiated education because doing so will greatly boost students' levels of engagement (Bender, 2017). More so during a pandemic, which necessitates teaching strategies that are appropriate for the students' circumstances in order for them to learn effectively. And, given the constraints and threats, small group discussion is viewed as an effective modality and, as a result, is the most preferred by Mathematics students.

## **RECOMMENDATION/FURTHER ACTION PLAN**

Further action plan is to seek for approval from the administration and the IATF for formality of the implementation of the Small Group Discussion as an added learning modality other than the Synchronous Mode and Asynchronous Mode. And, to experiment more teaching modalities that are suitable and more convenient to Mathematics instructions. The more teaching modalities, the better the learning of the students.

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Rubilyn G. Barrios

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# LIVED EXPERIENCES OF SUBSTANCE USERS

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## ABSTRACT

Illegal substance use is a widespread and timely problem despite the existence of laws for the apprehension of manufacturers and sellers of illegal substances. Through this unstoppable production of illegal substances, illegal substances are reaching people and users. Consequently, many are apprehended and placed into rehabilitation programs. Thus, the major purpose of this study “Lived Experiences of Substance Users” is to understand the experiences of substance users. Through this, the identification of the origins and consequences of substance use is established from the day they have started using up to enrolling and finishing substance treatment, and even extending to their present lives. Snowballing sampling was used to identify the KIs. A total of five (5) key informants were interviewed in this study. Methamphetamine and marijuana were the two (2) substances that they used due to their physiological, psychological and sociological effects to the user. While the users were under the influence of substances, it was recorded that the users were having hallucinogenic, stimulating and sedating experiences which pushed them to use more of the substance until authorities discovered their usage. Under the custody of the authorities, users experienced being interviewed, monitored, and were asked to undergo drug test and buy-bust operation. Before undergoing a rehabilitation process, the users were subjected to take an oath, enroll community service or be admitted to a rehabilitation center. During their rehab, the users faced personal and environmental problems and were able to overcome through adaptive, cognitive, suppression, avoidance and behavioral coping mechanisms. After finishing the rehabilitation process, the users dreamed of being employed, having a happy life, and continuing their education. With a feeling of happiness and being emotional upon release, users went back to their family, friends and the whole community where users were given support and acceptance. Problems on employment and stigma were survived with cognitive and avoidance mechanism. Overall, users, in the end, received their diplomas, avoided vices, and created a closer relationship with their friends and with God. With these, a proposed integration program was designed to address the needs of the users after finishing the rehabilitation program.

## INTRODUCTION

Drug use and abuse has been a problem here in the Philippines and it was only during the time of President Duterte that this was addressed. This is the reason why this study was pushed to be anchored on the life experiences of the substance users specifically before, during and after undergoing a rehabilitation program. This also provided answers on the success of rehabilitation program in reforming the substance user.

A Research was conducted by Brenda Roe, Caryl Beynon, Lucy Pickering, and Paul Duffy (2010) titled “Experiences of drug use and ageing: health, quality of life, relationship and service implications.” It was found out that even older people who continue to use drugs are vulnerable groups, with having problems on health status, having chronic conditions in health and having a poorer quality of life due to their drug use, addiction and life experiences. When it comes to their relationships, social networks and support, they were also more restricted due to their lifestyles. Living alone and being left alone by their children also made them more vulnerable to social isolation.

President Rodrigo Roa Duterte declared “war on drugs” since he took his office in 2016 through his “Oplan Tokhang”. The term “tokhang” came from a Visayan terms “toktok” which means to knock and “hangyo” which means to make appeal. This operational plan involves police officers specifically the

Philippine National Police to visit homes of suspected substance pushers and users and convince them to give up using and dealing illegal drugs (Romero, 2018).

Also, the reason for the President to make a move towards illegal substance is because of the increase in Filipinos who are using illegal substances. The Dangerous Drugs Board (2016), reported that there were 1.3 million Filipinos using illegal substances in the year 2012 and increased in the year 2016 when there were 1.8 million substance users, or 1.8% of the total population of 100.98 million. Due to the increasing number of substance users and pushers' overtime, the Philippine Government has been very dynamic in amending the laws to keep abreast with the current substance problem. And currently, the Philippines is using Republic Act Number 9165, which is also known as the Comprehensive Dangerous Drugs Act of 2002 which was signed by the former President Gloria Macapagal-Arroyo (R.A. 9165). Some of its provisions are amended by Republic Act Number 10640. This study, however, only dealt with the substance users under the provision of Republic Act Number 9165.

When it comes to treatment or rehabilitation of women substance abusers, the Philippine Government provided strategies and avenues to address this issue. Aside from the mandate of Republic Act Number 9165, Article two (2), Section sixteen (16), persons arrested due to substance use will be mandatorily rehabilitated for a minimum of six (6) months in a government center. The government also accredited, under the Department of Health (DOH), more Drug Abuse Treatment and Rehabilitation Centers (DATRCs) around the country.

In Isabela, there were about 1.26 million substance users who have surrendered after fifteen (15) months upon declaration of war on drugs (Tawatao, 2017). As of 2019 this year, in the Municipality of Jones, Isabela, a barangay kagawad was arrested because the person was enlisted as a 'high-value' drug target. He was arrested through an entrapment operation conducted by the PRO2 Regional Drug Enforcement Unit and Regional Intelligence Division with the 2nd Isabela Provincial Mobile Force Company and the Jones Municipal Police Station (Dalizon, 2019).

A research gap was found in the research of Ben Nyachwaya Sereta, Fred Amino, Peter Ouma, and Thomas Orind Ondimu(2016), where there was lack of study regarding the connection of a person's life experience before, during and after drug use with before and after undergoing a rehabilitation program, especially here in the Philippines, where studies about drug use is enough but not related to their life experiences before and after drug use and drug rehabilitation.

Hence, it is the objective of this study to determine the cause and effect of substance use and abuse, feelings and experiences while on substance use and abuse, experiences under custody of authorities, challenges experienced while under rehabilitation, coping mechanism to address these challenges and plans, and view of life after they have undergone the rehabilitation process. In order to achieve these objectives, research on the lived experience of substance users is highly needed to be conducted.

Through this research, the researcher can contribute to the community by coming up with recommendations on helping out drug rehabilitation programs to strengthen their program in the prevention of substance use and abuse.

## **STATEMENT OF THE PROBLEM**

The major purpose of this study is to understand the phenomenology of substance users before, during and after they have used these substances.

Specifically, it aimed to answer the following problems:

1. What are the reasons of the substance user to engage in illegal substance?
2. What are the experiences of the substance users
  - a. while engaged in illegal drugs?
  - b. while under the custody of the authorities?
  - c. after the custody of the authorities?
3. What are the challenges experienced by the substance user during rehabilitation?
4. What are the coping mechanisms used by the substance user against those challenges?
5. How do the substance users see their life after completing the rehabilitation process?

## METHODOLOGY

Qualitative research method is the most appropriate research design for this research because in understanding the experience of substance users, the researcher looked into the story of the substance users, noting their life before, during and after they have used drugs and their outlooks in life after their rehabilitation and treatment. Phenomenology is used since it dwells on lived experiences of substance users and it makes use of gathered information from the substance users to describe a particular phenomenon which is on their life as a drug personality. The participants of this research are those substance users in Jones, Isabela who have undergone or finished a rehabilitation program. Originally, there were seven (7) willing respondents out of twenty-three (23), however, due to unforeseen circumstances like backing out and transfer of residence, the total number of key informants was reduced into five (5). The substance users or key informants of these research are former drug users and have undergone a rehabilitation program. Code names for the key informants were used in this research which include KI1, KI2, KI3 and the like. An in-depth interview was used for the key informants of these research because there is a need to have intensive individual interview to gather more information regarding their past experiences before, during and after they have used illegal substance extending to their life after the rehabilitation process. Also, unstructured interview guide was used in this research when the researcher used open-ended questions during the course of data gathering. Data were treated using thematic analysis.

## FINDINGS

### Reasons for Users to Engage in Illegal Substance Use

In this study, key informants use illegal drugs because they cause addiction, remove stress, allow them to forget problems, and cause happiness to them. These could be themed into three (3), namely physiological, psychological and sociological reasons for the substance user to use illegal substances.

#### Physiological Reasons.

Physiological reasons to use illegal substance were supported by the following statements of the informants: “KI 1”: Tapos syak met ket birbiruken iti bagik. (And for me, my body is looking for it.); “KI 4”: Nasanay na yung katawan ko na gumamit. (My body is used to using it.); and “KI 5”: Mas kaykayat iti bagik idi. (My body liked it more before.)

Addiction or illegal substance addiction is one of the reasons for the key informants to use illegal substance. Illegal substance addiction symptoms include the feeling of the need to use the substance at a regular basis, having intense urges to use illegal drugs, ingesting larger amounts of the drug over a longer period of time, and experiencing withdrawal symptoms when the user attempts to stop using the substance (Pruthi, 2017).

#### Psychological Reasons.

The psychological reasons to use illegal drugs are supported by the following statements of the key informants: “KI 1”: Kaykayat ko nga matry. (I really want to try.); “KI 3”: Pang alis ng stress. Panglimot ng problema. Pampasaya. (To remove stress. To forget the problems. To be happy.); and “KI 4”: Mashudok nak nu awan maala da. (I get grumpy when they do not have it.)

Key informants use illegal substance because of the mental effect to the user. Users may feel either both short-term or long-term changes in the person’s brain activity which consequently affect their behavior (NIDA, 2018a). Illegal substance behavior effect varies from depression, anxiety, aggression, hallucinations and the like.

#### Sociological Reasons.

Sociological reasons are supported by the following statements of the key informants: “KI 2”: Nga kasla awan problemak...Nu maminsan pay, tapno jak malagip ti pinag apapa mi, ag marijuana ak. (Its effect makes my life lighter which makes me forget my problems...Sometimes, to forget our fight, I will use marijuana.); and “KI 3”: Pang alis ng stress. Panglimot ng problema. Pampasaya. (To remove stress. To forget about problems. To be happy)



This means that substance users are using illegal substances because of personal perspective of drug being their source of relief. Some people have been through difficult situations with their family, friends, school and peers and had to use illegal drugs as a means of escaping and trying to forget what was going on in their lives. They turn to drugs because they cause relaxation, increase their confidence, take their mind off things, give temporary relief and escape from reality (Odom, 2018). Without knowing that its effect is just temporary and because it is temporary, the moment its effect ceases from the body, the more that a person craves for its effects, and all the more that it turns them to use more of the drugs and eventually lead to addiction or drug addiction.

### **Experiences of Substance Users**

Experiences of the substance users in using illegal substance are divided into three (3), namely experiences while engaged in illegal substance, experiences under the custody of authorities and experiences after the custody of authorities.

### **Experiences while Engaged in Illegal Substance**

These experiences are better categorized based on the pharmacology of illegal substances, and these are hallucinogens, stimulants and depressants.

**Hallucinogenic Effect.** Hallucinogens are those that alter a person's awareness of their surroundings as well as their own thoughts and feelings. Hallucinogenic effect could be categorized more into two (2), namely illusion or misinterpretation and delusion or change of perception.

Illusion or misinterpretation could be seen in the statements of KI 1, as stated, "KI 1": *Tapos dagidiay gamit ket kasla nabiag. Kasla ag angangis jay silaw. Tapos makatungtong ko iti aso.* (Then those things felt like they were alive. It felt like the light was breathing. Then, I could also talk to dogs.) This also includes shimmering of images, illusory movement of images, visual perseveration of stationary objects, streaking of moving objects, and moving objects appearing as a consecutive series of stationary images (Levi, 2019). This was like the key informant experiencing different forms of things around him. This effect of illegal substance to users is because illegal substances try to distort the normal perception capacity of the brain of users (Khalid, 2014). Thus, making the substance user see things differently than normal.

Delusion or change of perception is when a person has false perception of one's self (Thomas, 2017). Substance users, under the influence of illegal substance could have a feeling of great power and strength which makes them believe that they are a god (Close, 2017). As stated by the key informants: "KI 4": *Ang feeling ko pa e, ako ang Diyos, ako ang boss.* (My feeling was I am God, I am the boss.) "KI 5": *Feeling ko ket syak ti boss.* (I felt that I was the boss.) Just like the key informant, the key informant felt like a boss and a god. Also, key informants have used methamphetamines that caused feeling of bugs crawling on their skin; and, these symptoms might subside after stopping use, but they can also persist for weeks or longer, and may increase one's susceptibility for developing future psychosis (Close, 2014).

**Stimulating Effect.** Substance users usually felt elevated mode of alertness, mood, and awareness. Stimulating effect, in this study, is categorized into two (2) makes them happy, and makes them active.

Makes them happy as an experience by the illegal substance is supported by the following statements of the key informants: "KI 1": *ket ag katkatawa da, isu nga agkatkatawa ak met lang...* (because they are laughing that is why I am also laughing); and "KI 3": *Masaya.* (Happy). Some people want to achieve this feeling by using illegal substance which the key informants tend to do. Illegal substance users use illegal substance in order to feel happy. Marijuana, for example has an active ingredient that makes the brain cell of the user release the feel-good chemical dopamine (Brodwin, 2015).

Makes them active as stated by the key informant "KI 4": *Malakas ako ma'am. Aktib ako.* (I am strong ma'am. I am active.). Substance user felt strong and active upon using illegal drugs. They portray strong and active behavior by laughing excessively, and more active than the usual. Because of this feeling, the user tends to stay awake and do unusual things until the effect of the substance wears off.

**Sedative-hypnotic Effect.** Sedative-hypnotic effect is the opposite of the stimulating effect where its symptoms are drowsiness, relaxation, decreased inhibition, anesthesia, sleep, coma, and even death. Substance users who gain the effects of sedative-hypnosis usually are peaceful sleepers because the substance has an effect of drowsiness and sleepiness as it reduces arousal and stimulation. This is evidently true on the following statements of the substance user: "KI 1": *Nu maturogen, dire-diretso. Agriing ak*

lattan nu agsapan... Ririingen dak ket haan dak kano mariing. (When I go to sleep, I sleep straight and just wake up in the morning... They try to wake me up but they could not.); and “KI 5”: ...jay marijuana ket kasla makaturturog ak (...that marijuana makes me sleepy.)

**Family is Oblivious.** However, the opposite thing happened with the substance users in this research where the family of the substance users were unaware of the illegal substance activity of their family member. This is supported by the following statements of the key informants: “KI 1”: Idi umuna ma’am, awan met ta gamin mangmangted ak latta kin nanang ket tatang ko ma’am. (At first ma’am, none because I always give money to my mother and father ma’am.); and “KI 2”: Idi umuna, madi da naamuan nga nag usar nak. (At first, they did not know that I was using.) This is a sad and frustrating reality since most of the family members are unaware that their relatives, parents or their child were using illegal substance. The substance user tends to not inform his relatives and his family that he is using because no one would really admit that he is a substance user or substance addict as it will only create feud among them.

The family of the substance users in this study does not know or is not informed that substance users were using these substances. The family members of the substance users were oblivious. They were only informed that they were using these substances when they were already confronted by their family members or another person. After they were confronted, that was when its effects were shown. Its effects upon confrontation were mostly positive because the family usually forced the substance user to change, get rehabilitated or imprisoned. When it comes to friend or peers, its effect also is different compared to the family.

**Friends are Accomplice.** Friends are big influencers of illegal substance use as stated by the key informants: “KI 2”: Ammu da ta kadwak met lang isuda. (They know because I am with them.); and “KI 3”: Pupunta ako sa boarding ng kaklase ko, doon kami gagamit. (I will go to the boarding house of my classmate and we will use it, there.). Friends also known as peers and peer pressure are commonly used when people are dealing with behaviors that are not socially-accepted like use of tobacco, alcohol and drugs. Peer pressure can also influence a person’s choice in a lot of things like substance use. Sometimes, it is the feeling of belongingness to that group or the sense of belongingness when that person is doing what the group is also doing. The same with substance users, they may feel that they are pressured, encouraged and influenced by their friends to use these substances to make the substance user feel that he or she belongs to that group.

**Friends are Oblivious.** Oblivious friends means that they are not aware that their friend is already a substance user. Oblivious, as the same with their family, was when the friends of the substance user did not know that their friend is using because the substance user is either shy, afraid or scared to tell their friends that they were using. This is also the case if other people would know of someone’s illegal hobby like use of illegal substance. People around one person tend to discriminate, bully and stigmatize the substance user. This is supported by the key informants in their statements: “KI 4”: Awan met ti nagbaliw ma’am. (Nothing changed ma’am.); and “KI 5”: Awan. Madi da ammo. (None. They did not know.)

**Community is unaware.** Lastly, the community is also affected on whatever substance a person is using. Substance use and drug abuse are often accompanied by a devastating social impact upon community life. In this research, the community is described as the government, barangay, and the whole neighborhood of the key informants. It is alarming that the government has no safety-nets in addressing the illegal substance problem of the country. Even when there are laws, these laws are not enough because of weak implementation. As stated by the key informants: “KI 1”: Awan met ma’am. Madi da met ammo nga ag ususarak idi damo na. (None ma’am. They did not know that I was using it initially.); “KI 2”: Naamuan da lang idi simmuko ak. (They only found out when I already surrendered.); and “KI 4”: Wala naman ma’am, hindi naman nila nalaman. (None ma’am, they do not know.)

### **Experiences under the Custody of the Authorities**

After they surrendered voluntarily or were arrested, illegal substance user experienced being interviewed, monitored, asked to undergo drug test, and experienced buy-bust operation.

**Intake Interview.** Substance users have been in custody of proper authorities like the barangay and the police and during those times, users were subjected to an intake interview. Interview is a helpful technique in the creation of sequential facts for proper investigation which will be used in court for trial (CTI, 2017.) Just like what the Barangay Officials are doing to the illegal substance, people who surren-

der have undergone an intake interview to gather information regarding their personal background and the way they have contacted with the use of illegal substance. As supported by the statement of the key informants: “KI 2”: Innala da met jay nagan ko, tawen, nagan ni inang ken tatang ko, nagan ti pamilyak. Amin amin... (They asked for my name, age, name of my mom and dad, name of my family. All.); and “KI 4”: Tinawag ni tito si Kapitan ma’am, nagtungtong kami manen. (My uncle called for the Barangay Captain, ma’am, we talked again.)

Intake interview is used to gather personal information about a person which includes his or her health, activities, religion, and history of substance use and abuse. This is also the reason for interview as one of the best tools in investigation. Interview’s aim during investigation is to discover the truth (Gehl, 2019).

**Monitoring.** Monitoring of the substance users is usually done by the police or the Philippine National Police (PNP). During this time, the PNP will have a close look up to any person on their watch list. This includes those drug or substance personalities and former substance users. They also do this to have home visitation, give treats to give in or surrender, and usually give referral for the substance users to be rehabilitated. As supported by the statement of the key informants: “KI 2”: Ken adda monitoring nga ub-ubraen da kadakami. (And they have monitoring that they are doing among us.); and “KI 4”: ...meron lang yung binibista ako ng pulis noong nag cocommunity service ako. (...there was this time that the police are visiting me during my community service.)

These police actions are guided under the PNP Command Memorandum Circular No. 16-2016 which is also known as the PNP Anti-Illegal Drug Campaign Plan – Project: “Double Barrel”. This plan has a two-pronged approach, namely Project Tokhang and Project HVT. In connection to this, the key informant’s experience with the Philippine National Police by following-up on people who surrendered of substance use is in fulfillment of Project Tokhang. Aside from interview and monitoring, substance users also experienced undergoing a drug test as a means of confirmatory.

**Undergone Drug Test.** Undergoing a drug or substance test is a mandatory requirement of the Philippine National Police upon arrest of any person that was suspected to be a substance user. According to Article 3, Section 36 of Republic Act No. 9165, any person apprehended or arrested for violating the provisions of Republic Act No. 9165 shall be subjected to screening laboratory examination or test within twenty-four (24) hours, if the apprehending or arresting officer has reasonable ground to believe that the person apprehended or arrested, on account of physical signs or symptoms or other visible or outward manifestation, is under the influence of dangerous drugs (RA 9165). If the result turns out to be positive, a confirmatory test shall be conducted within fifteen (15) days. Which the key informant also experienced as stated: “KI 3”: Pumunta kami sa hospital, kinuhanan kami ng ihi. Drug test daw yun. Tapos ayun nga nagpositive kami. (We went to a hospital, got a urine sample. They told us that that was a drug test. And there, we tested positive.)

**Buy-bust Operation.** Buy-bust operation is one of the common ways which law enforcers use to apprehend persons accused of selling illegal substances. Buy-bust operation is a form of entrapment whereby a law enforcer acts or disguises as a buyer of illegal substance and commences a buying and selling activity with the illegal substance seller. Before a buy-bust operation is conducted, the PNP must abide with the Specific Rules and Procedures in conducting buy-bust operations specifically Section 3.1 on the Revised PNP Manual on Anti-Illegal Drug Operations and Investigation. This may be seen on the statement of the key informant: “KI 5”: Idi nagbuy bust da gayam idjay balay...eksakto met nga ag us-usarak pay ti shabu idi idjay kwartok. (When they hadbuy-bust at our house...it was exactly the same time that I was using shabu in my room.)

### **Experiences after the Custody of the Authorities**

In this research, after the substance users have interacted with the police and the barangay officials, these authorities recommended that the substance users will undergo rehabilitation and their experiences include taking an oath, doing community service, and being admitted at a rehabilitation center.

**Took an Oath.** Taking an oath by the substance users are made in the municipality of Jones which starts the opening and enrollment of the substance users into community service and values. Taking an oath is part of Oplan Sagip of the government as directed by the Dangerous Drugs Board (DDB) and implemented by the local government, and handed down to the different barangays. These are supported by the following statements of the key informants: “KI 1”: Idjay, nagisapat kami nga madi kamin ag ususaren ti droga. Ken sumali ti community service idjay barangay mi ti 6 months. (There, we promised

to not use drugs again. And to join the community service in our barangay for 6 months.); and “KI 2”: Amin nga drug surrenderees ket napan idjay complex tapnu ag community service ken values idjay barangay mi. (All drug surrenderees went to the complex to have community service and values in our barangay.)

Through this oath taking of the substance user, they would swear to stop using illegal substance in the future and be enrolled in a rehabilitation program for six (6) months under the supervision of the barangay: the community service and values.

**Community Service with Values.** Community service with values is implemented by the all barangays in the Philippines under the local government through the office of the Municipal Mayor, as directed by the DDB. Community Service, has at least five (5) methods of intervention to substance users. These are motivational interview; brief interventions; spiritual or faith-based interventions; social support activities like technical skill enhancement, livelihood training activities, educational programs, civic and environmental awareness activities, job placement and employment; and other activities that the Municipal or the barangay sees as necessary for the improvement of the substance users. These are attested on the following statements of the key informants: “KI 1”: ... Ngim programa kanu ti municipyo ajay. Rehabilitation program iti Jones Kanu. (... But it is a program of the municipality. It is a rehabilitation program of Jones.); “KI 2”: Jay community service ket tumulong kami idjay barangay... (The community service is by helping in the barangay...); and “KI 4”: ...tumulong kami sa activities ng barangay on ng Jones. (...we are helping during activities of barangay and Jones.)

**Admitted at a Rehabilitation Center.** Rehabilitation center, as defined by Section 3 of Republic Act No. 9165, is any of the treatment and rehabilitation centers for substance users. Substance users who were admitted at a rehabilitation center dropped the following statements as key informants: “KI 3”: Noon umamin na ako na gumagamit ako at buong loob naman akong nagparehab. (When I admitted that I was using, I fully surrendered myself for rehab.); and “KI 5”: ...mapanak idiy rehabilitation center ta first time ko met nga natiliw. (...I will go to a rehabilitation center because it is my first time to be arrested.)

### **Challenges Experienced During Rehabilitation**

Rehabilitation centers are established to help substance users to cope with and recover from the effects of illegal substances. This research, however, found different personal problems and environmental problems that the substance users have encountered during their stay at the rehabilitation facility and during their time in the community service.

### **Personal Problems**

Personal problems are those event and happenings in the life of the substance users that were not influenced by the problems encountered by the rehabilitating institution. These personal problems are shame, fear, substance craving and home sickness.

**Shame.** Shame as a form of personal problem where the substance user himself or herself feels ashamed. Illegal substance users felt ashamed when they were seen by other people. They are ashamed to let other people know that they are undergoing community service or rehabilitation program because of illegal substance use. This is because the user has the tendency to overthink on how people would react if they knew that they were undergoing such program. As supported by the following statements: “KI 1”: Ajay mababain kami. (We are embarrassed.); and “KI 4”: ...nakakahiya ma’am. (...embarrassed ma’am.) With shame, the substance user may feel like simple mistakes are a sign that the user is defective as a person or that he or she is incompetent. Shame also brings with it a deep sense of separation from the people around him or her, and from the user himself for herself. Lastly, shame is where the user loses touch with parts of oneself and may feel disconnected from everything.

**Fear.** Substance users felt that they were afraid to be labeled, bullied or called as a drug addict as stated: “KI 1”: mabuting nak nga maawagan nga drug addick. (I am afraid to be called as drug addict.) Substance users are also afraid on the concept of being labeled in public as drug addict by the people around them. Labelling a person, a drug addict, could give more harm than good to the substance user and could actually affect their image and behavior (Peck, 2016). This is true in some cases because of helping the substance user to cope with and move on with their addiction, the substance user may end up not moving on at all because of the hindrances and struggles that come with being sober.

**Substance Craving.** Substance craving is a form of withdrawal symptoms of a substance user who has stopped the use of illegal substance. This is a normal feeling of a substance user when no illegal substances are introduced to his or her body but the struggle starts if the substance user is craving and looking for the effect of the illegal substance as supported by the following statements: “KI 3”: Kaso dumating ako sa puntong gusting gusto ko ng gumamit kaso wala akong pagkukuhanan. (I came to a point that I really wanted to use but I do not know where to get from.); and KI 5”: Adda pay idi umuna nga bulan ket kasla nagmadi ti riknak. Nagrugid idi madi nakon nag us-usar... Kunada ket withdrawal kanu adiy. (On the first month, I felt unwell. It started when I stopped using... They told me it was withdrawal.) Substance craving is a feeling of constantly looking for the taste, smell, feeling and effect of using an illegal substance. This is a form of withdrawal symptom, where the body tries to adjust, and stays to be sober. Substance craving starts when the substance user has stopped taking in illegal substance which made him or her addicted. Then, the substance user feels a thirst and hunger for the effect of the illegal substance, until the user becomes tempted to use again the substance. Thus, ending up to becoming addicted again.

**Home Sickness.** Homesickness is also a normal problem of any substance user because the user is either too busy with the rehabilitation program, the venue of the rehabilitation center is far away from the family, or the family is ashamed to visit the user. In this research, the substance user suffers from homesickness because of the rehabilitation program that has a very busy schedule, which makes the user cuts or have less time with the family, or the rehabilitation center is far away from their homes and family. As supported by the following statements: “KI 2”: Jay haan ko mabisita jay pamilyak idjay \*\*\*. (When I cannot visit my family in \*\*\*.); “KI 3”: Namimiss ko din yung pamilya ko noon. (I also missed my family back then.); and “KI 5”: Awan oras ko para iti pamilyak ta kasla nakabalok ak mit. (I do not have time for my family because it felt like I was imprisoned.)

### **Environmental Problems**

Substance user’s environmental problems are experienced because of the things and people around him or her that causes these problems. These are rumors, subjection and financial strains.

**Rumors.** Rumors are part of the society where people live in. When it comes to illegal substance use, rumors are one of their problems because of how they affect them as an individual who is undergoing a rehabilitation program. This is supported by the following statements: “KI 1”: Dagijay karruba mi ket ag chinchinnismis nga adik ak kanu, kasjay ma’am. (My neighbors were talking about me that I am an addict, like that ma’am.); and “KI 4”: Lagi na lang nila ako pinag uusapan. (They are always talking about me.) Rumors have either positive or negative effect on the substance users. It actually depends on how a substance user sees its effect on him or her. If a substance user sees these rumors as degrading and made as a means to insult them, then these rumors could give more harm to the users. Users, then, have a hard time solving and coping with this problem, but if the substance users would see these rumors are positive or a challenge during their rehabilitation process, then, the users could easily cope and move on with it.

**Financial Strain.** Undergoing rehabilitation process disrupts the regular life and routine of the substance users, which includes going to work, school, and spending time with their family, friends and loved ones. This also includes the opportunity for the substance user to go to work and earn money for his or her personal use and for his or her family. This is the reason for substance users not to have enough money to support their families because of spending more time on a regular job or work as supported by the following statements: “KI 2”: Di ak pay makatrabahon isu nga awan met lang maitid ko nga kwartak kin baket ko. (I cannot even go to work that is why I cannot give money to my wife.); and “KI 5”: Problemak iti kwarta, oras, tattao, amin idiy ma’am ket problema. (My problems are money, time, people, everything ma’am is my problem.)

### **Coping Mechanism Used Against Those Challenges**

Coping mechanism that the substance users used to overcome their personal problems are themed into five (5), namely adaptive mechanism, cognitive mechanism, suppression mechanism, avoidance mechanism, and behavioral mechanism.

### **Adaptive Mechanism**

Adaptive mechanism is one of the types of the coping mechanisms used by the substance users during their battle against their problems that they have experienced during the rehabilitation process (Beresford, 2014). Adaptive mechanism is usually used by the substance user where the user has accepted, adopted and assumed that these problems are always there and will hunt them. Therefore, the best way to do it is to accept it and move on with it until one becomes used to it. Adaptive mechanism is seen on the following statements of the key informants: “KI 1”: Nasanay nak metten nga kitkitan dak ti tao. (I am used to people looking at me.); and “KI 3”: ...pipigilan mo yung sarili mong ‘wag umalis sa \*\*\*. (...you’ll stop yourself from moving out at \*\*\*)

### **Cognitive Mechanism**

The second coping mechanism used by the substance user during their rehabilitation is the cognitive mechanism. Substance users were able to cope with their problems by changing the way they think or their perception about things. Some substance users changed their perception about God, while some changed their perception about being alone, and some changed their perception on pushing and making their mind stronger in order to finish the rehabilitation process. This supported by the following statements of the key informants: “KI 1”: ... ta baliwan na ti panunot ko ken mas immasideg ak kin Apo. (...so that He changes my mindset and I can build a closer relationship with God.); and “KI 3”: Kaya pinursigi ko ang sarili ko na tapusin para hindi ako makulong. (That is the reason for pushing myself to finish it so that I would not be imprisoned.) Change of perception during the rehabilitation process is one key to a successful rehabilitation and staying sober because change of perception could be a motivating factor for the substance user to finish the rehabilitation process. This is also where the users will be rewarded regarding the result of the rehabilitation process when they have finished it. Also, this would make the rehabilitation process easier for the substance users because their minds are also focused on the positive outcome of the rehabilitation.

### **Suppression Mechanism**

Suppression mechanism, on the other hand, as of the coping mechanism used by the substance user during the rehabilitation process is characterized as holding back unwanted urges (Berlin, 2009). The substance user’s coping mechanism is by trying so hard to hold back the urge to take illegal substance because the user does not want to go back to the withdrawal symptoms. This could be reflected on the statements of key informant 1: “KI 1”: Isu nga impapatik nga haan nak ag ususaren tapno haanakon ag-subli ijay withdrawal nga kunada. (That is the reason for asserting that I will not use again because of the withdrawal that they have said.) These is true to all cases because the substance user may experience having some cravings after the illegal substance has been withdrawn from the body of the user. The user may feel thirsty of the effect of the illegal substance that is the reason for craving. Holding back on not to use illegal substance is one of the biggest steps during the rehabilitation process including staying sober after the process because some users have the tendency to go back and use illegal substance after the rehabilitation.

### **Avoidance Mechanism**

Avoidance mechanism is a type of coping mechanism where a person tries to evade and avoid anything that causes distress (Scott, 2019). Avoidance mechanism may be seen when the substance users try to avoid the people around them who only make rumors and talk about them. These rumors or the people around them are stressors to the user. In order to easily finish the rehabilitation, the substance user’s strategy is simply avoiding them. In this way, lesser stress would be brought to the user and no triggering factor would be given to the people around the user. Avoidance mechanism as used by the substance users may be seen on the statement of the key informant 4: “KI 4”: Hindi ko na lang sila pinapansin ma’am. (I just do not mind them, ma’am.)

### **Behavioral Mechanism**

Behavioral mechanism was used by the substance users when they tried to change their normal routine to a new one. This may be seen on the following statements of the key informants: “KI 4”: ...pinapakita ko na talagang nagbago ako. (...I am really showing them that I have already changed.); and

“KI 5”: ...ipakitak nga nala-ing akon tapno makaruarakon idiy idi. (...I showed them that I am already ok so that I could be released.) It could be understood when the substance users showed to other people that they have really changed by not using illegal substance again and committing more activities that the public may see.

### **Life after Completing the Rehabilitation Process**

After the rehabilitation process, the substance user sees life in different ways. They see life as being employed, happy, educated, and renewed.

#### **To Be Employed**

Employment is one of the aims of the former substance user after finishing the rehabilitation process because of monetary problems that they have encountered during the rehabilitation phase. That is the reason for the former users to find income or source of living to help finance their families, especially so that the former substance users were bread winners and during the rehabilitation, money became a problem to their families. This is also a way for the substance users to give back to their families after all the sacrifices, acceptance and understanding that were given to the former users during the rehabilitation process. And this is supported by the following statements: “KI 1”: Kayat ko agrugi iti business ko ma’am. (I want to put up my own business ma’am.); and “KI 5”: Iti namnamaek ket makabirok iti nasayaat nga pagtrabahuwan. (I expect to find a good job.)

#### **To Be Happy**

Anyone who has been released from isolation could really expect happiness. People are happy because their freedom is back and they could already do whatever they want again. Despite of all the problems they have encountered during the rehabilitation process, they were able to cope with them, and succeed all the hardships. Thus, that is the reason for the substance users to become happy. And this happiness can be supported by the following statements: “KI 2”: Iti namnamek ket, naragsak ken napayapa ng apinagbiag. (What I am expecting is a happy and free life.)

#### **To Continue Education**

Education is a good aspiration of illegal substance users after finishing the rehabilitation process. The urge to go back to school and study again is a way for the illegal substance users to start a new life without the use of illegal substance because education is a way to land a good job after a graduation and to finance all expenses in the future. These could be seen in the statement of key informant: “KI 3”: Ang plano ko po noon noon, babalik ako sa pag-aaral ko. (My plan before was to finish my education.) The substance user sees education as a ticket to a better future because education could lead to someone’s success. Substance users assume and presume that education may land them in good-paying jobs, and eventually help them with their finances. Former substance users see and want their lives in the future to be successful and become financially capable by being employed and continuing their education. Also, through this, their lives would be free and happier with their family, friends, and loved ones.

#### **Feelings after the Rehab**

After the former substance users have moved out of the rehabilitation centers or have finished the rehabilitation process, the feelings, moods or dispositions are include being happy and being emotional.

#### **Felt Happiness.**

Happiness is but a normal feeling of substance users after they have been released from the rehabilitation center or have finished the rehabilitation process. The key informants are happy and joyful because they have succeeded the agonizing days of being sober and at last, they are being released to do whatever they want, do whatever they need, to be with whoever they want to be, or to start creating a better world and life without illegal substances. And these are seen on the following statements of the key informants: “KI 1”: Naragsakan nak ma’am. (I felt happy ma’am.); “KI 2”: Ragsak... (Happiness...); and “KI 5”: Nasayaat ma’am. (Happy ma’am.)

**Felt Emotional.** The key informant showed tears of joy upon release because of too overwhelming emotions that lead to tear, as stated by “KI 3”: Naiyak ako noon. (I was about to cry back then.). Those tears were not because the person was sad but because the person was very overwhelmingly happy.

## Treatment after Rehab

After being released from the rehabilitation center or finishing the process of rehabilitation, the former substance user went back to the community, specifically, the former substance user went back to the family, friends and loved ones. During their return, there were no changes that were recorded on how their family, friends and community treated them.

**Family Did Not Change.** The former substance users felt that there were no changes on how their families treated them because their families are still beside them. Even when the former substance users went through a huge problem regarding substance use and abuse, their families were still there with them. Thus, no changes happened between in their relationship. These are supported by the following statements of the key informants: “KI 1”: Awan met nagbaliw ma’am. (Nothing changed ma’am.); and “KI 4”: ...walang nagbago ma’am. (...nothing changed ma’am.)

**Supportive Family.** A change that was recorded was having a supportive family after the rehabilitation process. Staying in a state of soberness could not be done alone by the former substance users. They need help from the persons who are near and dear to them-family. Family support includes avoiding being judged by refraining criticism and negativity as much as possible, showing and expressing of love and care to former substance users. This is also giving the former substance users an environment which is drug-free. This change was recorded on the following statements of the key informants: “KI 1”: Ngem marikriknak nga sinuportaran dak... (But I felt that they supported me.); “KI 2”: Open arms nga inawat idi. (They have accepted me with open arms.); and “KI 3”: Si mama nagbago na... Si papa halos kada buwan ay umuwi ditto sa \*\*\*. (My mother already changed... My father comes home almost every month.)

**Strict Family.** Having a strict family, on the other hand, is also an opposite of having a family that does not change at all or having a supportive family. Having a strict family is one of the results of illegal substance use. Families tend to be strict because they are using an iron fist to prevent another occurrence of illegal substance abuse. This type of family often believes that being strict or firm is the best to keep the drugs away. Some people believe that being firm and strict is the best way to show love, care and support to a person who has done wrong especially if it is illegal substance related especially in a Filipino family. Filipino families imbed in their culture the idea of being strict, firm and harsh to instill discipline or control on someone’s behavior. Having a strict family could be seen on the following statement of the key informant: “KI 5”: Nag-istrikto... Banbantayan nak. (She was very strict...She monitors me.)

**Friends Did Not Change.** Friends of the former substance users did not change their treatment towards them and these are seen on the following statements of the key informants: “KI 1”: Gaygayem ko met latta isuda ma’am. (I am still friends with them ma’am.); and “KI 5”: Awan nagbaliw ma’am, ayaban dak pay uminom. (Nothing changed ma’am, they even call me to drink.) Having friends who stay beside a person’s side even though tragic events happen are the best friends a person could ever have. Key informants that have this type of friends are very lucky because they are still friends even though the former substance users were once involved in use and abuse of illegal substance.

**Friend’s Acceptance.** Support of friends is shown and seen upon acceptance of the substance, this may be better manifested on the following statements of the key informants: “KI 2”: Nasayaat met ma’am. Inawat dak met mit lang ma’am. (Good ma’am. They still accepted me ma’am.); and “KI 3”: ...tanggap naman ako ng mga kaklase ko na mga kaibigan ko din ngaun... (My classmates who also are my friends now, accepted me.). This is an additional motivation for the former substance user to stay sober aside from being surrounded by supportive family. Acceptance from friends is a good step in staying away from illegal substance. It is a form of showing support, love and care to the former substance user. It creates a greater success to staying sober and to not go back to illegal substance.

**Communities’ Acceptance.** Community as described includes those persons found in the neighborhood or residence of a former substance user. In contrary to other cases where other people judge, mistreat and negatively talk about former substance user; the community where the key informants reside have accepted them like no substance use and abuse-related happened as presented on the following statements of the key informant: “KI 1”: Kaykayat nak iti karuba tayo ta aktibo ak met nga tanod tatta. (Our neighbors like me because I am now an active barangay tanod.); “KI 2”: Madi dan agchichinnismisen. (They no longer talk about me.); and “KI 3”: ...tinanggap na din nila ako dahil sa maayos ko din na pakikitungo sa kanila. (...they have accepted me because of my good relationship with them.).



## Problems after Release

Problems experienced by the former substance user after release include challenges in employment and stigma brought by other people in the society and the community.

**Employment.** Employment is not just a dream for the former substance user but also a problem that had risen after the process of rehabilitation. Non-acceptance during job application after being found out that the person was a former substance user and had undergone rehabilitation is one of the biggest problems that the substance users have undergone. This employment problem is seen on the following statements of the key informants: “KI 1”: Agbirok trabaho ma’am. (To look for a job ma’am.); and “KI 5”: Iti karigigatan ma’am ket diay pinag apply ko iti trabaho. (The most difficult ma’am is my application for a job.) Same is true with what the former substance user is experiencing, unacceptance in employment, because of the use of illegal substance which is a form of a criminal activity. Employers often argue that they do not want to hire or employ former criminals because they may become a liability and may endanger the image of the company.

**Stigma.** Stigma is seen when the people around the former substance users see them the negative way because they have history of illegal substance use and abuse. This may be seen on the following statements of the key informants: “KI 2”: ...tapos nu ag kamali ka ket ichismis da pay ti karuba. (...and then, if you make a mistake, they would gossip it with our neighbors.); “KI 3”: Yung walang tigil na usapang na drug addik ako noon. (Those endless talks that I was a drug addict before.); and “KI 4”: Yun din ma’am yung mga chismosa. (Those persons who always talk about me.) The result of this non-acceptance of the substance user makes it harder for the substance user to adjust to a life outside of the rehabilitation process. This becomes a hindrance on the part of the substance user to have full detoxified and sober life.

## Coping Mechanism

The coping mechanism that the former substance user used after being released from the rehabilitation center or after finishing the rehabilitation process is a cognitive and avoidance mechanism.

**Cognitive Mechanism.** Cognitive mechanism is a type of coping mechanism where the person tries to solve his or her problems by changing the way he or she thinks. The former illegal substance users try to solve or overcome their problems by changing the way they think. Instead of allowing themselves to be engulfed by the problems they are facing, the former substance users tried to motivate themselves to think and do better. Cognitive Mechanism is seen on the following statement of the key informant: “KI 1”: Imbagak ti bagbagik nga awan asenso na ti biag ko nu puro buting ti surutik. (I told myself that life will not progress if I will follow my fear.) This type of mechanism is not new because it was used by the former substance users during their struggle in the process of rehabilitation in a center or during the community service. This is a reason for the former substance user to use this coping mechanism to cope with the problems.

**Avoidance Mechanism.** Avoidance as a coping mechanism, on the other hand, is also known as avoidance coping where avoidance coping is choosing a person’s behavior based on trying to avoid or escape (Corpuz, 2018). In this study, the substance users are trying to avoid those people who are talking about them, as seen on the following statements of the key informants: “KI 2”: Lumisi ak lattan. (I will just avoid them.); “KI 3”: Pinabayaan ko na lang sila. (I just let them be.); and “KI 4”: Hindi ko na lang sila pinapansin ma’am. (I just do not mind them ma’am.). They try to avoid those people who bring bad vibes because they bring stigma to the substance users. Avoidance does not eliminate the problems that the substance users are experiencing. They acknowledge that there are problems but they have to recover quicker than normal. This coping mechanism is because the substance user felt that problems could just become a hindrance. This is the reason for them not to mind the problem but just move on with their lives.

## Life Now

The life status of the former substance users is either having a closer life with their family and with God, becoming a graduate of an educational institution or having life without any vices.

**Closer with Family.** Having a closer family is the effect of a positive treatment of the family to the former substance users. This starts with having a supportive family who stays with them with whatever challenges and problems that come their way. The former substance users also realized the importance of having their family with them-having a loving, caring and supportive family. They have also realized

that a family is the most influential thing in a person's life. It is not surprising that the former substance users have strengthened it by having a closer bond with their family. This positive outcome could be seen on the following statements of the key informants: "KI 4": ...tumutulong sa bahay. (...helping in our house.); and "KI 5": Tatta ma'am, adda asawak ken tatlo nga anakon. (Today ma'am, I already have a spouse with three children.)

**Closer with God.** Having a closer relationship with God is also a positive outcome that comes by having a closer relationship with their families because some of the former substance users created a way with God through their families and loved ones and this may be seen on the following statements of the key informants: "KI 1": ...ken ni Apo. (...to God.); "KI 3": ...nakilala ko ng mas maigi ang Panginoon. (...I was able to know God more.); and "KI 4": ...kapag sabado at linggo naman, pumupunta kami sa kapilya. (...during Saturdays and Sundays, we go to church.). This type of relationship is also a positive outcome of the rehabilitation process because of the rehabilitation program through values. In the values program, the former substance users were taught good moral values in relation to God which made them God-fearing individuals.

**Educated.** Former substance users also finished their studies, and these are seen on the following statements of the key informants: "KI 3": ...graduate na po ako ng Argiculture. (...I already graduated from Agriculture.); and "KI 4": Mas nakapagfocus ako sa pag-aral ko ma'am. (I was able to focus more on my studies ma'am.) Education as a ticket for a good paying job and a decent life in the future. This is the reason for the former substance users to finish their interrupted studies. This is also one of the former illegal substance user's bucket lists upon release from the rehabilitation center or upon finishing the rehabilitation program.

**Avoid Vices.** The vices that they tried to avoid are use of alcohol, tobacco and illegal substances. This type of life style choice is one of the best results or outcomes brought by the rehabilitation program because it hinders recidivism of illegal substance use and abuse. This is manifested on the following statements of the key informants: "KI 2": Madik nga talagan nga ag usaraen ti dorga. (I really do not like to use drugs again.); "KI 4": Masaya ako na wala ng droga...at wala naman din akong balak bumalik pa. (I am happy that there no drugs...and I do not have plans in returning.); and "KI 5": Naiwasak amin nga bisyo pati inum. (I have avoided all vices including drinking.)

## CONCLUSION

Illegal substance users or takers as studied among the participants are commonly using methamphetamine and marijuana for their physical, behavioral and environmental causes because they give the takers a feeling of being high while having hallucinated, stimulated or sedated feeling. In contrary, people around the substance takers are not aware of the abusive situation that they are in. Upon acknowledgement of the abusive substance situation that they were in, authorities intervened by conducting intake interviews and buy-bust operation, and placing takers in monitoring and drug test. Before substance takers were brought for rehab, they either took an oath not to use illegal substances again, and immediately sent for community service; or immediately sent to rehab centers. During the rehab, takers faced personal and environmental difficulties which they resolved through different coping mechanisms.

After finishing rehab, former takers dreamed of having a happy life while they becoming educated and employed. Those are the reasons for them to be happy and become emotional upon release. They were also accepted and supported by their families, friends, and loved ones in their road to a new life. But it has not always been that happy because they have also faced problems like difficulty in getting a job and non-stop bullying by other people. Despite these, they were able to cope with it, was able to have a simpler life with their families and with God. And for other takers not to have the same difficulties after rehab, a proposed integration program was created.

## RECOMMENDATION

From the issues and concerns derived from the conclusion, the following are forwarded:

1. For current substance users to stop taking illegal substance so that they would not experience the same difficulties that KIs have gone through;

2. For current substance users to surrender voluntarily to the local government so that they would be easily subjected to community service;
3. For current substance users undergoing rehabilitation, to be honest with the social workers so that proper rehabilitation treatment would be given to them;
4. For the community and to all barangay residents to be oriented and educated to the cases of substance use and abuse so that they may not be a hindrance on the full recovery of the former substance users.
5. For employers to hire or employ reformed and rehabilitated substance users;
6. Adoption and implementation of the proposed integration program attached in this research; and,
7. Other researchers can also do prospective studies on lived experiences of substance users.

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# TEACHING COMPETENCE VIS-A-VIS NATIONAL ACHIEVEMENT TEST PERFORMANCE

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## ABSTRACT

The country's education goal is to provide students opportunity for total development through quality education. Teachers, as main source of knowledge, are considered as contributors to students learning. Hence, students' performance in a national standardized examination can be a measure of teachers' competence. This study aimed to investigate the correlation between students' National Achievement Test performance and teachers' teaching competence in the three school years from 2010-2014. The study was conducted at Bohol Island State University-Candijay Laboratory High School department. Students' NAT ratings were gathered from the National Education Testing and Research Centre (NETRC) through the dean of College of Teacher Education (CTE) and data on teachers' competence were taken from the annual teachers' evaluation results using the Performance Evaluation System (PES) tool. Using the Pearson Moment Product correlation coefficient, the result revealed that there is a significant correlation between teachers' teaching competence and students' NAT performance. It was also found out that students obtained Poor or Failed performance in the five subject areas in NAT while teachers teaching competence is at Outstanding level. The result implies that students' performance in NAT is not congruent with teachers' competence. Therefore, there is a need to revisit the areas of teacher's evaluation to match students' performance in a national standardized test and teachers' competence in teaching.

*Keywords: National Achievement Test, Students' Performance, Competence, Teachers, Education*

## INTRODUCTION

The quality of students depends so much on the quality of teachers. Qualified and competent teachers are necessary for students to receive quality education. Teachers' competence is essential to meet the demands of every learner. To achieve competence, teachers must meet the major demand of the profession which is to develop skills and knowledge aligned with the set of teaching competencies by the school system (Anbuthasan & Balakrishnan, 2013). Nessipbayeva (2012) explained that in teacher education, competencies include knowledge, skills and values that teachers must developed to become competent in the profession. Competence, therefore, is every goal of each teacher because a teacher cannot deliver quality education unless one is competent.

On the other hand, one of the measures of teachers' competence is student's achievement in a national standardized test which is the National Achievement Test (NAT) in the Philippines. The agency responsible for the implementation of NAT is the National Educational Testing and Research Center (NETRC) in Manila. The agency's function is to provide research which enhances the evaluation and measurement of efficiency of education made by the Department of Education. The NAT aimed in assessing the knowledge, abilities, and skills of high school students in five disciplines, namely, English, Filipino, Science, Mathematics, and Araling Panlipunan. High school students from all over the Philippines take the NAT as part of their curricular requirement, including the ones in the Laboratory High School of BISU-Candijay. However, the NETRC, in the year 2011-2012 reported that there was a declining percentage on the students' NAT results. The numbers for the overall Mean Percentage Score (MPS) for 4th year high schools' students is 48.9 percent against the 75 percent goal targeted which

seems elusive at this point. De Dios (2013) stated that the authority must provide data analysis based on the given report to address the problem on students' declining of scores in a national standardized test.

Some literatures on students' poor performance in a standardized test also points out teachers as one of the factors being correlated to the issue. The study of Pedersen, Gran, and Crofford (2011) reveals that teachers' quality and performance have positive correlation to students' achievement. Teacher quality is inextricably linked with the degree of teachers' preparation and experience in subject matter and pedagogy, thus, making the latter pair essential for student achievement. The study of Kane and Staiger (2008) found out that effective teaching considered a significant predictors of student achievement. From a research perspective of Odden, Borman, and Fermanich (2004) teachers performance results from teacher-based evaluation tools can provide good data to assess teachers impact on school and students learning performance. In contrary Peterson (2002) explaine that relationship between standards-based teacher evaluation scores and measures of student achievement needs to be demonstrated before using these scores in research on teacher effects or teacher quality. Therefore, the best way to assess teachers' competence is to look at students' progress in terms of their test scores since it is one way assess students' learning in school. Accordingly, teachers, as main provider of learning, is an important determinant of students' achievement in school. Thus, more studies were conducted on teachers' evaluation tool to make sure the effectiveness of assessing teachers' performance that will lead to teachers' effects on student achievement (Steele, 2010).

According to Rivkin, (2005) teachers are the most important school-based determinant of student learning as measured in standardized test. Likewise, Sirait (2016) emphasized that teacher quality, in term of teacher evaluation score, is a matter and statistically significantly to student performance, in senior high school level. Although most studies claimed that teachers' quality is correlated with students' achievement it is important to highlight that Filipino teachers' performance is generally outstanding. To be a teacher in the Philippines requires one to be resilient, enduring and patient – qualities that make all teachers outstanding. Teachers from Philippines have also shown positive traits which aid students' better performance in school.

Furthermore, in Bohol Island State University-Candijay Campus, Laboratory High School students have shown low or poor performance ratings in the National Achievement Test (NAT) for the past three years. Therefore, this is made to assess the degree of relationship between teachers' teaching competence based on the Performance Evaluation System (PES) and students' performance based on the National Achievement Test (NAT) with the purpose of providing empirical data that will serve as basis in formulating enhancement program for teachers to provide better effective teaching to improve students National Achievement Test (NAT) performance.

## **OBJECTIVES OF THE STUDY**

This study aimed to determine the relationship between students' NAT performance and teachers' teaching competence in the school years 2010-2011, 2012-2013, and 2013-2014.

Specifically, it seeks to answer the following questions:

1. What is the competence of the teachers based on the results of the Performance Evaluation System (PES) in the three (3) school years?
2. What is the performance of students in the five subject areas in NAT in the three (3) school years?
3. Is there a significant relationship between teachers' teaching competence and students' performance in NAT in the three (3) school years?

## **METHODOLOGY**

This study employs descriptive-documentary and correlational design to determine the relationship between students' NAT performance and teachers' teaching competence in the three identified school years. The study's respondents were forty-one (41) 4th year high school students and fifteen (15) teachers from Laboratory High School of Bohol Island State University-Candijay from barangay Cogtong. The said institution has the Laboratory High School with one section per year level which belongs to the College of Teacher Education. The gathered data on teachers' competence was taken from the results of

teachers' annual evaluation using the Performance Evaluation System (PES) tool. The instrument used is rated by superior and self (teachers) and the other is for student evaluation. The standardized questionnaire contains the following competencies: instructional skills, report management and attendance, professional growth, and personal and social skills. Said competencies have some observable skills which serve as the specific points to be evaluated. On the other hand, the students NAT ratings was taken from NETRC Manila with the consent and approval of the campus director and dean of the College of Teacher Education (CTE) for ethical consideration. Since the study had undergone ethical review the researcher first sent a letter of intent to the Campus Director of BISU-Candijay through the Dean of the College of Teacher Education (CTE) asking permission to gather data on teachers' PES ratings and another letter of intent was sent to the chairperson of Laboratory High School asking permission to gather data on students' NAT ratings. The researcher also sent formal letter to each student and teacher whose data were be gathered. Since the chairperson does not have a complete copy of the NAT results, the Dean of the CTE in which the laboratory high school belong, sent another letter of request to the Manila to request the results of students' NAT. In terms of data analysis, the study employs correlational research to analyse the correlation between teachers PES ratings and the NAT scores of the students. Frequency count was used to present data on teaching competence and students' NAT ratings while Pearson Moment Product correlation coefficient was used to compute the correlation between the two studied variables.

## FINDINGS

**Table 1. Teachers' Teaching Competence Level**

School Years	Competencies	O	VS	S	US	P	Qualitative Index
2010-2011	Instructional Skills	8	2	0	0	0	Outstanding
	Report, Management, and Attendance	3	7	0	0	0	Very Satisfactory
	Professional Growth	2	8	0	0	0	Very Satisfactory
	Personal and Social Skills	7	3	0	0	0	Outstanding
	<b>Overall</b>	<b>0</b>	<b>10</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>Very Satisfactory</b>
2011-2012	Instructional Skills	2	14	0	0	0	Very Satisfactory
	Report, Management, and Attendance	1	12	3	0	0	Very Satisfactory
	Professional Growth	6	10	0	0	0	Very Satisfactory
	Personal and Social Skills	8	6	2	0	0	Outstanding
	<b>Overall</b>	<b>1</b>	<b>15</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>Very Satisfactory</b>
2012-2013	Instructional Skills	10	7	0	0	0	Outstanding
	Report, Management, and Attendance	3	13	1	0	0	Very Satisfactory
	Professional Growth	7	9	1	0	0	Very Satisfactory
	Personal and Social Skills	9	6	2	0	0	Outstanding
	<b>Overall</b>	<b>2</b>	<b>15</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>Very Satisfactory</b>

Table 1 shows the teachers' competency level in the three identified school years. In 2010-2011 teachers' *Instructional Skills and Personal and Social skills* are in the outstanding level, while *Report, Management, and Attendance and Professional Growth* is at very satisfactory level. Thus, the overall rating of teachers' competence is at Very Satisfactory level. Likewise, in 2011-2012, teachers' *Personal and Social Skills* was in the outstanding level while the three competencies fall in the Very Satisfactory qualitative index leading to the overall competence level of Very Satisfactory. In 2012-2013 teachers' competence in *Instructional Skills and Personal and Social Skills* was outstanding while *Report, Management, and Attendance and competence in Professional Growth* is at very satisfactory. In the overall, teachers' competence in this school year is at Very Satisfactory level.

Therefore, it can be concluded that the overall rating of teachers' competency for this school year is in very satisfactory level. Yet, it is worthy to note that there are two teachers whose competency is in outstanding level in the same year. With this, the study reveals that almost all of the teacher-respondents have manifested very satisfactory performance for the past three years. In fact, it is worth noting that there were three teachers who have shown outstanding teaching performance based from the PES. Moreover, teachers' competence connotes the quality of teaching-learning process. Competence is

teacher's appeal to students in the class. The importance of a competent teacher in the educational process is indeed indisputable. That is why qualified and competent teachers are necessary so that students may be able to receive quality education from educational institutions life (Anbuthasan and Balakrishnan, 2013). Thus, for learning to take place, the learner must be effectively and positively involved in the learning process by the teacher. This statement stresses the significance of the great role of a teacher.

**Table 2. Students' NAT Performance in the Five Subject Areas**

School Year	Subjects	FREQUENCY						Qualitative Index
		Out-standing (96-100)	Very Satisfactory (91-95)	Satisfactory (86-90)	Un-satisfactory (81-85)	Poor (75-80)	Failed (75 below)	
2010-2011	AralingPanlipunan					5	36	Failed
	English					0	41	
	Filipino					7	34	
	Mathematics					0	41	
	Science					0	41	
2012-2013	AralingPanlipunan			2	0	6	29	Failed
	English					2	35	
	Filipino					9	28	
	Mathematics					0	37	
	Science					0	37	
2013-2014	AralingPanlipunan					8	31	Failed
	English					6	33	
	Filipino				1	5	33	
	Mathematics						39	
	Science						39	

Table 2 shows that in 2010-2011, five (5) students in *Araling Panlipunan* (AP) and seven (7) students in Filipino got a Poor performance while most students Failed in the 5 subjects areas. Thus, the overall students' performance in NAT is Failed. Furthermore, in 2012-2013 two (2) students in *Araling Panlipunan* subject got a Satisfactory performance while majority of the students got Poor and Failed Performance in the five subject areas which leads to the overall NAT performance which is Failed. In addition, in 2014-2015 one (1) student got an Unsatisfactory performance in Filipino subject while nineteen (19) students got Poor performance in the subjects *Araling Panlipunan*, Filipino, and English and all of them Failed in Mathematics and Science subjects. With this the overall performance is still Failed.

Based from the above data, the result reveal that the fourth year 4<sup>th</sup> year high school students failed to achieve the passing mark of 75 mean percentage score for the past three years. However, it can also be reflected that in the past 3 years only in the *Araling Panlipunan* subject area in which few students have shown quite good performance. Accordingly, test scores and teaching factor give an indication of how students are performing at a particular school but it does not tell everything since there are still other factors which may have great influenced in students' performance in NAT. According to Victorino (2011) students' NAT performance maybe influenced by different factors such as technology that there is a dominant usage of cell phones and internet among students, most students are not usually involved in extra-curricular activities, media study habits, motivational practices of the family, low economic status of the family, environment, climate, and intelligent quotient of students since they have different foundations of learning. Thus, teacher factor may not be the only factor accountable for students' low performance in NAT.

**Table 3. Correlation Between Teachers' Teaching Competence and Students' NAT Performance**

Variables	Computed r	p-value	Critical t-value	Computed t-value	Decision
Teachers Competency vs. Students' NAT Performance	0.418	.007	1.645	2.9657	Significant

Table 3 result reveals that the computed-r has a p-value of .007 which is greater than the critical value of 1.645 indicates that there is a significant relationship between teachers' teaching competence and students' NAT performance. Thus, the null hypothesis is rejected, meaning that the two variables are inversely correlated. The inverse correlation between the two variables implies that there are still other factors which greatly affect students' low performance in NAT. Lack of review classes and mismatched competencies with the NAT are nearest factors that would result students' low performance. This low performance in NAT calls for remediation in all subject areas to address students learning gaps.

According to Kane and Staiger (2008) student test scores should not be the sole factor to determine teaching competence rather it is just believed that teachers have important role to play in the academic achievement among students. Likewise, this concurs with Zulueta (2009) which states the following factors which may affect students' poor academic performance such as teacher factor, student factor, and school environment factors, socio-economic status of students. Same is true with Barker (2010) who stated that, standardized test scores of students is just one piece of information for school leaders to use, to make judgments about teacher effectiveness, such scores should only be a part of an overall comprehensive evaluation.

## CONCLUSION

The negative correlation between the two variables indicates that students' performance in NAT is not parallel with teacher's competence. The result, implies that there are still other factors that can be associated with student's low performance in NAT. The lack of review classes and mismatching the competencies taught in the classroom with competencies in NAT are near factors to consider.

### Recommendations

The findings of the study direct to the formulation of the following recommendations.

1. The chairperson must consider conducting review and remedial classes for NAT.
2. Competencies in the actual teaching must match with competencies set in NAT.
3. Guidelines and mechanics must be reviewed to evaluate teachers actual teaching competence fairly and honestly.

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# **MASTERY LEVEL AND MENTAL MODELS OF GRADE 8 LEARNERS IN SOLVING ALGEBRAIC EXPRESSIONS TAUGHT UNDER A BLENDED LEARNING MODALITY: TOWARDS A PROPOSED LEARNING INTERVENTION FRAMEWORK**

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## **ABSTRACT**

**This study aimed to describe and associate mastery level with mental models of Grade 8 learners in solving algebraic expressions taught in a blended learning modality. The study also characterized attributes of mental models among the learners. The study utilized the descriptive-correlational research design. Data were gathered using validated researcher-made mastery and open-ended tests administered to 32 Grade 8 learners of Bambang National High School. Only selected learners were subjected to a validated researcher-made four-item paper and pencil test to determine the degree of the attributes of their mental model according to representation and connections, reasoning or proof, communication, and problem solving. Results revealed that the learners have partial mastery level and have a synthetic mental model when solving algebraic expressions problems. The results exposed that learners with little to partial mastery and with initial to synthetic mental models exhibited confusion on determining degrees of terms, on translating phrases to mathematical symbols, and on understanding the meaning of a constant in the given algebraic expressions. Moreover, the learners' mastery level and mental models in solving problems involving algebraic expressions have a slight positive correlation but non-significant. Thus, this study proposed a learning intervention framework for Grade 7 learners to be exposed to both modular and online learning, in expressing and in explaining their answers, allowing them to rephrase or state basic rules on algebraic expressions by letting them provide their own examples and by exposing them to meaningful problem applications observed in real-life situations.**

*Keywords: constructivism, errors and misconceptions, mathematics education, modular and online learning, problem solving*

## **INTRODUCTION**

Mastery of mathematics is necessary for every individual as well as for every nation because mathematics plays a vital part in everyday life. However, providing a fair, enjoyable, and meaningful mathematics instruction, a problem faced by teachers in other subject areas too, especially during the pandemic is fraught with difficulties. The COVID-19 global pandemic had a significant impact on schooling around the world, resulting in unusual conditions that needed quick reactions (Chirinda et al. 2021). Many policies have been put in place in each institution to ensure that learning continues. International and national studies done early in 2020 found that teachers were worried when negotiating these changes and were concerned that pupils' academic and social requirements were not being satisfied (Hamilton et al., 2020). To address the current challenges in education brought by the COVID-19 pandemic, the Philippine's Department of Education issued DO No. 12, s. 2020 indicating the need to adopt the Basic Edu-

cation – Learning Continuity Plan (BE-LCP) for school year 2020-2021 which emphasized that learning opportunities be given to students through the blended distance learning modality until prohibition for face-to-face learning will be lifted (DepEd, 2020). Blended learning is a type of learning delivery method that combines two or more alternative learning modalities such as online distance learning, modular distance learning, and TV/Radio-based Instruction (DepEd, 2021). The modules will be the major source of content delivery in the blended learning modality. These modules shall allow learners to study independently. In the blended learning delivery modality, independent learning plays a significant role. Some research found a negative difference in the achievement of students who used a blended learning approach (Adams et al., 2015; Powers et al., 2016). According to Powers et al. (2016), the negative outcome was due to the difficulty of the concepts being dealt with independently by the students.

For these reasons, misconceptions may arise through blended learning approach. In addition, it is common among students of all grade levels to have misconceptions regarding various concepts in mathematics. Ay (2017) stated that misconceptions have been determined as one of the most important barriers in learning mathematics. Further, Chen (2019) reiterated that misconceptions have a huge impact on the learning performance of students and is considered to be the key reason for the low mastery level of students. But a sad reality is undeniable. Many educational institutions throughout the Philippines annually produce graduates who are mathematically unprepared or has low mastery level (Estonanto et al., 2017). In the Philippines, the general conclusions of the memorandum for the National Achievement Test (NAT) results and analysis stated that the Grade 10 learners obtained an average mastery level index in all tested learning areas except for mathematics in which had a low mastery level (DepEd, 2018). Furthermore, the percentage distribution of the region 02 Grade 10 test takers revealed that no examinee is noted to be highly proficient in mathematics, just 1.78% are proficient, and about 98% do not fall under the proficiency level in mathematics (DepEd, 2018). These data manifest a big challenge to the mathematics educators especially that general finding in the 2018 NAT result indicates that there is an urgent need for additional intervention programs and activities to improve learners' performance.

Hence, it is important for a teacher to assess teaching and learning in the classroom and strive to discover the issues and mistakes that students frequently make (Daud & Ayub, 2019). In example, some researchers have found that students have errors and misconceptions about algebraic expressions (Aydin-Guc & Aygun, 2021; Tavsan, 2020; Simsek & Soylu, 2018; Ural, 2016; Daud & Ayub, 2019). Aydin-Guc and Aygun (2021) noted that the most common misconception was that minus at the beginning of algebraic expression has no meaning. While Tavsan (2020) disclosed that students make the mistake of ignoring parentheses while interpreting algebraic expressions and writing them in mathematical sentence. Similarly, some learners do not regard the parenthesis when translating phrases into algebraic expression (Simsek & Soylu, 2018). It was also shown that students struggle with operations of algebraic expressions and building relationships between variables and word problems (Ural, 2016). Based on the salient findings of the study of Ural (2016), the causes of mistakes within the scope of algebraic expressions are: putting variable and fixed terms into operation separately and equalizing the results; doing operations for coefficients only by ignoring the variable; getting a solution by assigning a value to the variable; digitizing the algebraic expression by assigning a value to the variable in the solution obtained; failure to pay attention to the use of parenthesis; failure to attribute a meaning to  $x$  in a geometrical shape; and errors in arithmetic operations in the algebraic expressions. Students also make errors when it comes to process skills in performing operations with algebraic expressions, such as when they solve  $2(x + 5y)$  as  $2x + 5xy$  or as  $2x + 5y$  (Daud & Ayub, 2019). In addition, Daud and Ayub (2019) discovered that students' errors in algebraic expressions are caused by their inability to determine the most significant common factor, cross-sectional processes, and a lack of understanding of fractions and negative integers.

Indeed, students' difficulties in previous mathematics classes cause issues in future mathematics sessions. Along this line, it can be conceived that students' poor performance in higher mathematics can be influenced by their performance in basic concepts of Algebra such as algebraic expressions. This topic, according to Torio (2015), serves as the basic foundation in solving other mathematics problems such as in geometry, trigonometry, and statistics and probability. Thus, there is a need to attain its mastery to ensure progressive learning. As reflected in K to 12 mathematics curriculum, algebraic expressions is one of the most essential algebra topics in Grade 7. The following specific skills and processes are to be honed as well: representation and connections, reasoning, communication, and problem-solving (DepEd, 2016). As per SEI & MATHTED (2011), critical and analytical thinking encompass these specific skills

and processes. In illustration, a person who thinks critically and analytically is: often successful in problem solving; able to communicate mathematical ideas using the precise language of mathematics; able to make reasonable and logical statements; and able to extend thinking in order to connect mathematical ideas to other areas of study or aspects of life. Scusa (2008) posited that these are the specific skills and processes of mathematical thinking needed to achieve better learning performance in mathematics.

In the context of constructivism theory, generally attributed to Jean Piaget, the process of how the students solve the problem is very important. Al-huneidi & Schreurs (2012) noted that the role of the teacher in constructivism is to try to understand how students interpret knowledge and to guide and help them to refine their understanding and interpretations to correct any misconception arising among students at an early stage and improve learned knowledge quality. Hence, as educators, teachers must understand the underlying causes of the misconceptions and take steps to ensure more efficient learning environments (Ojose, 2015).

It is vital that teachers understand students' existing knowledge in order to better provide learning concepts, and one way to assess student's existing knowledge is through mental models. According to Prayekti et al. (2020), a mental model is an internal representation that can depict a student's knowledge structure and explain how the problem-solving process is carried out. This is also an important aspect of teaching because mental models play an important part in explaining individual reasoning when seeking to understand or explain a concept (Fazio et al. 2013). DiSessa and Wagner (2005) defined it as the ability of students to know a reason in drafting a knowledge, and to explicitly explain the alleged knowledge. Chittleborough (2004) posited that mental model is essential for making predictions and solving problems. Accordingly, when students have a full mental model, students will be able to make a good explanation of the resolution of a problem. But when students have wrong or a mental model that is not intact, then they will have difficulty solving the problem. There is even a possibility of learners having misconceptions that hinder them to learn concepts. As such, there really is a need to develop and build wholly students' mental model. Moreover, as explained by Prayekti et al. (2020), students have an initial mental model when their framework is still preliminary knowledge; students have a synthetic mental model when the student framework formed is the product of the synthesis of various ideas; and students have a formal mental model when students successfully rebuild or reorganize their theory of framework and accommodate new information to reflect a good knowledge or understanding in accordance with formal mathematical rules.

Further, students' way of thinking are manifestations and attributes of their mental model. Several researches already discussed their connections (Senge, 2004; Solaz-Portoles & Lopez, 2007; Wang, 2007). Senge (2004) described mental model as a person's internal image of thinking and the image that limits a person to action. Meanwhile, Solaz-Portoles and Lopez (2007) explained that mental model is used to explain the individual reasoning process in solving the problem of syllogism. Making it relevant to the present time, learners have to be evaluated in terms of their mental models by focusing on the conceptual aspects (Wang, 2007). For such reason, teachers might determine sources of understanding the concepts and likewise, elicit factors affecting their learning.

Such concepts are used by researchers to explore and to develop the level of students' mental models in understanding various concepts in the fields of mathematics and science. Bofferding (2014) revealed that students' mental models about sequence and integer values can be categorized into five forms: initial mental model, transition mental model I, synthetic mental model, transition mental model II, and formal mental model. Meanwhile, Haili et al. (2017) described students' mental models in physics and categorized the models into three, namely, low mental model, medium mental model, and high mental model. Prayekti et al. (2019) found that in solving patterns generalization problems, students work under two types of mental models: direct and indirect mental models. In 2020, Prayekti et al. also investigated a wide range of students' mental models of number patterns. Their study showed that there are four types of mental models in solving the problem of number patterns: formal direct mental model, formal indirect mental model, synthetic direct mental model, and synthetic indirect mental model. Consequently, research on mental models emphasize the need for teachers to take into account students' mental models in solving mathematics problem to help them achieve better learning (Prayekti et al., 2019). In addition, Chiras (2008) elaborated that the mathematical achievement of students is an excellent predictor of the quality of their mental models.

In light of the above discussion, the researcher intended to study more deeply the mental models and mastery levels of Grade 8 learners who were taught in a blended learning environment.

## STATEMENT OF OBJECTIVES

The general objective of the study is to describe and associate mastery level with mental models of Grade 8 learners in solving algebraic expressions taught in a blended learning environment during the pandemic, a new education setting, as well as to further characterize attributes of mental models among the learners. The expected output of this study is a learning intervention framework for Grade 7 learners in solving algebraic expressions. Specifically, the objectives of the study are as follows:

1. Describe the mastery level of Grade 8 learners in solving problems involving algebraic expressions;
2. Identify and classify the mental models of learners in solving problems involving algebraic expressions;
3. Determine the degree of the attributes of the mental model in terms of representation and connections, reasoning, communication, and problem solving;
4. Determine if mastery level and mental models of Grade 8 learners in solving problems involving algebraic expressions are significantly associated; and,
5. Propose a learning intervention framework for Grade 7 learners in understanding algebraic expressions.

## METHODOLOGY

### Design

This study used the descriptive-correlational research design in describing and determining the association of mastery level and mental models of Grade 8 learners in solving algebraic expressions. The mastery level of the learners was determined using a validated researcher-made mastery test. To identify and classify the learners' mental models in solving algebraic expressions, the researcher made use of validated researcher-made open-ended test. Accordingly, only selected learners were subjected to a validated researcher-made four-item paper and pencil test to characterize attributes of their mental model according to representation and connections, reasoning or proof, communication, and problem solving.

### Locale

This study was conducted at Nueva Vizcaya General Comprehensive High School (NVGCHS) and Bambang National High School (BNHS) from March 2022 to May 2022. These are secondary schools in the Schools Division of Nueva Vizcaya, with NVGCHS having the largest population in the northern district of SDO Nueva Vizcaya and BNHS having the largest population in the southern district of SDO Nueva Vizcaya. Currently, these selected schools provide blended –learning education that allows learners to learn remotely. For school year 2021-2022, NVGCHS and BNHS have used blended learning modality through the use of synchronous online teaching and self-learning modules. Synchronous online teaching includes a live-streamed lecture that learners attend virtually. The teacher and learners use web and videoconferencing technologies such as Google Meet or Zoom to create learning spaces. Furthermore, blended learning modality is reflected in the Basic Education Learning and Continuity Plan of the school in response to distance learning implemented due to the pandemic.

### Samples and Sampling Procedures

The participants of the study were the Grade 8 learners of the selected schools enrolled for the school year 2021-2022. They were selected since this grade level are expected to have met the learning competencies for algebraic expressions in the previous school year 2020-2021, as reflected in the K to 12 Curriculum. The participants were all Grade 8 learners from all science sections at NVGCHS and BNHS who are involved in the blended learning modality. The schools selected are among the big schools in the division, and the reason for choosing a learner from this school was to determine the overall level of learners' mental model.

Grade 8 learners of NVGCHS who had used blended learning modality served as the try-out sample for the item and reliability analyses of the mastery test in algebraic expressions. From the three science sections, a total of 85 learners volunteered to take part in the pilot testing. However, Grade 8 learners of BNHS served as participants in the conduct of the tests and interviews to describe and associate mastery level and mental models of learners in solving algebraic expressions taught in a blended learning environment during the pandemic which offered a new education setting. After the administration of the in-

formed consent form, 32 out of 72 Grade 8 learners volunteered to participate in the study and completed the activity.

For the four-item paper and pencil test, purposive sampling was employed. Based on the results of the open-ended test and mastery level, 5 participants with no or little mastery and with initial to synthetic mental model, 5 participants with partial mastery and with synthetic to formal mental model, and 5 participants with meet expectations or advanced mastery and with synthetic to formal mental model, were subjected to four-item paper and pencil test and their answers were utilized in determining the degree of the attributes of their mental models in terms of representation and connections, reasoning, communication, and problem solving. Subsequently, a follow-up interview was conducted to selected participants with vague answers to elicit meaning from their solutions or responses.

### **Data Treatment**

In treating the gathered data, the following tools and techniques were used:

1. Computation of mean percent scores (MPS) was used to describe the learners' mastery level on algebraic expressions. It was presented in the form of tables with the appropriate statistics (frequency count, percent, and mean);
2. The validated researcher-made rubric for the 10-item open-ended test was used in identifying and classifying the learners' mental models on algebraic expressions. The rubric was made based on the three categories in describing the learners' mental models from a concept - initial, synthetic, and formal - cited by Prayekti et al. (2020). On the other hand, analysis of the level of learners' mental model was obtained through the computation of MPS. It was also presented in the form of tables with the appropriate statistics (frequency count, percent, and mean). Sample solutions in the open-ended test along with the three mental models were also presented;
3. A tool adopted from Scusa (2008) was used to determine the degree of the attributes of the mental model in terms of representation and connections, reasoning, communication, and problem solving. Attributes were characterized as high, moderate, or low depending on their ability to respond or answer the given four-item paper and pencil test. The overall characterized degree of mental model attributes from the three groups of the participants were agreed upon by the inter-raters;
4. Pearson r correlation was used to measure the strength of association between the mastery level and mental models of the learners; and
5. The results of the mastery level and mental models of Grade 8 learners were used as the reference in the development of a learning intervention framework ready for use by teachers in teaching algebraic expressions to Grade 7 learners.

### **Ethical Considerations**

Upon the approval of the thesis adviser and panel members, this study was submitted for approval to the Saint Mary's University Research Ethics Board (SMUREB) at Saint Mary's University, Ponce Street, DMM, Bayombong, Nueva Vizcaya with email: reb@smu.edu.ph.

The researcher affirms that there is no conflict of interest in this study, and confidentiality does not appear to be an issue. The researcher made sure that no one else had access to data once the data in the study had been collected. After the study is completed and finally bound in a book, all the data collected from the learners will be deleted for good. Before the test administration, the participants were informed about the nature and purpose of the study, the plans for using the tests and for conduct of the interview, and the protocols observed to protect their anonymity. Since the study included minors, the learners were asked to fill out the assent form/certificate of consent, which was duly signed by their parent or guardian. Only learners who volunteered to participate in the study were asked to complete the activity. To address the vulnerability of Grade 8 learners as respondents, they were supervised while answering test questions by their teacher, parent, or guardian.

This study was funded by the Department of Science and Technology – Science Education Institute (DOST-SEI) through the Capacity Building Program in Science and Mathematics Education (CBPSME).

## FINDINGS

### A. Learners' Mastery Level on Algebraic Expressions

**Table 1. Frequency Count and Percent of Grade 8 Learners' Level of Mastery on Algebraic Expressions**

Range of the percent scores	Frequency	Percent	Level
90-100	5	15.625	Advanced
80-89.99	4	12.5	Meet Expectations
60-79.99	10	31.25	Partial Mastery
40-59.99	8	25	Little Mastery
0-39.99	5	15.625	No Mastery
Total	32	100	
Overall	Mean Percent Score: 62.81 Level: Partial Mastery		

Disclosing the results of the mastery test on algebraic expressions as presented in Table 1, most of the learners or 10 of them (31.25%) garnered percent scores between 60-79.99 which is qualitatively described as *partial mastery*, with a slight difference with 8 learners (25%) who obtained *little mastery*. Notable, however, in the findings, is that 5 or 15.625% of the learners performed with no mastery on algebraic expressions, while 9 or 28.125% of the learners attained percent scores between 80-100 or qualitatively categorized as *advanced* or *meet expectations*. Observing the overall mean, the results show that learners generally have *partial mastery* on algebraic expressions with a mean percent score of 62.81. This implies that the learners demonstrate partial understanding of the learning goal or can perform portions of the performance expectation with assistance. Likewise, they need the necessary intervening support in order to properly develop mastery and meet the learning objective.

**Table 2. Mean Percent Scores and Mastery Level in each Learning Competencies on Algebraic Expressions**

Learning competencies	MPS	Mastery level
1. Translates English phrases to mathematical phrases and English sentences to mathematics sentences, and vice versa.	66.25	Partial Mastery
2. Illustrates and differentiates related terms in algebra.	67.5	Partial Mastery
3. Evaluates algebraic expressions for given values of the variables. (M7AL-11c-4)	58.59	Little Mastery
4. Adds and subtracts polynomials. (M7AL-11d-2)	71.88	Partial Mastery
5. Derives the laws of exponent. (M7AL-11d-e-1)	56.25	Little Mastery
6. Multiplies and divides polynomials. (M7AL-11e-2)	66.67	Partial Mastery
7. Uses models and algebraic methods to find the: (a) product of two binomials; (b) product of the sum and difference of two terms; (c) square of a binomial; (d) cube of a binomial; (e) product of a binomial and a trinomial. (M7AL-11e-g-1)	55.31	Little Mastery

*Legend: 0-39.99% (No Mastery); 40-59.99% (Little Mastery); 60-79.99% (Partial Mastery); 80-89.99% (Meet Expectations); 90-100% (Advanced)*

Learners' mastery level ranges from little mastery to partial mastery as gleaned from Table 2. Learners have little mastery in evaluating algebraic expressions, deriving the laws of exponent, and finding special products of polynomials. This implies that the learners are having difficulties understanding the aforementioned competencies. This finding corroborates Marpa's (2019) findings, revealed that algebraic expressions are difficult for students to understand. Teachers should, thus, provide enough time to allow the learners develop their mastery of the basic concepts as it may lead to another concern if not properly addressed (Pondalis, 2011). Furthermore, their mathematics performance across algebraic expressions did not meet expectations (75% and below) based on DepEd Order No. 8, s. 2015. Within this level, the respondents need necessary intervention to increase their mathematics performance and meet the desired standard or mastery level of being at least within the level of meet expectations or advanced.

The following are some examples of items where learners were found to have little mastery:

For question 13, Evaluate the expression  $(10b^2 - 12d + 56)$  if  $a = -1$ ,  $b = 2$ ,  $c = \frac{1}{4}$ , and  $d = 8$ , almost half of the learners or 15 of them (46.88%) answered -2, -1, or 1 instead of the correct answer which is 0 chosen by a little more than half (53.13%). This implies that almost half of the learners replaced the given numbers for each variable incorrectly or became confused while performing the arithmetic operations. This lends support to Ural's (2016) study which discovered that the most common causes were failure to assign a meaning to the unknown and hence performing operations by assigning a value to the unknown. In other words, inability to grasp the core idea of algebraic expressions, such as the concept of variable and the concept of algebraic expression incorporating variables, could be cited as a primary factor in difficulty in algebra.

For question 23, Evaluate the expression  $x^0y^4$  using zero exponent rule, more than half of the learners (53.13%) forgot or were not aware of the zero-exponent rule, which states that any non-zero number raised to the zero power always gives a one. A little less than half of the learners or 15 of them (46.88%) answered  $xy^4$ , which is incorrect, believing that  $x^0$  is equal to  $x$ . Two learners, who answered  $x^4$  and  $y^4$ , assumed that the expression  $x^0y^4$  was the same as  $x^4$  or  $x^4y$ , which is also incorrect. However, fifteen learners (46.88%) successfully evaluated the expression using the zero exponent rule and chose  $y^4$ .

For question 40, To find the product of the \_\_\_\_\_, multiply the first terms and multiply the last terms, there were only ten learners (31.25%) who answered item number 40 correctly whereas almost 70% of the learners were confused or unaware of the methods for finding the product of the sum and difference of two terms. This means that the learners did not acquire mastery of learning competency 7. This could also imply that much difficulty could be experienced by learners when topics with this learning competency are taught.

## B. Learners' Mental Model on Algebraic Expressions

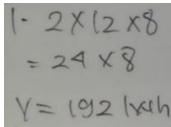
**Table 3. Frequency Count and Percent of Grade 8 Learners' Level of Mental Model on Algebraic Expressions**

Range of the percent scores	Frequency	Percent	Level
70-100	5	15.625	Formal Mental Model
35-69.99	22	68.75	Synthetic Mental Model
0-34.99	5	15.625	Initial Mental Model
Total	32	100	
Overall	Mean Percent Score: 50.94 Level: Synthetic Mental Model		

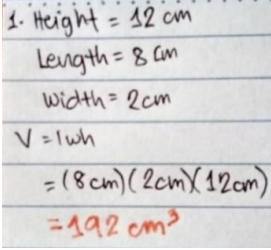
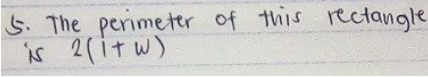
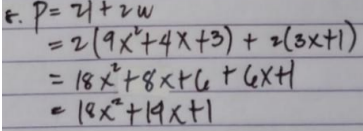
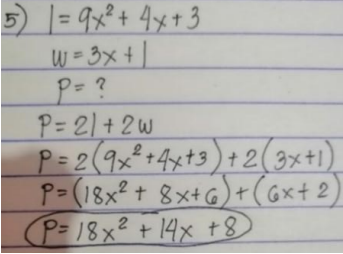
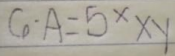
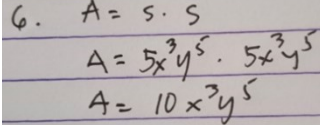
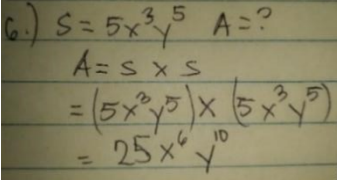
The table reflects that approximately 70% of learners have a *synthetic mental model*, with a percent score ranging from 35-69.99. Trailing are the learners who were classified to have *initial* and *formal mental models* with a little less than 16% each, with percent scores ranging from 0-34.99 and 70-100, respectively. Investigating the mental models of the learners as unveiled in Table 3, the respondents attained a mean percent score of 50.94, qualitatively described as *synthetic mental model*. It can be said, therefore, that learners may have understanding of some concepts but errors and misconceptions prevailed in dealing with algebraic expressions.

The next tables show the Grade 8 learners' sample solutions in the open-ended test along with the three mental models.

**Table 4. Sample Solutions to Problem Numbers 1, 5, and 6 along with the Three Mental Models**

Mathematical Task	Sample Solutions	Level
1. If the height ( $h$ ) of a rectangular box is 12cm, the length ( $l$ ) is 8cm and the width ( $w$ ) is 2cm, what is its volume? The formula for the volume of a box is $V = lwh$ .	 <p>Jessa's Answer</p>	Synthetic Mental Model


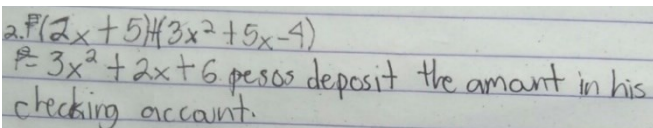
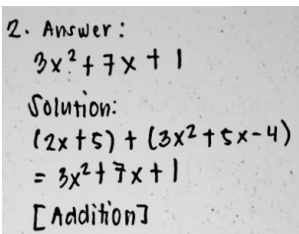
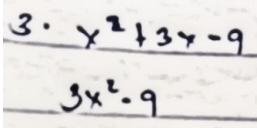
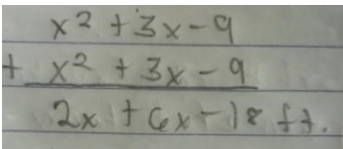
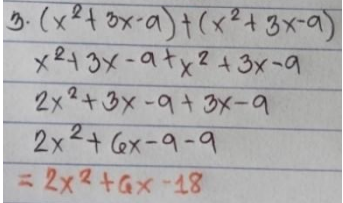


<p>1. If the height (<math>h</math>) of a rectangular box is 12cm, the length (<math>l</math>) is 8cm and the width (<math>w</math>) is 2cm, what is its volume? The formula for the volume of a box is <math>V = lwh</math>.</p>	 <p>John's Answer</p>	<p>Formal Mental Model</p>
<p>5. If the length (<math>l</math>) of a rectangle in terms of <math>x</math> is <math>9x^2 + 4x + 3</math> and its width (<math>w</math>) is <math>3x + 1</math>, what is the perimeter of this rectangle? The formula for the perimeter of a rectangle is <math>P = 2l + 2w</math>.</p>	 <p>Mae's Answer</p>	<p>Initial Mental Model</p>
	 <p>Tina's Answer</p>	<p>Synthetic Mental Model</p>
	 <p>Rizza's Answer</p>	<p>Formal Mental Model</p>
<p>6. A square has a side measuring <math>5x^3y^5</math>, what is its area? The formula for the area of a square is <math>A = s \cdot s</math>.</p>	 <p>Kevin's Answer</p>	<p>Initial Mental Model</p>
	 <p>Anna's Answer</p>	<p>Synthetic Mental Model</p>
	 <p>Nalene's Answer</p>	<p>Formal Mental Model</p>

It can be gleaned that, in problem numbers 1, 5, and 6, learners were tasked to solve problems involving algebraic expressions applied to the volume of a box, perimeter of a rectangle, and area of a square, respectively. None of the learners obtained an initial mental model for problem number 1. This means that the learners were able to replace the variables in the formula  $V = lwh$  with the values that are assigned to them. However, Jessa's answer did not provide the correct unit of final answer. This solution demonstrates a synthetic mental model for problem number 1. In the case of Tina and Anna's solution, they made mistakes when performing the operations. In problem number 6, Anna was able to replace the variable in the formula  $A = s \cdot s$  with values assigned to them, but neglected the rules in performing the operations. It demonstrates that Anna exhibited error in operation. Instead of multiplying  $5x^3y^5$  and  $5x^3y^5$ , she added  $5x^3y^5$  and  $5x^3y^5$ , yielding  $10x^3y^5$ , which is incorrect. Meanwhile, in problem

number 5, Tina was successful in replacing the values assigned to the rectangle's length and width, as well as in performing  $2(9x^2 + 4x + 3)$ . It proves that Tina has a good understanding about multiplying a constant by a polynomial. However, carelessness occurred when multiplying 2 by  $3x + 1$ . The product should be  $6x + 2$  instead of  $6x + 1$ . The same error was discovered by Luka (2013), who described it as a misinterpretation of distributive law. Students simplified  $4(x + 3)$  as  $4x + 3$ . Students overlooked the parentheses and worked from left to right. These are evidences that Tina and Anna have a synthetic mental model for the particular problem. Moreover, as shown also in the table, Mae and Kevin obtained an initial mental model for problem numbers 5 and 6, respectively. It clearly shows that these learners have no idea on how to evaluate algebraic expressions for given values of the variables. Meanwhile, John, Rizza, and Nalene were able to replace the variables in the formula with the values that are assigned to them and correctly simplified the expressions. These are manifestations that the learners have a formal mental model for problem numbers 1, 5, and 6, respectively.

**Table 5. Sample Solutions to Problem Numbers 2 and 3 along with the Three Mental Models**

Mathematical Task	Sample Solutions	Level
<p>2. Jimmy has <math>2x + 5</math> pesos in his checking account. He received a check of <math>3x^2 + 5x - 4</math> pesos and decided to deposit the amount in his checking account. How much money does he have in his account after the deposit?</p>	 Rizza's Answer	Initial Mental Model
	 James' Answer	Synthetic Mental Model
	 Mae's Answer	Formal Mental Model
<p>3. The twin towers in Rockwell measures <math>x^2 + 3x - 9</math> feet high. If you could put the two towers together, how high up in heaven will the two towers reach?</p>	 Ivan's Answer	Initial Mental Model
	 Carl's Answer	Synthetic Mental Model
	 John's Answer	Formal Mental Model

The table shows that Kevin and Ivan's answers demonstrated an initial mental model when tasked with solving problems involving the addition of polynomials. In problem number 3, Ivan's answer to the computed height of the towers was incorrect. Meanwhile, Rizza placed a question mark for her answer to problem number 2. It can be seen also from the table that James was incorrect in solving problem number 2. He was right that he added the two amounts given in the problem, but he committed errors while performing the operations. It seems that there is a confusion about adding algebraic expressions. He added  $2x$  and  $5x$  as  $2x$  and  $5$  and  $-4$  as  $6$ , which are both incorrect. A similar problem is shown in Carl's answer. Carl also used a correct operation, which is addition, to determine the height of the tower if it was put together, but he committed mistakes while performing the operations. It demonstrates Carl's carelessness in adding the first terms. The procedure could have already been correct, but carelessness prevailed when adding  $x^2$  by  $x^2$ . The sum is supposed to be  $2x^2$ , not  $2x$ . These responses are classified as synthetic mental model. This agrees with Aydin-Guc and Aygun (2021) who said that students exhibit numerous errors and misconceptions about algebraic expressions. Further, Mae and John have formal mental model for problem numbers 2 and 3, respectively. This tells that these learners were able to add polynomials.

Subsequently, learners were also tasked to solve problems involving subtraction of polynomials (problem number 4): *A submarine was at  $6x^2 + 8x - 4$  feet below sea level. If it descended  $4x^2 - 4x + 2$  feet further, what is its new position?* Some learners were classified as initial mental model since the operation addition was used to represent the new position of the submarine, which is incorrect. It clearly shows that the term descended was misunderstood by the learners. However, some learners were also classified as synthetic mental model because a correct operation, subtraction, was used in identifying the submarine's new position, but the operations were performed incorrectly. In example, Mae simplified  $(4x^2 - 4x + 2)$  as  $2$ , resulting in an incorrect answer. On the other hand, learners with a formal mental model of this problem have perfectly subtracted the polynomials, yielding a result of  $2x^2 + 12x - 6$ .

### **C. Learners' degree of representation and connections, reasoning or proof, communication and problem solving as attributes of their mental model.**

When learners with advanced mastery or meet expectations and mental model from synthetic to formal were tasked to solve problems which is focused on basic concepts of algebraic expressions (problem 1) and applied to the perimeter of a rectangle (problem 2), five learners (100%) possessed high representation and connections, reasoning or proof, and communication. These learners were able to provide detailed representations about the concepts. These learners were also able to provide sound arguments to support their answers and they were able to use mathematical language and symbol to communicate and explain their ideas. Further, these learners were tasked to work on algebraic expressions applied to problem solving such as on evaluating algebraic expressions (problem 3). Majority of them possessed a moderate level on reasoning or proof, communication and problem solving. However, when the tasks involved translating English phrases to mathematical phrases and vice versa (problem 4), five learners (100%) with advanced mastery or meet expectations and mental model from synthetic to formal tend to have high level of problem solving, but four of them (80%) have moderate level of representation and connections. These tell that learners having advanced mastery and mental model from synthetic to formal could use prior knowledge and application to the particular problem but failed to provide complete connections and representations of mathematical and English phrases.

Whereas, four learners (80%) learners with partial mastery and synthetic to formal mental have moderate degrees of representations and connections and reasoning or proof when they were tasked to work on basic concepts of algebraic expressions (problem 1). This means that these learners have attempted to answer a given problem on algebraic expressions but failed to provide complete structure and reasoning or evidences. However, when the tasks involved problems involving algebraic expressions applied to the perimeter of a rectangle (problem 2), five learners (100%) possessed high reasoning or proof. Further, five learners (100%) have low degree of representation and connections, and problem solving when the tasks involved translating English phrases to mathematical phrases and vice versa (problem 4). This implies that Grade 8 learners with partial mastery and synthetic to formal mental models cannot present or communicate their solutions and they might or might not have a strategy that leads to a solution and have little evidence of connecting with prior tasks and applications of algebraic concepts.

Learners with little or no mastery and with mental models ranging from initial to synthetic also responded to the given problems along algebraic expressions. Learners' mental model attributes along representation and connections, reasoning or proof, communication and problem solving were pegged at low degree. These tell that Grade 8 learners having little or no mastery about algebraic expressions and having initial to synthetic mental models cannot present or communicate their solutions, have incorrect reasoning and have very little evidence of connecting prior tasks and applications. But when tasked to solve problems involving algebraic expressions applied to the perimeter of a rectangle (problem 2), three learners (60%) have a moderate degree of reasoning or proof. This means that these learners have some reasoning and evidence to support their responses or they have made an attempt to support their approaches.

Generally, learners with little to partial mastery and with initial to synthetic mental models who exhibited low degree of representation and connections, reasoning or proof, communication and problem solving are confused on determining degrees of terms or algebraic expressions in general, on translating phrases to mathematical symbols, and on understanding the meaning of a constant in the given algebraic expressions.

#### D. Association of Mastery Level and Mental Model

**Table 6. Association of Learners' Mastery Level and Mental Model on Algebraic Expressions**

		Mental Model
Mastery Level	Pearson Correlation	.274
	Sig. (2-tailed)	.130
	N	32

As shown in Table 6, with  $r=0.274$ , it can be said that there is a slightly positive correlation. This means that the higher the level of mastery, the higher the level of mental model. This agrees with Chiras (2008) who elaborated that the mathematical achievement of student is an excellent predictor of the quality of their mental models. This is also supported by previous research that has been conducted by several researchers who concluded that teachers are required to take into account students' mental models in solving mathematics problems to achieve a better learning process (Bofferding, 2014; Haili et al., 2017; Prayekti et al., 2019; Prayekti et al., 2020). The success of learning depends on the learners' mental model (Prayekti et al., 2020).

However, with  $p>0.05$ , the mastery level is not significantly associated with mental models of Grade 8 learners in solving problems involving algebraic expressions taught under a blended learning modality. Thus, the revealed positive correlation insufficiently means that the learners with advanced or meet expectations mastery have a formal mental model on algebraic expressions. The not significant association between the learners' mastery level and mental models in this study implies that a demonstration of mastery of certain concepts does not always result in a good mental model. Significantly, learners still make mistakes or have misconceptions when solving problems involving algebraic expressions, despite achieving a high level of mastery. As revealed in this study, some learners with advanced or meet expectations mastery from synthetic to formal mental model solved only a part of the problem and failed to understand the concept of a constant term in the linear expression when tasked to work on algebraic expressions applied to problem solving, such as on evaluating algebraic expressions. Generally, the majority of the learners committed errors when performing operations and struggled with simplifying algebraic expressions.

#### E. Proposed Learning Intervention Framework

Given the difficulties encountered by learners in solving algebraic expressions, a learning intervention framework ready for use by mathematics teachers in teaching algebraic expressions to Grade 7 learners is, therefore, being proposed. The main goal of this learning intervention framework is to improve the mastery level and mental models of the learners in mathematics, particularly in solving problems involving algebraic expressions.

The following table shows the proposed interventions based on the learning competencies on algebraic expressions where learners struggled or committed errors. Specific examples were provided on how to implement the interventions.

Learning Competency	Interventions	Examples
LC 3 LC 5 LC 7	Allow learners to provide their own examples to improve their mastery level.	After an online discussion or independent study in this particular learning competency, have the learner create three examples on their own. And after that, ask guide questions or make helpful suggestions based on their responses, but try to give only minimal assistance and only when necessary to overcome challenges.
	Provide strategic intervention materials.	After assessing learners in these competencies, distribute adopted or developed strategic intervention materials to learners who are unable to demonstrate mastery in order to support students in mastering competencies that were not developed during blended learning. This learning material must focus only on the identified least learned competencies in algebraic expressions.
LC 3 LC 4 LC 5 LC 6	Reteach, provide more examples, and give additional exercises on evaluating and performing operations in algebraic expressions.	Reteach content to students who have previously failed to learn it. If the learner is having difficulty evaluating algebraic expressions for a given value of a variable or performing operations on algebraic expressions, for example, simply show the method to the learner again and provide more examples. Following that, additional exercises will be required to master skills in these specific competencies.
	Organize study and tutorial groups to engage in collaborative problem-solving exercises and activities	Think-Pair-Share is an example of this intervention, which allows learners to communicate and collaborate to understand a concept or solve a problem after they have individually thought about it. For example, give each pair a problem involving algebraic expressions, give them a minute to think about it without talking, have them discuss their solution with their partner, and then, and then have the pairs share with the class.
All learning competencies	Prioritize other students in the limited number of face-to-face classes or conduct online discussion.	In the limited number of face-to-face classes, prioritize learners who cannot demonstrate mastery of these certain learning competencies on algebraic expressions, and it would be beneficial to conduct online discussion at least three times per week.

*LC 1 - translates English phrases to mathematical phrases and English sentences to mathematics sentences, and vice versa.*

*LC 2 - illustrates and differentiates related terms in algebra.*

*LC 3 - evaluates algebraic expressions for given values of the variables. (M7AL-llc-4)*

*LC 4 - adds and subtracts polynomials. (M7AL-lld-2)*

*LC 5 - derives the laws of exponent. (M7AL-lll-e-1)*

*LC 6 - multiplies and divides polynomials. (M7AL-lll-e-2)*

*LC 7 - uses models and algebraic methods to find the: (a) product of two binomials; (b) product of the sum and difference of two terms; (c) square of a binomial; (d) cube of a binomial; (e) product of a binomial and a trinomial. (M7AL-lll-e-g-1)*

## CONCLUSIONS

Based on the findings, the following conclusions are made:

1. Partial mastery implies that the Grade 8 learners did not meet expectations in solving algebraic expressions.
2. The Grade 8 learners' mental models differ across problems involving algebraic expressions. The learners may have understanding of some concepts but errors and misconceptions prevail in dealing with algebraic expressions.
3. Generally, learners exhibit various degrees across levels of mastery and mental model characterizations.
4. The not significant association between the learners' mastery level and mental models in this study implies that a demonstration of mastery of certain concepts does not necessarily lead to a good mental model.
5. The proposed learning intervention framework is seen as relevant to improve the mastery level and mental models of the learners in solving problems involving algebraic expressions.

## RECOMMENDATIONS

Based on the findings and conclusions, the following are further recommended:

1. More innovative teaching and learning activities be planned and implemented to reach out to learners who could hardly cope with the rigors of dealing with mathematics lessons.
2. Expose Grade 8 learners, both in the modular and online learning, in expressing and in explaining their answers, allowing them to rephrase or state basic rules on algebraic expressions by letting them provide their own examples and in exposing them to meaningful problem applications observed in real-life situations.
3. Other relevant factors (e.g. reflective thinking skills, confidence in doing math, attitude towards math, etc.) may be pursued to determine those that truly help develop good mental models in mathematics.
4. Mathematics supervisors and teachers may operationalize the learning intervention framework proposed in this study.
5. Future researchers may endeavor to conduct more research of this kind in a wider scale and scope, particularly on other critical contents of mathematics.

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# MATHEMATICS PERFORMANCE OF INTERMEDIATE PUPILS OF ANONAT ELEMENTARY SCHOOL

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## INTRODUCTION

Mathematics has been at the heart of human culture, philosophy and advancement since the dawn of civilization. We cannot think of our modern society apart from mathematics because mathematics influences every facet of our daily lives. Due to the far reaching effects of mathematics in our world, mathematics education may be one of the most efficient ways to influence betterment of mankind. That is why teachers need to nurture and cultivate the mathematics educational environment for our future generation so that they may become significant part of the solution and advancement of our society (Kerr, 2016).

Mathematics is the very subject that can foster much needed creativity and convergence, and is becoming a core factor in raising national competitiveness. Mathematics is behind everything. The twin goals of mathematics in the basic education levels K-10, are Critical thinking and Problem solving. Critical thinking is the intellectually disciplined process of actively and skin fully conceptualizing, applying, analyzing, synthesizing, and / or evaluating information gathered from, or generated by, observation, experience, reflection, reasoning, or communication, as a guide to belief and action. On the other hand, mathematical problem solving is finding a way around a difficulty, around an obstacle, and finding a solution to a problem that is unknown. These two goals are to be achieved with an organized and rigorous curriculum content, a well- defined, a set of high-level skills and processes, desirable values and attitudes, and appropriate tools, taking into the account the different context of Filipino learners (Imam, 2013).

Therefore, teachers should always be prepared because teaching mathematics from the lower level to higher levels is not any easy task on the part of a mathematics teacher especially with the many innovations of the Philippines. Leahy, et al. (2008), One of the most importance of teaching and learning today which is very challenging is that teaching mathematics to slow learners which is one of the very problem of nowadays specially to the elementary level. As part of the means to improve the achievement level of the slow learners, teachers are encouraged to prepare students to visualize concepts using new innovative technologies and approach during their study time (Jiang, 2014).

According to the study of Quiming, (2013), she concludes in her study that teaching mathematics can be fun if teachers know the strengths and weaknesses of their learners, plan on the learners' needs, set objectives, prepare activities, review the available materials, use variety of methods, techniques strategies and approaches, and conduct periodic assessment on pupil's performance coupled with the administrative and supervisory support extended to teachers by school heads. So a teacher must always be flexible and creative enough to achieve the objectives and goals. Use many methods, techniques, Approaches and strategies in teaching in order to be more effective and more creative in the process of learning.

A study conducted by Bergantinos (2017) cited parent's involvement as directly affective of the student performance. The initial stage of learning is at home, thus parents are the first teachers, they set the initial stage of learning and are the very source of encouragement and support to the student which drive them hard and attain meritorious accomplishments.

Mitized et al., (2005) emphasized the concern of the school towards the whole growth and development of the learners as follows; "schools should provide humane environment that encourage learning and that students are motivated to learn. The designer of the school must remember that school is for learning and that learning takes many forms. Learning to live with others, learning to like yourself and how to learn."

Chapin, et. al (2009) said that five teaching practices for improving the quality of discourse in mathematics classroom (a) ”talks moves” that engage students/ facilitate discussion (b) the art of questioning (c)using student thinking to propel discussion, (d) setting up supportive environments and ( e) orchestrating the discourse.

According to Koeze (2009), “differentiated instruction calls on a teacher to realize that classrooms must be places where teachers pursue the understanding of teaching and learning and to recall daily that no practice is truly best practice unless it works for the individual learner”. In effect, learning must be tailored to the individual student’s need. Student learn differently, for example, there are students who learn effectively by listening (audio), watching (visual), movement (kinesthetic) and tactile (touch or feel) or by using a combination of the mentioned learning styles. It is imperative that educators can categorize student in groups or through providing divergent learning stations that best suits the student style of learning.

Given all these citations, the proponent ventures on the Mathematics performance of the intermediate pupils of Anonat Elementary School. Indeed, this study would be beneficial among the learners, teachers and administrators to cope with the pressing issues related in teaching Mathematics and to propose possible teaching strategies to improve the instruction of Mathematics among the elementary pupils.

## LITERATURE REVIEW

First world countries are known to have quality and effective system of instruction, focusing more on the acquisition of knowledge and skills in Science, Technology and Mathematics which are the competencies these states want their citizens to have. The world of today which leans more and more heavily on science and technology demands more and more mathematical knowledge on the part of its people. So, it is necessary to prepare the child with a strong base of mathematical knowledge of challenges of the modern technological society.

According to the National Policy on Education (1986) states, that “Mathematics should be visualized as the vehicle to train a child to think, reason, analyses and to articulate logically.

The Department of Education’s Curriculum Guide list the following Mathematics 6 learning competencies as covered topics, Number and Number Sense, Measurement, Geometry, Patterns and Algebra, Statistics and Probability. This k to 10 Mathematics Curriculum provides a solid foundation for Mathematics at Grade 11-12 as well as teachers more importantly use this for direction when planning, serves as guides on how instruction should look and provides steps for practice and assessment which provides necessary concepts and life skills needed by Filipino learners as they proceed to the next stage in their life.

In the implementation of Mathematics program, teachers are confronted with problems of various levels which hamper the smooth flow of teaching. This is expected because of several factors affecting the teaching-learning process. These factors are attributed to pupil, teachers, administrator, parent, different learning competencies, instructional materials, methods and techniques, approaches and strategies, evaluative tools, administrative and supervisory supports and many others (Deped Order 13, series 2015).

The dependent variables are the mathematics performance of the intermediate pupils from Grade 4 to Grade 6 of Anonat Elementary School. As expected, at the end of the study, the researcher suggests suited mathematics program in order to improve the performance of the pupils in Mathematics. The dependent and independent variables relationship is shown in Figure 1.

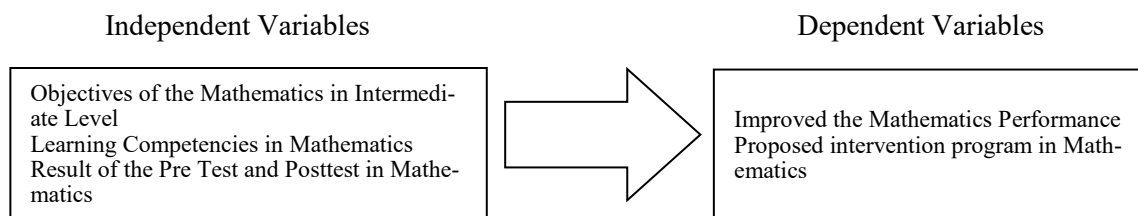


Figure 1. Paradigm of the Study

### Statement of the Problem

Generally, this study aimed to determine the mathematics performance of the intermediate pupils of Anonat Elementary School for the School Year 2019-2020.

Specifically, it sought answers to the following questions:

1. What is the Mathematics performance of the intermediate pupils in pretest?
2. What is the Mathematics performance of the intermediate pupils in posttest?
3. Is there a significance difference between the mathematics performance of the pupils between the pretest and posttest?
4. What action plan could be introduced in order to improve the mathematics performance of the pupils?

### Hypothesis

There is no significance difference between the mathematics performance of the pupils between the pretest and posttest.

## METHODOLOGY

This chapter discusses the different aspects of research method and procedures. They are: research method used, respondents of the study, research instruments used, research procedures used, and statistical treatment of data.

### Research Method

The research study used descriptive-experimental research. Both these research types have their own methods that facilitate the researcher to gain maximum outcomes. Descriptive research aims to obtain data which can be analyzed. According to Orodho (2009), descriptive research is intended to collect data by questioner from a sample of individuals. Given this, the researcher used pre-post test to determine the mathematics performance of the intermediate pupils of Anonat Elementary School

Additionally, descriptive-comparative research was utilized to identify the significant difference between the pre and posttest of the pupils in mathematics. Experimental research refers to research where the researcher manipulates the variable to arrive at conclusions or else to come across findings.

### Research Environment

This study was conducted at Paracelis, Mountain Province. Paracelis is a municipality in the landlocked province of Mountain Province. It is a border town of Mountain Province where it shares borders with Kalinga, Isabela, and Ifugao Provinces. In the north, its borders with the city of Tabuk and the town of Tanudan. In the south it is bordered by Alfonso Lista.

Paracelis was divided into two districts, the Paracelis North District and Paracelis South District. Paracelis South District, where the study was conducted specifically at Anonat Elementary School.

### Respondents

The respondents of the study were the intermediate pupils of Anonat Elementary School, Paracelis South District, Mountain Province. All the official enrollees from Grade 4 to Grade 6 during the School Year 2019-2020 were serves as respondents of the study. Hence, total enumeration technique was used to select the respondents. The distribution of respondents is shown in Table 1.

Table 1. Distribution of Respondents as to Grade Level

Grade Level	Number of Pupils	Percentage
Grade 4	35	36.84
Grade 5	28	29.47
Grade 6	32	33.69
<b>Total</b>	<b>95</b>	<b>100</b>

### Data Gathering Procedures

The study was conducted during the School Year 2019-2020. The researcher asked permission from the Public Schools District Supervisor to conduct the study.

To legalize the conduct of the study, the researcher sent a request letter to address the school principals in order to conduct the study. Moreover, the researcher asked consent from the pupils to administer the pretest and posttest.

The researcher administered the pretest among the intermediate pupils of Anonat Elementary Schools before the beginning of the second quarter. Then, the researcher religiously checked and recorded the obtained scores of the pupils from Grade 4 to Grade 6. After which, at the end of the second quarter, the researcher administered the posttest using the same test instrument. Similarly, the researcher thoroughly checked and recorded the scores of the pupils during the posttest.

Moreover, the data gathered were tabulated, analyzed and interpreted using the appropriate statistical tool.

### Data Gathering Instruments

The standardized pre-posttest material in Mathematics intended for the Grade 4 to Grade 6 were used in this study. The instruments were provided among the pupils during the administration of the pre-posttest.

A validated test in mathematics was administered to the pupils. There was a separate test for Grade 4, 5 and 6. The tests were validated by the Master's teachers based on a Table of Specifications. For Grade 4, the test consists of 40 items and 50 items each for Grades 5 and 6. The scores of the pupils were related to the profile of the pupils.

In order to interpret the scores of the pupils in Mathematics, the National Achievement Test scale for level of mastery was used as shown in Table 2.

**Table 2. National Achievement Test Scale for Level of Mastery**

Mean Percentile Score	Achievement Level
36-40	Mastered
26-35	Closely Approximating Mastery
16-25	Moving Towards Mastery
5-15	Average Mastery
0-4	Absolutely No Mastery

Source: *www.netrc.sysportal, 2010*

### Statistical Treatment of Data

This study used mean to determine the performance of the pupils in Mathematics both pretest and posttest. On the other hand, t-test was used to determine the significant difference of the mathematics performance of the intermediate class.

## RESULTS AND DISCUSSION

### 1. Mathematics Performance of the Intermediate Pupils in Pretest

Table 3 shows the mathematics performance of the pupils during their pretest. It shows that the Grade 4 obtained the mean scores of 24.25 while Grade 5 pupils obtained the mean scores of 22.38. On the other hand, Grade 6 pupils obtained the mean scores of 24.58. It shows that the overall mean of the intermediate pupils in pretest is 23.74. This indicates that the pupils' performance in Mathematics is moving towards mastery.

The result of the study of Ma and Xu (2004) that student's achievement can influence a student's attitude as well. Thus, it is important for teachers to improve student work to make a positive change in their attitude toward mathematics. They obtained low scores of Mathematics because of their negative mathematics insight.

Equally, Hannula (2002) stated that attitudes can change in a short period of time, and sometimes dramatically. Many students, especially those that are younger and less established students, their attitude toward a particular subject is proportional to their recent success in the class.

In relation to the findings and statements of the other authors, the results imply that this is where teachers can have a great impact on the shaping of this attitude: “Teachers can reinforce the idea that mathematics is an interesting subject, used in other disciplines, and is an admission ticket for colleges and careers.” (Anderson, 2007 p. 12).

In addition, when it comes to mathematics attitude, they concluded that motivation is a bigger factor than the home environment. When they looked at instructional environment, the biggest factor affecting the students’ attitude toward mathematics was the teacher’s clarity of presenting the material (Reynolds & Walberg, 2018).

The results imply that the intermediate pupils obtained low scores in Mathematics because of their mathematics disposition. Likewise, an attitude is fairly stable and only minor changes occur based on successes and failures in Mathematics.

**Table 3. Mathematics Performance of the Intermediate Pupils in Pretest**

Pre-Test	Mean	Remarks
Grade 4	24.25	Moving Towards Mastery
Grade 5	22.38	Moving Towards Mastery
Grade 6	24.58	Moving Towards Mastery
<b>Overall Mean</b>	<b>23.74</b>	Moving Towards Mastery

## 2. Mathematics Performance of the Intermediate Pupils in Posttest

Table 4 presents the results of the posttest of the respondents in Mathematics. It shows that their mathematics performance is closely approximating mastery with an overall mean of 27.73. It further shows that Grade 4 obtained the mean score of 27.35 while Grade 5 obtained the mean score of 27.38. On the other hand, Grade 6 obtained the mean score of 28.46. This indicate that their mathematics performance is relatively the same regardless of their grade levels. It shows that they excel in mathematics during their posttest.

The findings corroborate with the study of Gurney (2007) that students obtained excellent performance in mathematics if the strategies in teaching should be considered. This means that effective and efficient teaching methods could help improve student’s performance in mathematics are most desired. Teaching is effective and efficient when students are taught the right content, having enough learning materials and high ratio of teachers’ time on the teaching activity. This requires a teacher to have passion in sharing knowledge with students while motivated with school management system.

In the study of Guay et al. (2010), which aimed to investigate the self-concept of the students, they found that students who have high academic self-concept have higher grades because they are more motivated to perform well in school. However, students who have low self-concept avoid school tasks because they consider these as threats, which led them to have poor performance. This corroborates the findings of the study. They have obtained high scores in posttest because of their self-concept and importance of mathematics in their own life.

In addition, Ajogbeje (2010) investigated the relationship between self-concept and academic achievement of the students using multiple regression analysis. Results uncovered that there was a critical connection between self-concept and Math achievement. It also revealed that moderate self-concept could predict Math achievement. In this case, the mathematics performance of the pupils depends on the self-concept.

The result of the study implies that the mathematics performance of the pupils shows closely approximating mastery. This indicates that they performed well in their mathematics subject. Also, active participation among pupils in mathematics lesson affect their performance. Further, it indicates that pupils have high self-concept needs that could help the respondents develop a positive attitude towards the subject, which can also help in improving the students’ academic performance.

**Table 4. Mathematics Performance of the Intermediate Pupils in Posttest**

Pre-Test	Mean	Remarks
Grade 4	27.35	Closely Approximating Mastery
Grade 5	27.38	Closely Approximating Mastery
Grade 6	28.46	Closely Approximating Mastery
<b>Overall Mean</b>	<b>23.74</b>	<b>Closely Approximating Mastery</b>

### 3. Significance Difference of the Mathematics Performance of the Pupils between the pre-test and post test

Table 5 shows the significance difference of the mathematics performance of the Pupils between the pre-test and post-test. It shows that there was a significant difference of the mathematics performance of the pupils between their pretest and posttest.

In Grade 4, it obtained the negative mean of -3.10, -5.63 t-test with 19 degree of freedom and revealed that there is a significant difference between the pretest and posttest of the pupils with 0.000 significance. This means that the hypothesis is rejected.

On the other hand, the Grade 5 pupils obtained also a negative mean of -5.00, -5.48 for t-test with 12 degree of freedom and revealed that there is a significant difference between the mathematics performance of the pupils between their pretest and posttest while in Grade 6, it revealed that -3.88 negative mean score. It obtained -5.68 t-test with 0.000 significance level. This indicates that the hypothesis is rejected.

The findings corroborate the study of Iheanachor (2007) that teachers were responsible to the learning and experiences. The students might engage everyday as well as setting of educational goals and total personality development. This must be in line with professional development of teachers on content and instruction, which has remarkable effect on student achievement in Mathematics.

Likewise, Suan (2014), as she cited from Hill, Rowan & Ball (2005), and Quimbo (2003), observed that teachers who have mathematical knowledge, good attendance and participate in programs development have the students with good performances in mathematics.

The results implicate that the mathematics performance of the pupils in mathematics influenced with the teaching strategies, motivation, attitudes, resources and environment. This raises an issue that the negative perception of the learners and dispositions of the students affect their mathematics performance.

**Table 5. Significance Difference of the Mathematics Performance of the Pupils between the pre-test and post test**

	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
<b>Grade 4</b> Pre-Test – Post Test	-3.10	2.34	0.52	-4.19	-2.01	-5.93	19	.000
<b>Grade 5</b> Pre-Test – Post Test	-5.00	3.29	0.91	-6.99	-3.01	-5.48	12	.000
<b>Grade 6</b> Pre-Test – Post Test	-3.88	3.34	0.68	-5.29	-2.46	-5.68	23	.000
<b>Overall</b> Pre-Test – Post Test	-3.86	3.04	0.40	-4.67	-3.05	-9.57	56	.000

## CONCLUSIONS AND RECOMMENDATIONS

### Conclusions

Based on the findings of the research study, the following conclusions were drawn:

1. The mathematics performance of the intermediate pupils was moving towards mastery which calls for an issue that the negative perception of the learners and dispositions of the students affect their mathematics performance.
2. The intermediate pupils' performance in their posttest revealed closely moving mastery. Thus, they have acquired enough skills in their mathematics lesson with the initiative of their teachers in introducing varied activities and suited teaching strategies in teaching Mathematics.
3. Significant difference of the mathematics performance of the pupils between their pretest and post-test was evident and manifested. Therefore, there are factors that may affect the performance. Like the teaching strategies, motivation, attitudes, resources and environment.

4. The following strategies in teaching math is proposed to improve the performance of pupils' in math.
  - a. Teachers must prepare worksheets for the pupils.
  - b. Teachers may conduct 30 minute remedial classes in the afternoon before going home.
  - c. Use collaborative learning- game-based teaching and multi-media learning.
  - d. Teachers write their daily reflections
  - e. Problem solving using real life scenes
  - f. Teachers use cut-outs or sticks, straws, bottles, stones & others to teach math.
  - g. Teachers start Math classes with very short exercise or singing or humor. This will remove math anxiety of pupils.
  - h. Conduct pre-test in math to determine the pupil's weakness and strength.

### **Recommendations**

In the light of the findings and conclusions drawn from the results of the study, the DepEd teachers should continue increasing the mathematics performance of the pupils in different schools through the following recommendations in order to address the teaching strategies, motivation, attitudes, resources and environment needed in the improvement of pupil's performance in mathematics.

1. Initiating active learning activities must be introduced to the pupils to increase the performance of the pupils in Mathematics by the mathematics subject teacher.
2. Enrichment activities must be provided among the pupils who excelled in Mathematics while remedial teaching will be provided among the pupils who obtained low performance in Mathematics. Recognitions and incentives must be given to the students who excelled very well in Mathematics from the different grade levels.
3. Learning Action Cell (LAC) sessions and collaborative activities for teachers about teaching strategies in teaching mathematics must be done. The school head shall plan for contingency plan on how to improve the teaching modalities in mathematics despite the health crisis.
4. Proper monitoring and evaluation tool must be designed by the school heads to identify the schools' priorities and needs; proper technical assistance must be provided for teachers. Pupils shall be given priority on how to help them increase their performance in Mathematics.
5. Further studies related to the mathematics performance must be conducted using other variables and other factors that may affect the mathematics dispositions and insights.

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