NUMERACY SKILLS AND ACADEMIC PERFORMANCE IN MATHEMATICS OF GRADE 5 STUDENTS

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MASTER OF ARTS IN EDUCATION

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A P P R O V A L S H E E T

In partial fulfillment of the requirements for the degree in **MASTER OF ARTS IN EDUCATION** major in Educational Management, this thesis entitled **"NUMERACY SKILLS AND ACADEMIC PERFORMANCE IN MATHEMATICS OF GRADE 5 STUDENTS"** has been prepared and submitted by **DOREEN C. ARSENIO** who, having passed the comprehensive examination, is hereby recommended for oral examination.

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DEDICATION

I humbly dedicate this piece of work...

To my beloved Husband and Son,

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For their unfailing love, encouragement and for being an inspiration;

To my beloved parents,

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For their untiring support, provision and assistance.

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A B S T R A C T

Numeracy Skill refers to one's ability to grasp the fundamental concepts of basic operations in Mathematics such as addition, subtraction, division, and multiplication. While numeracy skill development is the progression on the ability of a person to grasp fundamental concepts of basic operations in Mathematics such as addition, subtraction, division, and multiplication. This study considered the level of numeracy skills development of the student-respondents based on the numeracy skills test of the DepEd and numeracy self-assessment scale (NSAS) which were associated with their academic performance. To ensure confidence in the results, appropriate descriptive and inferential tools were utilized. The study revealed that the student-respondents were rated as "moderately numerates" based on the result of the numeracy skills test of the DepEd and they considered themselves "fairly skilled" on their numeracy skills development based on the self-assessment using the NSAS. In looking into the linear association between the numeracy skills of the student-respondents based on the numeracy skills test and their academic performance in Mathematics, it was found significant. Moreover, in looking into the linear association between the numeracy skills of the student-respondents based

on the numeracy self-assessment scale and their academic performance in Mathematics, it was found not significant.

Key Words: Numeracy Skill, Numeracy Skill Development, Mathematics, Anxiety in Mathematics, Academic Performance

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Introduction

A child's first five years are a time of rapid learning and development. In fact, young children can recognize numbers, patterns, and shapes. They likewise use Mathematics concepts to make sense of their world and connect these concepts with their environment and everyday activities. This reflects the necessity to be numerate in order to maximize the academic potential of every individual. Hence, numeracy skills are becoming increasingly more significant and most sought-after elements of students' success.

As a result, a strong numeracy skill lay the foundation for all students to succeed at school and in their daily life. Thus, poor numeracy skills are barriers to academic success as numeracy tests are increasingly becoming a routine part of the teaching and learning process. Numeracy is defined as the knowledge, skills, behaviors, and dispositions that students need to use Mathematics in a wide range of situations. It also involves recognizing and understanding the role of Mathematics in the world and having the dispositions and capacities to use mathematical knowledge and skills purposefully (https://www.kangan.edu.au, 1 May 2021).

Furthermore, numeracy refers to the ability to access,

use and interpret, and communicate mathematical information and ideas, in order to engage in and manage the mathematical demands of various situations in adult years. Numeracy skills are needed to solve problems and make sense of numbers, time, patterns, and shapes for activities like cooking, reading receipts, reading instructions, and even in playing sports (Atweh et al., 2013:185).

Numeracy is closely related to Mathematics because without a solid foundation in mathematical concepts and procedures, there can be no numeracy. However, knowledge of mathematical concepts and procedures per se is not enough to guarantee numeracy. By and large, what Mathematics is taught and how it is taught have important bearing on the development of numeracy of students. In school, numeracy is a fundamental component of learning, discourse, and critique across all areas of the curriculum. It basically involves the disposition to use, in context, a combination of underpinning mathematical concepts and skills from across the discipline like numerical, statistical, and algebraic; mathematical thinking and strategies; general thinking skills; and grounded appreciation of context (Stephens, 2009:2-5).

By nature, different students come to their Mathematics class with varying degrees of preparation which, in turn, could be the result of some factors that impact on the latter. Mathematics curriculum has always focused on the cognitive

outcomes of students in terms of their achievement and skills. Subsequently, the primacy of the cognitive outcomes in Mathematics of the students is emphasized (Chiu & Whitebread, 2011:196-206).

Alongside this idea, the Mathematics curriculum has undergone several reforms from the New Elementary School Curriculum in 1983 to the New Secondary Education Curriculum or the Secondary Education Development Program (SEDP) Curriculum in 1988 to the Refined Basic Education Curriculum (RBEC) in 2002 to, finally, the K to 12 Curriculum by virtue of Republic Act Number 10533 or the Enhanced Basic Education Curriculum (Balagtas et al., 2019:1-14).

With the K to 12 Curriculum, Mathematics adopted the spiral progression approach with the twin goals of critical thinking and problem-solving. However, even with the changes to the curriculum and the twin goals upheld, the goals of the said subject at the basic education level remain more or less the same which are to provide opportunities for individuals to develop skills and attitudes for effective participation in everyday living, and prepare them for further education and the world of work so that they make worthwhile inputs to the society at large (Pascua, 2013:1).

Sadly, Filipino students are still below par in their performance in Mathematics as evidenced by international and local assessments. Filipino 15-year-olds scored 353 average

points, earning it the second to the bottom spot in the 2018 Programme for International Student Assessment (PISA). The score was overwhelming lower than the 489 average points for most member countries of the Organization for Economic Co-Operation and Development (OECD) (https://www.oecd.org, 1 May 2021).

In addition, the Southeast Asian Ministers of Education Association (SEAMEO) and the United Nations Children's Fund (UNICEF) reported through the Southeast Asia Primary Learning Metrics (SEA-PLM) that a modest percentage of Grade 5 children have achieved mathematical literacy skills expected at the end of primary school. This implied that Grade 5 Filipino children are still working toward mastering fundamental mathematical skills such as making calculations (Marquez, 2020:1).

In a local assessment, the available results of the National Achievement Test (NAT) have shown dismal performance in Mathematics of students. As regards the performance of the elementary students in the NAT, the mean percentage score (MPS) of the Grade 6 students was 37.44 in 2016, the weakest performance in the history of NAT. Said result was a downward spiral from the MPS of 39.95 in 2017. Specifically, the data indicated that the Grade 6 students who took the 2016 NAT got less than four correct answers out of every 10 items. This ultimately suggested low mastery in Mathematics of students

(Albano, 2019:1).

According to the Trends in International Mathematics and Science Study (TIMSS) 2019 by the International Association for the Evaluation of Educational Achievement (IEA) (https://www.google.com/amp/s/news.abs-cbn.com, 09 December 2020), the Philippines scored 297 in math and 249 in science which ranks the Philippines last among 58 countries. Accordingly, both scores are lower than how the country fared in 2003, which are 358 in math and 332 in science. The TIMSS makes use of a 4-level scale to interpret students' scores: Advanced International Benchmark (625), High International Benchmark (550), Intermediate International Benchmark (475), and Low International Benchmark (400). In math, only one percent of Filipino students reached the high benchmark, which means only few students apply conceptual understanding to solve problems.

Locally, Catbalogan X District in Schools Division of Catbalogan City has shown better academic performance in Mathematics as shown by the mean percentage scores (MPS) of the different public elementary schools in said district. In Rama Central Elementary School, for instance, the MPS during the First Quarter of School Year 2019-2020 was posted at 74.76 percent, 76.35 percent in the Second Quarter, and 78.28 percent in the Third Quarter. Other schools in the same district posted the following MPS: Cagutsan Elementary School

(ES) has had 74.88 percent in the First Quarter, 76.90 in the Second Quarter, and 78.35 in the Third Quarter; and Buluan ES has had 76.24 in the First Quarter, 78.46 in the Second Quarter, and 80.51 percent in the Third Quarter (District X Consolidated Report for the Three Quarters of School Year 2019-2020).

Moreover, the report also indicated that Cinco ES has had 75.66 percent MPS in the First Quarter, 77.14 percent in the Second Quarter, and 79.28 percent in the Third Quarter; Bagongon ES has had 76.84 in the First Quarter, 78.01 in the Second Quarter, and 79.51 in the Third Quarter; Mombon ES has had 75.78 percent in the First Quarter, 76.89 in the Second Quarter, and 79.28 in the Third Quarter; and Canhawan ES has had 76.15 in the First Quarter, 77.78 in the Second Quarter, and 80.16 in the Third Quarter.

Thus, the aforementioned results were a welcoming relief since they were above the 75 percent lower than the mastery level of 85 percent national standards set by the Department of Education (DepEd). However, based on feedback by some Junior High School teachers, the students registered low numeracy level in the recent conduct of numeracy test in the different Junior High Schools in the Schools Division of Catbalogan City. In fact, in Silanga National High School, there were 15 identified non-numerates in Grade 7 whereas Samar National High School had quite a handful. If these

results in the secondary level have to be taken seriously, then the implication is that there has been something wrong with their numeracy skills development in the elementary level.

Careful consideration must be had that the philosophy behind the numeracy skills test is based on the Department of Education Order Number 73, Series of 2012, also known as the Guidelines on the Assessment and Rating of Learning Outcomes under K to 12 Basic Education Program, which stated that the assessment shall be used as a quality assurance tool to track student progress in the attainment of standards and provide a profiling of students' performance. Hence, the presence of non-numerates in the secondary level might imply the lack of quality assurance in the elementary level when it comes to the development of numeracy skills and the achievement of higher academic performance in Mathematics. For this reason, intervention programs must be given so that every child has better access to quality education (DepEd Order Number 73, Series of 2012).

Based on the division numeracy assessment results for the School Year 2020-2021, 8.57 percent were highly numerate while 75.00 percent were moderately numerate, and 16.43 percent were non-numerate. In contrast, the district numeracy assessment results were posted at 22.86 percent who were highly numerate, 65.00 percent were moderately numerate, and

12.14 percent were non-numerate (DepEd Dashboard, 2021). From the foregoing results, it was evident that there were still incidences of non-numerate among the Grade 5 students and majority of them need improvement in their numeracy skills.

Hence, the researcher is prompted to conduct this study which aims to determine the possibility of a link between the numeracy skills and the academic performance in Mathematics of Grade 5 students in the hope of developing an intervention program to address the gap in numeracy skills development and Mathematics performance of the said students.

Statement of the Problem

This study determined the numeracy skills and academic performance in Mathematics of Grade 5 students in District X of the Schools Division of Catbalogan City, during the School Year 2021-2022.

Specifically, the present research sought answers to the following questions:

1. What is the profile of the student-respondents in terms of the following:

    1.1 age and sex;

    1.2 gross monthly family income;

    1.3 parents' highest educational attainment;

    1.4 parents' occupation;

    1.5 final grade in Mathematics in Grade 4;

1.6 attitude toward Mathematics; and

1.7 anxiety in Mathematics?

2. What is the level of numeracy skills development of the student-respondents based on the following:

2.1 Numeracy Skills Test of the Department of Education (DepEd); and

2.2 Numeracy Self-Assessment Scale (NSAS) of Awofala (2014)?

3. What is the academic performance in Mathematics of the student-respondents based on their mean grades of the First and Second Quarters?

4. Is there a significant relationship between the level of numeracy skills development of the student-respondents based on the numeracy skills test and the following:

4.1 student-related variates; and

4.2 academic performance in Mathematics?

5. Is there a significant relationship between the level of numeracy skills development of the student-respondents based on the numeracy self-assessment scale and the following:

5.1 student-related variates; and

5.2 academic performance in Mathematics?

6. What intervention program in improving the numeracy skills of the student-respondents may be developed based on the findings of this study?

Hypotheses

On the basis of the afore-cited specific problems, the following null hypotheses were tested:

1. There is no significant relationship between the level of numeracy skills development of the student-respondents based on the numeracy skills test and the following:

    1.1 student-related variates; and

    1.2 academic performance in Mathematics.

2. There is no significant relationship between the level of numeracy skills development of the student-respondents based on the numeracy self-assessment scale and the following:

    2.1 student-related variates; and

    2.2 academic performance in Mathematics.

Theoretical Framework

The study focused on the numeracy skills and academic performance in Mathematics of the students. Hence, this study was based on the following theories: Piaget's Cognitive Development Theory, Vygotsky's Constructivist Theory, Gagne's Conditions of Learning Theory, and Problem-Solving Theory by Newell and Simon.

The Cognitive Development Theory formulated by Piaget (1957:32-36) serves as the primary theory that supports the

present research. The said theory elaborates that cognitive development is explained as a process which occurs due to biological maturation and interaction with the environment. The theory further argued that young children think and learn in strikingly different ways compared to adults. Children are born with a very basic mental structure which is genetically-inherited and evolved on which all subsequent learning and knowledge are based. In summary, the theory recognizes that the cognitive development of an individual is a progressive reorganization of mental processes as a result of biological maturation and environmental experience.

Moreover, Piaget proposed that individuals undergo a series of sequential stages of cognitively different levels of intellectual development, namely: Sensory-Motor Stage from age 0 to 2 years, the Pre-Operational Stage from age 2 to 7 years, the Concrete Operational Stage from age 7 to 11 years, and the Formal Operational Stage from age 11 to 16 years. From this theory, students at the elementary level are at the formal operational stage since most of them are 11 years old which is the standard chronological age for Grade 5 students.

At the formal operational stage, learners are able to deal with ideas and think beyond the concrete reality. Thus, learners at this stage of cognitive development develop the ability to solve problems mentally through representations and mental models, coordinate thought processes and deal with

more logical operations aside from those operations at the concrete level, and follow the scientific way of finding solutions to problems or derive conclusions from the given premises of an argument. Hence, they manifest higher-order thinking skills by responding to inquiries logically and making effective decisions (Keating, 1979:211-246).

Moreover, as the students attain formal thought, they are able to apply mental operations not only to concrete objects, but to objects, situations, ideas, and concepts that are not directly perceived. Therefore, Intermediate students, including those in the fifth grade, are presumed to be at this stage of cognitive development, and thus, should be capable of propositional thinking and should mature in their ability to engage in inquiry-based activities in Mathematics. Most importantly, they already possess numeracy skills at this level, and may be prepared for higher level of conceptual understanding, procedural fluency, and strategic competence to have higher level of academic performance in Mathematics.

The Constructivist Theory proposed by Vygotsky (Elliot et al., 2000:256) is the secondary theory that provides solid support to the study. For Vygotsky, people actively construct or make their own knowledge and that reality is determined by the experiences of the learner. The said theory further believes in personal construction of meaning by the learner through experience, and that meaning is influenced by the

interaction of prior knowledge and new events.

The Constructivist Theory of Vygotsky revolves around certain principles. First, knowledge is constructed, rather than innate, or passively absorbed. The central idea of the theory is that human learning is constructed, and that the learners build new knowledge upon the foundation of previous learning. In this respect, the prior knowledge of learners, influence what new or modified knowledge an individual will construct from new learning experiences. Second, learning is an active process which means that learners construct meaning only through active engagement with the world such as through experiments or real-world problem-solving (Driscoll, 2000:39-47).

A third principle of the constructivist learning is that all knowledge is socially-constructed. It means that learning is a social activity, rather than an abstract concept. This implies further that the environment in which children grow up will influence how they think and what they think about. Thus, all teaching and learning is a matter of sharing and negotiating of a socially-constituted knowledge. Fourth, a constructivist classroom believes that all knowledge is personal. This means that same lesson, teaching or activity may result in different learning by each student as their subjective interpretations differ (Fox, 2001:30).

Based on the propositions of Vygotsky, the essence of

constructivism is captured through the development of active and student-centered learning. From this perspective, an ideal Mathematics classroom is where all students have access to high-quality, engaging Mathematics instruction. This means a mathematically-rich curriculum which offers an enabling venue for students to have higher conceptual understanding and procedural fluency in Mathematics, the cornerstone of better academic performance in the subject (National Council of Teachers of Mathematics, 2000:3).

The Conditions of Learning Theory of Gagne (1985:17) serves as a support theory for this study. The said theory describes two different types of conditions in learning, namely: internal and external. The capabilities that already exist in a learner before any new learning begins make up the internal conditions necessary for learning. By contrast, external conditions are the different stimuli that exist outside the learner such as the environment, the teacher, and the learning situations. This means that each new learning situation begins from a different point of prior learning and will consist of a different external situation, depending on the learner and on the learning environment.

Furthermore, Gagne's proposition stressed that when the conditions for learning are supportive of the students' best interests, they can achieve intellectual skills which include knowing how or having procedural knowledge which is required

in Mathematics, and cognitive strategies which meant having certain techniques of thinking, ways of analyzing problems, and having approaches to solving problems which are needed in both Science and Mathematics.

The children's mathematical knowledge at school entry is viewed as the strongest predictor of both later success in Mathematics and success in other academic domains. Hence, the development among children of numeracy skills the earliest possible time is critical. Early numeracy skills encompass several skills such as verbal counting, knowing the number symbols, recognizing quantities, discerning number patterns, comparing numerical magnitudes, and manipulating quantities such as adding, subtracting, dividing, and multiplying some objects from a set (LeFevre et al., 2009:55-66).

However, these numeracy skills are considered to be part of informal mathematical skills since they are acquired prior to or outside of the school setting. Nonetheless, they are critical to the students' academic success in Mathematics which is composed of formal mathematical knowledge acquired through explicit teaching within the school setting. This instance is manifested by the example on counting numbers. In most cases, counting numbers from 0 to 10 is learnt at home with parents as initial teachers. However, operating on these numbers such as adding 0 and 10 is part of formal instruction in Mathematics. Hence, ideally for most students, acquisition

and mastery of early numeracy skills for later success in Mathematics occur spontaneously through certain conditions of learning in the home and other experiences in their other everyday environments such as the classrooms (Starkey et al., 2004:99-120).

Lastly, the study found support from the Problem-Solving Theory by Newell and Simon (https://www.instructionaldesign.org/domains/problem-solving/ 5 March 2022). This theory established the information processing paradigm for the study of problem-solving and the concepts of "means-ends-analysis" and "problem space". According to the General Problem Solver (GPS) framework, problem-solving involves the identification of sub-goals and the use of methods (especially heuristics) to satisfy the sub-goals.

Problem-solving skills appear to be related to many other aspects of cognition (Frederiksen, 1984) such as schema, the ability to remember similar problems, pattern recognition, recognizing familiar problem elements, and creativity, developing new solutions. The issue of transfer is highly relevant to problem solving. A good summary of problem-solving research as it applies to instruction is provided by Tuma and Rief (1980). Problem-solving skills are fundamental to many professional domains such as engineering or medicine.

The theories discussed in this part focused on how the

students develop cognitively to assure them of better and higher quality of academic performance, how they operated and tried to construct in their environment to learn and possess of skills in Mathematics, and how certain conditions of learning enable them to acquire numeracy skills that are needed for later academic success in Mathematics. Hence, these three theories shed light to the specific problems of the study.

Conceptual Framework

Figure 1 presents the conceptual framework of the study which an adaptation of the Independent-Dependent-Variable (IDV) Model (Salkind, 2010). It schematically illustrates the variates of the study and the relationship between the variates.

The base frame consists of the respondents of the study, Grade 5 students of District X, Schools Division of Catbalogan City, during the School Year 2021-2022. This base frame is connected to the bigger frame by a single-directional arrow pointing upwards.

The bigger frame shows that the profile of the student-respondents described in this study in terms of their age and sex, gross monthly family income, parents' highest educational attainment, parents' occupation, final grade in Mathematics in Grade 4, attitude toward Mathematics, and

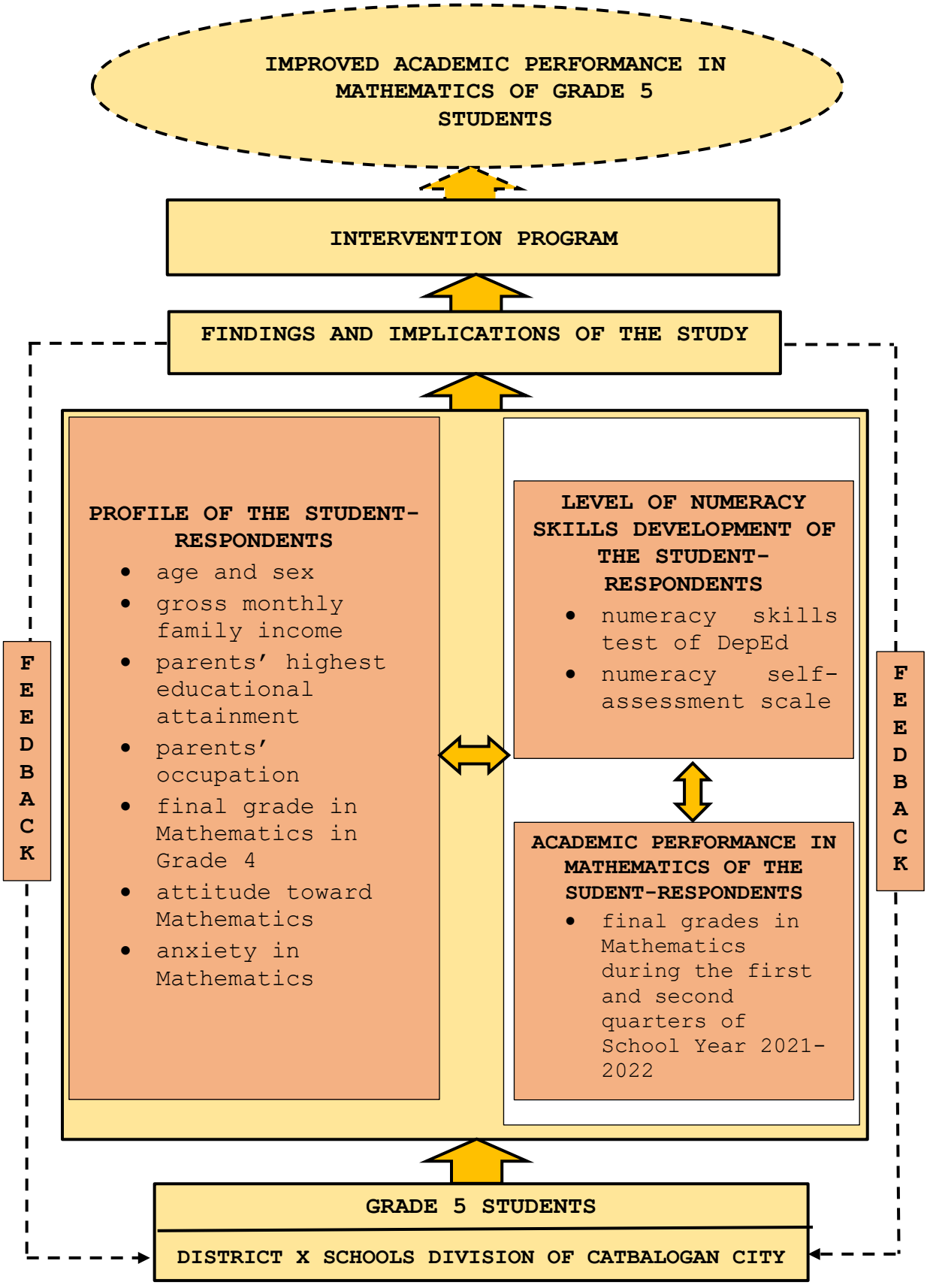

Figure 1. The Conceptual Framework of the Study

anxiety in Mathematics, as seen in the smaller box at the left of the bigger box.

Moreover, the level of numeracy skills development of the student-respondents based on the Numeracy Skills Test of the Department of Education (DepEd) and the Numeracy Self-Assessment Scale (NSAC) of Awofala (2014), shown in the upper smaller box at the right of the bigger frame. Likewise, the study assessed the academic performance in Mathematics of the student-respondents based on their final grades in the said subject during the First and Second Quarters of School Year 2021-2022, seen in the lower smaller box at the right of the bigger frame.

Also, the study determined the relationship between the level of numeracy skills development of the student-respondents and their profile variates; and between the academic performance in Mathematics of the student-respondents and some identified variates like the student-related variates and level of numeracy skills development, as reflected by the double-directional arrows connecting the smaller frames in the bigger frame.

The findings and implications of the study, shown by the third smaller frame linked from the bigger frame by a single-directional arrow, served as valuable inputs for the development of an intervention program aimed at improving the numeracy skills of the student-respondents, as indicated by

the fourth higher frame. The broken loops on either side of the bigger frame served as feedback mechanisms to ensure that there was an improved academic performance in Mathematics of the student-respondents as seen in the perforated shape at the apex of the schema.

Significance of the Study

The findings of the study would be significant to the students, the teachers, school Mathematics coordinators, the school administrators, education program supervisor in Mathematics, the DepEd key officials, the curriculum planners, the parents, and the future researchers.

To the Students. The findings of the study would give the students opportunities to assess their academic performance in Mathematics. This assessment would enable them to place in proper perspective the factors which may be responsible for their academic success, including their numeracy skills. In the process, they would be given chances to adopt better and convenient numeracy skills for improved academic performance in Mathematics in the end.

To the Teachers. The findings of the study would give the teachers baseline understanding regarding the level of numeracy skills of their students based on two testing tools, namely: Numeracy Skills Test of the Department of Education (DepEd) and the Numeracy Self-Assessment Scale (NSAC) of

Awofala (2014). With the results of these assessments, the teachers would be able to develop activities in Mathematics that aim to improve the students' numeracy skills. They would also be able to create learners' activity sheets (LAS) that are fine tuned to the level of numeracy of the students so that the success in Mathematics is ensured. In the end, the teachers would be able to help the creation of a pool of Mathematically-inclined and successful students.

To the School Mathematics Coordinators. The results of this study would provide the school Mathematics coordinators inputs for their monitoring and assessment of the academic performance of the students in Mathematics and to monitor the pedagogies in teaching adopted by the teachers if these pedagogies meet the expected outcome of the students' performance.

To the School Administrators. The findings of the study would provide school administrators with opportunities to encourage teachers to strictly and religiously assess the numeracy skills development of the students. Moreover, the school administrators would have baseline data as to the number and percentage of non-numerates, moderately numerate, and numerate students in their respective schools. With this data, they would be able to adopt intervention programs that would provide enhancement programs to the moderately numerate and numerate students, and intervention programs to the non-

numerates.

To the Education Program Supervisor in Mathematics. The results of this study would provide the education program specialists in Mathematics inputs for any intervention program that would be implemented to improve the teaching pedagogies of Mathematics teachers that would redound to improve the academic performance of their students.

To the DepEd Key Officials. The findings of the study would serve as frame of reference for DepEd key officials to assess the need for adoption of either enhancement program or intervention program to maintain or improve the numeracy skills and academic performance in Mathematics of students. Eventually, these officials would be able to give teachers appropriate learning and development (L&D) activities on the aspect of pedagogical competencies to improve the numeracy skills and academic performance in Mathematics of their students.

To the Curriculum Planners. The findings of the study would give curriculum planners valuable insights to review the current Mathematics Curriculum in the K to 12 Program. With the review, they would be able to evaluate whether the most essential learning competencies (MELCs) used in the basic education level now are suitable to the numeracy skills levels of the students. Ultimately, they would be able to make some refinements in the competencies as embodied in the

MELCs or to make major revisions of these MELCs to adjust to the levels of the students.

To the Parents. The findings of the study would encourage the parents to actively participate in their children's learning of Mathematics as worthy facilitators of learning at home.

To the Future Researchers. The findings of the study would enable future researchers to conduct follow-up studies involving students in other districts and divisions.

Scope and Delimitation

This study determined the numeracy skills and academic performance in Mathematics of Grade 5 students in District X of the Schools Division of Catbalogan City.

The study described the profile of the student-respondents in terms of their age and sex, gross monthly family income, parents' highest educational attainment, parents' occupation, final grade in Mathematics in Grade 4, attitude toward Mathematics, and anxiety in Mathematics. Moreover, the level of numeracy skills development of the student-respondents was determined based on the Numeracy Skills Test of the Department of Education (DepEd) and the Numeracy Self-Assessment Scale (NSAC) of Awofala (2014).

Likewise, the study assessed the academic performance in Mathematics of the student-respondents based on their final

grades in the said subject during the First and Second Quarters of School Year 2021-2022.

Finally, the study was conducted during the School Year 2021-2022.

Definition of Terms

The terms found in the statement of the problem were defined in this part conceptually and operationally in order to have better frames of reference to the readers of the present research.

Academic Performance. Conceptually, the term refers to a measure of the indicative and responsive abilities that express in an estimated way what a person has learned as a result of a process of education; and the product given by the students, usually expressed through school grades (Lamas, 2015:313). Operationally, the term will be used in this study to refer to the measure of how the student-respondents have learned in their Mathematics subject based on their final grades in the said subject during the First and Second Quarters of School Year 2020-2021.

Anxiety in Mathematics. Conceptually, the term refers to the feeling of being extremely nervous when faced with doing Mathematics; a negative emotional reaction to Mathematics that can be debilitating; and a feeling of tension that interferes with the manipulation of numbers and solving of

mathematical problems in academic situations (Sokolowski & Ansari, 2017:1). Operationally, the term will be used in this study to refer to the debilitating emotional reaction to Mathematics of the student-respondents based on their answers in the Abbreviated Mathematics Anxiety Rating Scale developed by Alexander and Martray (1989).

Intervention Program. This term refers to the coherent and organized system of objectives, activities and human, material and financial resources based on an approach to be implemented to meet the needs of a specific clientele to change the clientele's state (https://www.lawinsider.com/dictionary/intervention-program/ 5 March 2022). In this study, it refers to the activities or program that will be developed as an off-shoot of this study to improve the academic performance of Grade 5 students in Mathematics.

Attitude toward Mathematics. Conceptually defined as a disposition toward an aspect of Mathematics that has been acquired by an individual through his beliefs and experiences but which could be changed (Eshun, 2004:13). Operationally, the term will be used in this study to refer to the beliefs toward Mathematics of the student-respondents based on their Attitudes toward Mathematics Inventory by Tapia and Marsh (2004).

Mathematics. Conceptually, the term refers to the discipline of abstract science of number, quantity, and space

(https://www.livescience.com, 1 May 2021).

Numeracy Skill. Conceptually, the term refers to one's ability to grasp the fundamental concepts of basic operations in Mathematics such as addition, subtraction, division, and multiplication (https://www.indeed.com, 1 May 2021). Operationally, the term will refer to the ability of the student-respondents to grasp the fundamental concepts of basic operations in Mathematics based on their Numeracy Skills Test of the Department of Education (DepEd) and the Numeracy Self-Assessment Scale (NSAC) of Awofala (2014).

Numeracy Skill Development. Conceptually defined as the progression on the ability of a person to grasp fundamental concepts of basic operations in Mathematics such as addition, subtraction, division, and multiplication (Awofala, 2014:1).

Chapter 2

REVIEW OF RELATED LITERATURE AND STUDIES

The researcher presents a review of various literature on numeracy skills, academic performance in Mathematics, and the relationship between these two variates from sources like books, journals, periodicals, and publication materials. The researcher has also reviewed significant findings of previous studies focused on numeracy skills, academic performance in Mathematics, and the relationship between these two variates from published and unpublished materials.

Related Literature

This part of the chapter lays out the review made on the literature about numeracy skills and academic performance in Mathematics which hopes to expound and explain the potential link between these two variates which are the subjects of the present study.

Mathematics is a struggle not only to the students but to the teachers as well. Accordingly, teaching and learning Mathematics is challenging to both teachers and students. On the part of the students, Mathematics is typically viewed as a difficult subject because few of them have truly learned the subject and many have, in fact, struggled through their entire study of the said subject. More so, many students feel

that Mathematics has little or no relevance to the real world. On the part of the teachers, they are concerned about the limitations of their knowledge in as much as Mathematics is precise and requires exact execution, and the answer is either right or wrong. Hence, teachers need to have profound understanding of fundamental Mathematics in order to teach the same subject well (Fan & Zhu, 2018:132-152).

The emphasis on outcomes in Mathematics stems from the idea that knowledge about the subject is crucial to success in other disciplines in higher levels of education. In fact, Mathematical knowledge offers widespread application in and outside of the academic institution. Unfortunately, students oftentimes find themselves struggling to perform in the said subject. Poor performance in Mathematics is, thus, typical of every student in all levels of education. In view of this, a need to explore and investigate factors affecting students' academic performance in Mathematics must be made (Brezavscek et al., 2020:1-24).

Meanwhile, education per se is a complex process with many variables interacting in a way that affects how much learning takes place. By implication, there is likewise a diverse and complex nature of factors associated with the students' academic performance in Mathematics. One author, for instance, distinguished between internal and external factors influencing Mathematics performance. The internal

factors are those related to the test material while those that are external refer to the environment which surrounds the individual and his unique personality such as his socio-economic level and school climate (Papanastasiou, 2010:1-7).

Other authors emphasized factors which range from the dynamics of individual cognitive processes to the social and environmental factors that affect a particular student as predictive of Mathematics performance. Moreover, the success of students in learning Mathematics is contingent on a myriad of factors such as those that are inherent on the students like their entry behavior, motivation, and attitude; socio-economic factors like the education of their parents and their family's socioeconomic status; and school-based factors such as the availability and usage of learning materials, school type, and teacher characteristics (Enu et al., 2015:69-74).

However, a comprehensive and systematic review of some literature on factors responsible for success or failure in Mathematics of the students indicated major categories of these factors. One major category are psychological variables which include attitude toward Mathematics, intelligence, self-concept, study habits, achievement motivation, cognitive style, self-esteem, interest in Mathematics, test anxiety, and numerical ability. Another major groping are social factors which include socioeconomic status, home and school environments, type of school, and social maturity. Lastly,

biographical and instructional aspects are determinative of the students' outcomes in Mathematics and include gender, methods of instruction, birth order, teacher effectiveness, and home mentoring (Kushwaha, 2014:53-62).

Among the psychological variables viewed as critical to the students' learning outcomes in Mathematics, the students' numerical ability is the most preferential factor. Numerical ability and skills are key skills that focused on the National Council of Teachers of Mathematics (NCTM) standards, which include skills such as numerical sense and counting systems, the concepts of number operations, numerical relationships, theory of numbers, calculation and estimation. These skills enable students to understand numbers and methods of representation and the relationship between numbers and numerical systems, understand the meanings of operations, and how they relate to each other. Ideally, these numerical skills for basic quantitative literacy are acquired in elementary, and practiced throughout their schooling as students develop complex understanding of relevant topics in Mathematics (Abed et al., 2016:161-174).

Hence, the question is what does it mean when someone is said to be numerate and what does it mean to be numerate in an increasingly digital age. A numerate is someone who has the confidence and competence in using number which will allow him to solve problems, analyze information, and make informed

decisions based on calculations. Being numerate increases the opportunities within the world of work and establishes secure mathematical foundations which can be built through lifelong learning (https://www.unrwa.org, 29 April 2021).

Furthermore, being numerate is an important fundamental life skill that permeates all aspects of life, and is, in fact, another form of literacy. Numeracy can be defined as a proficiency which involves confidence and competence with numbers and measures. It requires an understanding of the number system, a repertoire of computational skills and an inclination and ability to solve number problems in a variety of contexts. More so, it demands practical understanding of the ways in which information is gathered by counting and measuring, and is presented in graphs, diagrams, charts, and tables (Falaye, 2016:33-42).

Moreover, numeracy skills includes understanding the number concept and number system like ones, tens, hundreds, and thousands; understanding and using mathematical symbols; being able to compare numbers; mastering basic number operations like addition, subtraction, multiplication, and division; measurement like distance, area, weight, volume, and others; money; geometry; reading and explaining graphs and charts; logical reasoning; mental arithmetic; estimation and rounding; fractions, decimal fractions, and percentages.

In addition, numeracy is not perceived as easy to teach

by most teachers and many feels that they need more support to teach numeracy than literacy, perhaps because they themselves did not like Mathematics at school. However, numeracy is not limited to Mathematics. It can also be applied to other fields. For instance, numeracy can be applied to History in terms of the concept of time, dates, sequencing events and dates, understanding and comparing large numbers, using a timeline, and logical reasoning (Daly et al., 2017:554-574).

Similarly, in another example, numeracy can also be applied to Social Studies in terms of collecting data, graphs and diagrams, logical reasoning, practical application of Mathematics in everyday life such as in percentage calculations and dealing with money. There is a three-point approach that works well across all mathematical areas in developing numeracy in children. These are: think which means that students must think about the problem presented to them and what they already know; solve which means that students use what they know to solve the problem presented to them; and build which means that students use the problem to build understanding of the specific concepts (https://study.com, 29 April 2021).

Generally, numeracy can be grouped into three distinct categories, namely: baseline, functional, and multiple. The first group of multiple numeracy refers to the ability and

willingness to use mathematical models of thought such as logical and spatial thinking, and presentation like formula, models, graphs, and charts that enable a person to fully function in a modern society. The second group of functional numeracy refers to the ability to apply basic mathematical principles and processes in everyday contexts at home or in school as needed. The third group of baseline numeracy refers to having a sound knowledge of numbers, measures, structures, basic operations, basic mathematical presentations, and the ability to use appropriate aids that enable further development (Condelli et al., 2016:3-18).

Specifically, numeracy skills are very important math skills that are useful not only for education but also for future job or employment. Moreover, numeracy skills are basic mathematical skills that include a range of abilities to understand and analyze numerical information and to make the right conclusions and decisions. They further encompass the ability to express ideas and situations using numerical or mathematical information. By implication from the definition of numeracy skills, to have these skills does not mean to be a great mathematician. It simply means to have some basic Mathematics skills along with some analytical thinking (https://www.businessphrases.net, 1 May 2021).

Meanwhile, the level of numerical ability and skills of the students are most commonly determined through speed test

which usually consists of basic arithmetic such as addition, subtraction, multiplication, division, number sequences, and simple Mathematics like percentages, powers, and fractions. The numerical ability skills test is designed to measure the students' capacity to manipulate or use numbers to correctly solve problems (Ann, 2014).

Most importantly, using these numerical ability skills test can establish the potential relationship between the numeracy skills of the students and their performance in their Mathematics subjects. To this end, several literatures have affirmed that numerical skills are good predictors of the students' academic performance in the subject. Thus, for the students to perform well in the general aptitude tests in their Mathematics subject, they need to have higher numeracy skills (Abiam, 2015:53-54).

Therefore, numeracy is important for students in order to develop their logical thinking and reasoning strategies in dealing with even their everyday activities. Numeracy skills are needed by the students to solve problems and make sense of numbers, time, patterns, and shapes for activities such as playing sports. In this sense, the development of numeracy skills is every teacher's responsibility. The key to this end is for teachers to understand the mathematical demands of the activities that they set for students to undertake and the potential difficulties of the numeracy skills students may

experience and knowledge of various strategies to assist this development (https://www.child-encyclopedia.com, 1 May 2021).

Subsequently, it is important to acknowledge that basic number concepts and numeracy skills generally emerge before school entry. It is pivotal to promote the development of these skills in young children, preferably during elementary grades, and to know the best learning methods that support such development of numeracy skills because, in the end, these are predictive of the students' future academic performance in Mathematics. Understanding the variability of numeracy skills of young students can help in the development of much needed instructional programs which, in turn, can contribute to the sustainability of the children's academic performance in Mathematics as it is linked to their numeracy skills (Mix, 2011:427-444).

Prior to the enactment of Republic Act Number 10533 which is known as the Enhanced Basic Education Act of 2013, the 10-year basic education curriculum was extended to a 12-year period with the added years in Senior High School. Beyond the structural re-engineering of the country's education system, the K to 12 Program was implemented in the basic education levels which aims to uplift Philippine education, in general, and the learning outcomes of students, in particular. In this sense, said reform provided high hopes in improving Filipino

students' performance in the different learning areas, most especially in Mathematics which earned dismal performance among the students (Balagtas et al., 2019:1-14).

The 10-year structure of the country's education was pinpointed as one of the key structural factors that explains the dismal performance in Mathematics of the students. Yet, based on the 2018 results of the Programme for International Students Assessment (PISA), Filipino students still showed a poor performance in Mathematics based on the mean score of 353, earning the country's 75th spot among the 77 Organization for Economic Co-Operation and Development (OECD) member countries (https://gpseducation.oecd.org, 1 May 2021).

Furthermore, numeracy is defined as the ability to understand and use numbers. In addition to basic reading and writing skills, today's students' need is an understanding of numbers and basic mathematical skills to use any numerical information presented in text, tables or charts. This is especially true in many educational settings, where a basic understanding of numerical concepts is arguably as important for informed decision making as reading ability. Although systematic research on numeracy has been growing steadily over the last several years, there have been few comprehensive studies of this topic. In addition to summarizing key points, a review could serve to identify gaps in our knowledge and suggest paths for future research in the

field (https://www.researchgate.net/ 1 May 2021).

Thus, with the 2018 PISA dismal Mathematics literacy of the Filipino students, the structural factor delineated by the shift from the 10-year to the 12-year basic education level is not the sole determinant of said literacy. At this time, the Mathematics Curriculum is governed by the twin goals of critical thinking and problem-solving which specifically covers the study of number domain, number sense, and the basic operations of these numbers. Hence, the study of Mathematics is even more challenging and students are deemed to struggle, especially those with low levels of numeracy skills. It is on this premise that the present research finds relevance as this aims to determine the potential link between the numeracy skills of the students and their academic performance in their Mathematics subject.

The ideas that are discussed in this part of the chapter offer intensive and extensive review of literature to better put in perspective the concepts of numeracy skills and academic performance in Mathematics, and how these two variates are interrelated. Hence, this review sheds light to the problems of the present research.

Related Studies

Several researches focused on the topics of numeracy skills and academic performance in Mathematics have been

dissected by the researcher to explain their relevance to the present research in terms of their similarities and how to enhance the previous studies to fit into the specific problems of the present research by focusing on their differences.

Callaman (2020) conducted a study entitled, "Students' Mathematics Achievement in Mindanao Context: A Meta-Analysis". The findings showed that the overall effect sizes have a small effect on Mathematics achievement. Furthermore, mathematical skills, attitude, and self-efficacy are found to be the predictors of mathematical achievement. Likewise, the type of school where the student is studying could cause significant variation in the effect sizes.

The study of Callaman found relevance in the present one because both explored the various factors that impact on the students' academic performance in Mathematics. Despite the similarity, the study of Callaman was more in-depth in as much as it employed meta-analysis to study the overall effect sizes of previous researches on the factors affecting the academic outcomes of students in Mathematics. By contrast, the present research was simply a descriptive research which described how numeracy skills impacted on the students' academic outcomes in Mathematics. Also, the study of Callaman investigated various other factors that affected the students' academic achievement in Mathematics whereas the present research was only the students' numeracy skills as

the major variate.

Guinocor (2020) conducted a study entitled, “Mathematics Performance of Students in a Philippine State University”. It was found out that there is a significant positive high correlation between the study orientations of the students considering their academic performance in terms of their Graded Point Average (GPA) in Mathematics subjects. It was revealed that the study orientations of students differ.

The only similarity between the previous study and the present one was on its focus on Mathematics performance of the students. Nonetheless, the previous study of Guinocor held many dissimilarities from the present one. First, the two studies differed in terms of respondents because the previous study involved college students taking up education courses whereas the present one involved student from the elementary level. Second, the two studies differed in terms of the independent variates considered because the previous one considered the students’ study orientations whereas the present one considered the students’ numeracy skills.

Indefenso (2020) conducted a study entitled, “Numeracy Level, Mathematics Problem Skills, and Financial Literacy”. The study found out that the respondents have an average level of numeracy, problem solving ability, and financial literacy. The findings likewise revealed that there is a significant and positive correlation between numeracy and financial

literacy.

The previous research found similarity in purpose with the present one in so far as they both determined the numeracy level of the students. Likewise, the two studies determined how the students' numeracy impacted on certain outcomes of their Mathematics performance. But the two studies diverged in terms of depth because the study of Indefenso was more in-depth as it is multivariate, taking into account numeracy level, Mathematics problem skills, and students' financial literacy. The present research, however, considered only the students' academic performance in the subject as the dependent variate on which the impact of their numeracy skills was determined.

Nortvedt (2020) conducted a study entitled, "Numeracy and Migrant Students: A Case of Secondary Level Mathematics Education in Norway". The results showed that the teachers valued diversity in their classrooms and that their teaching was student-centered. However, the teachers focused on language issues of migrant students as primary factors of their vulnerability to become numerates in Mathematics. In this sense, cultural aspects of classroom participation and mathematical activity were neglected by the teachers as other potential factors of the students' numeracy.

The previous study paralleled the present research in terms of purpose because they both focused on assessing the

numeracy of students. However, the previous study was keener on assessing the factors that impacted on the numeracy levels of students in contrast to the present study which used the students' numeracy skills as predictive factors of their academic performance in Mathematics. Likewise, the previous study was conducted within a specialized context of students being migrants and hence, differences in language and cultural backgrounds were moderating factors. In the present one, the students which involved are heterogenous, that is, they came from various social and cultural groupings. Lastly, the students in the previous study were secondary students whereas in the present research, the students involved were elementary students.

Rodriguez (2020) conducted a study entitled, "Success in Mathematics and Academic Wellbeing in Primary-School Students". Results showed that success in Mathematics is linked to a student's academic wellbeing in such a way that perceived competence in the subject, perception of usefulness of mathematical content, and mastery motivation was higher in students with better previous performance. Anxiety and negative feelings were also lower when success in Mathematics increased.

The study of Rodriguez was similar to the present study in terms of purpose because both were focused on assessing the students' Mathematics success in terms of academic

outcomes in the said subject. Nevertheless, the study of Rodriguez was different in terms of scope in so far as it took academic success in Mathematics as an independent variate linked to the academic well-being of students in school. In the present research, the success in Mathematics of the students was the dependent variate which may be impacted by the students' numeracy skills.

Chiu (2018) conducted a research entitled, "Effects of Early Numeracy Activities on Mathematics Achievement and Affect: Parental Value and Child Gender Conditions and Socio-Economic Status Mediation". Three major results were: early numeracy activities have effects on Mathematics confidence and interest in addition to achievement; SES mediates the effects of early numeracy activities on achievement and confidence but not on interest, and the mediating effect of SES suggests that high-quality educational provision should be provided during early numeracy activities; and parents provide fewer numeracy activities for girls, which suggests that parents should provide more early numeracy activities to girls.

The similarity between the previous study and the present research lied on the focus on the students' numeracy and how it impacted on certain aspects of their academic lives. Yet, the previous research was more complex as it determined the impact of numeracy not only on the Mathematics

achievement of the students but also on their interest in the subject. On the contrary, the present research determined the impact of the numeracy skills of students solely on their academic performance in Mathematics.

Nelson (2017) conducted a study entitled, "The Effects of Early Numeracy Interventions for Students in Preschool and Early Elementary: A Meta-Analysis". Results showed that early numeracy interventions among preschool and kindergarten students produced larger treatment effects than interventions with first-grade participants. The results of the final meta-regression model indicated that the following predictors accounted for the most variance in Mathematics achievement: concrete-representational-abstract instructional framework, intervention duration, risk status of participants, and the inclusion of counting with one-to-one correspondence in the intervention content.

The study of Nelson found relevance in the present one because it possessed similarity of purpose which was on an assessment of the numeracy performance of the students. In this sense, the previous study provided significant inputs in gaining deeper understanding regarding how numeracy levels developed among students to achieve better learning gains in Mathematics. Nonetheless, the previous study differed from the present research because the former was a meta-analysis of the variances in Mathematics achievement of the students

based on series of researches conducted about the development of numeracy interventions. The present research was simply a descriptive type of research which observing patterns of academic performance in Mathematics of the students depending on their numeracy skills.

Capate (2015) conducted a study entitled, "Assessing the Mathematics Performance of Grade 8 Students as Basis for Enhancing Instruction and Aligning with K to 12 Curriculum". Results indicate that most of the Grade 8 students were in the Beginning level of achievement only. Moreover, half of the tested contents were least-mastered. Incorrectly applying the formulas, properties, theorems, or laws and incompletely solving the problem despite correctly doing the initial procedure are their common difficulties.

The previous study of Capate found significance in the present research as it provided valuable insights regarding the performance in Mathematics of students. Hence, these two studies were similar in terms of purpose which was to assess the academic performance in Mathematics of the students. But the two studies were different in some aspects. First, they differed in scope because the previous study of Capate simply focused on assessing the Mathematics performance of the Grade 8 students, with emphasis on their common difficulties in learning the subject. By contrast, the present research tackled the students' numeracy skills and how these skills

were crucial to the academic performance in Mathematics of the Grade 5 students. Second, they differed in terms of respondents involved because the previous study involved Junior High School students whereas the present one involved elementary grade students.

Namusisi (2015) conducted a study entitled, "Factors Affecting Mathematics Achievement of First-Year Secondary School Students in Central Uganda". Of all the considered explanatory variables that impact on Mathematics achievement, socio-economic status, gender, prior Mathematics achievement, parental support, peer influence, mean of prior Mathematics achievement, perception of good classroom assessment, school mean of class climate, and parental support were significant predictors of Mathematics achievement.

The previous study was similar in purpose to the present research which likewise assessed the academic performance in Mathematics of the students and how it impacted by some variates that are inherent in the students themselves. Yet, the previous research was broader in scope as it generally considered student-, classroom-, and school-level factors in assessing the Mathematics achievement of the students. On the contrary, the present research only considered a student-level factor which was specific to the students' numeracy skills. Another point of divergence between the previous study and the present one was on the respondents involved

since the former had secondary school students whereas the latter had elementary school students.

Graham (2012) conducted a study entitled, "Improving the Numeracy Performance of Middle School Students through Enhancing Basic Academic Skills: Evidence from the Use of QuickSmart with Indigenous Students". The findings showed cognitive growth for students in QuickSmart of up to two years in the 30-week program as compared to the growth of average-achieving students in the same class who have not accessed the program.

The previous and present researches were similar in terms of their purpose which was to determine, in a sense, the level of numeracy of the students. Although the previous research focused primarily on the students' numeracy performance while the present one focused specifically on numeracy skills, the latter study provided significant insights that reflected the importance of numeracy to the students' overall academic outcomes in Mathematics. Hence, it paralleled the present study. However, the previous research was more complex as it measured the effectiveness of QuickSmart as an intervention to improve the numeracy of the students. Hence, the previous study implied an experimental design of research in contrast to the present which was simply a descriptive type of research. Moreover, the previous study involved a specialized group of students as respondents, the

indigenous students, in contrast to the present study which generally involved all types of Grade 5 students, irrespective of their ethnic groupings.

Jordan (2012) conducted a research entitled, "Early Predictors of Mathematics Achievement and Mathematics Learning Difficulties". The findings of the study revealed that early number competencies of students are important for setting children's achievement trajectories in Mathematics because difficulties and disabilities in the subject had their roots in weak number sense. More so, higher levels of kindergarten number competence were significantly predictive of the students' performance in Mathematics at the end of Grade 3. Also, symbolic number competencies associated with whole number relations and operations were significantly related to the students' performance in Mathematics. Lastly, the numeracy competence of the students depended largely on their language abilities such as knowing number names, and on quantitative and spatial knowledge such as combining and separating sets of numbers.

The similarity between Jordan's study and the present study lied on the purpose for which they were conducted. In this sense, both studies assessed the achievement in Mathematics of the students. Likewise, both studies explored the numerical competencies of the students which have impacted on their achievement in Mathematics. However, the

two studies were different in some aspects. Foremost, the previous study was a longitudinal research which took into account the achievement in Mathematics of the students in a long span of time, starting from when they were in Kindergarten up to the time, they reached Grade 3. In contrast, the present research was only a terminal research which delved into the academic achievement of the Grade 5 students in a given school year. Second, the previous study included other competencies of students, apart from their numeracy skills.

The studies cited in this part may have differed in some important aspects from the present research, but they were very much critical in understanding the specific problems of the latter research. The salient findings discussed in each of the previous researches cited offered building blocks from where the analysis of the specific problems of the present research have had.

Chapter 3

METHODOLOGY

This chapter consists of discussions on the methods and procedures used in the conduct of this study. This chapter specifically included the research design, the locale of the study, the instrumentation, the validation of instrument, the sampling procedure, data gathering procedure, and the statistical treatment of data.

Research Design

The study was a quantitative research that utilized a descriptive research design, with correlation analysis, to determine the numeracy skills and academic performance in Mathematics of Grade 5 students in District X of the Schools Division of Catbalogan City.

Specifically, the descriptive type of research described the profile of the student-respondents in terms of their age and sex, gross monthly family income, parents' highest educational attainment, parents' occupation, final grade in Mathematics in Grade 4, attitude toward Mathematics, and anxiety in Mathematics.

More so, the descriptive research design assessed the level of numeracy skills development of the student-respondents based on the Numeracy Skills Test of the

Department of Education (DepEd) and the Numeracy Self-Assessment Scale (NSAC) of Awofala (2014). Lastly, the same research design assessed the academic performance in Mathematics of the student-respondents based on their final grades in the said subject during the First and Second Quarters of School Year 2021-2022.

On one hand, the relationship between the level of numeracy skills development of the student-respondents and their profile variates; and between the academic performance in Mathematics of the student-respondents and some identified variates like the student-related variates and level of numeracy skills development was determined through the conduct of correlation analysis.

Descriptive and inferential statistical tools were used to provide quantitative analysis to the data. On one hand, the descriptive problems of the study were quantified using Frequency Count, Percentage, Median, Mean Absolute Deviation, and Weighted Mean. On the other hand, the hypotheses were tested using the following inferential statistical tools: Chi-Square Test, Spearman's Rank Coefficient of Correlation (Spearman's Rho), and the Fisher's t-Test.

Locale of the Study

Figure 2 presents the map showing the locale of the study, District X of the Schools Division of Catbalogan City.

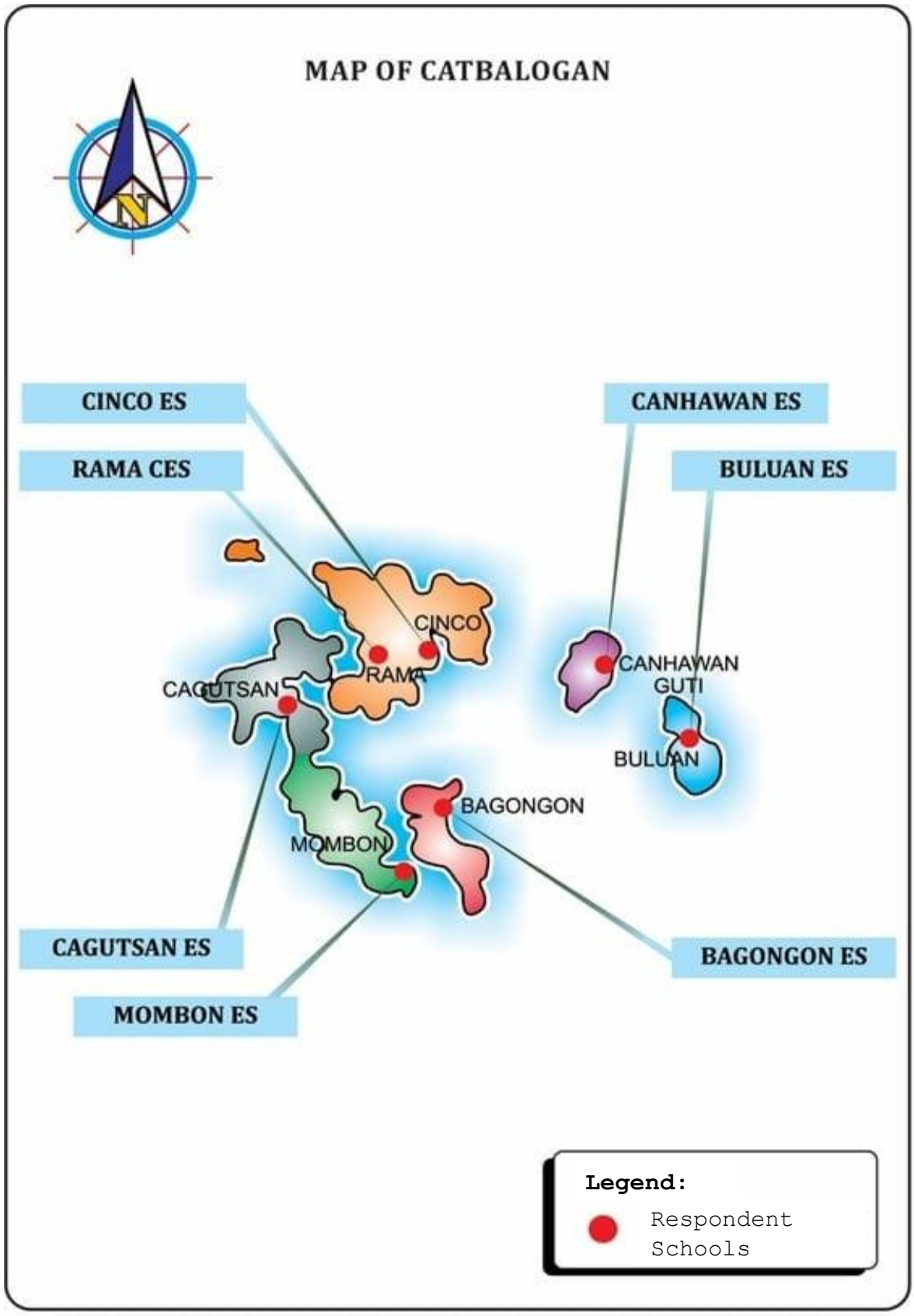

Figure 2. The Map Showing the Locale of the Study

The study was specifically conducted in the seven public elementary schools composing District X of the Schools Division of Catbalogan City. These schools included Rama Central Elementary School, the central school in the said district, Cagutsan Elementary School, Buluan Elementary School, Cinco Elementary School, Bagongon Elementary School, Mombon Elementary School, and Canhawan Elementary School.

Moreover, District X is one of the ten school districts of the Schools Division of Catbalogan City. The said school division was established in 2008 to comply with Republic Act Number 9391 which converted the Municipality of Catbalogan into a component city. However, the said status was reverted back into that of a municipality a year later due to pressures from the League of Cities. With the conferment of cityhood back to Catbalogan, Division of Catbalogan City had a soft launching on April 16, 2012, with Dr. Edita S. De Veyra as Officer-in-Charge, with eleven education supervisors, one cashier, and one bookkeeper (DepEd Catbalogan City Division Educational Management Information System (EMIS), 2012). The City Schools Division of Catbalogan is found in the City of Catbalogan, one of the two cities in the Province of Samar.

Catbalogan was founded in October 1596 by Spanish Jesuit priests and became the capital of the entire island of Samar. Friar Francisco de Otazo, S.J., who arrived in the Philippines in 1596, founded the Catbalogan Mission

and was thus the first missionary to bring the Catholic faith to the people of Catbalogan. In 1627, Catbalogan was raised to the status of residencia (residence or central house) and among its dependencies were Paranas where in 1629 Father Pedro Estrada actively evangelized the area and Calbiga where he took white rock or grey limestone to use as building blocks for its church. The church has some arc-like stone roof that was pasted together to dry on each block, giving an arching force to the side. On October 17, 1768, Catbalogan was ceded to the Franciscans who took over from the Jesuits. The first Franciscan parish priest was Fray Jose Fayo, OFM.

During the early days of Spanish colonization of the Philippines in the 16th century, Samar was under the jurisdiction of Cebu but later was declared a separate province. In 1735, Samar and Leyte were united into one province with Carigara, in Leyte, as the capital. The union, however, did not prove satisfactory. In 1768, Catbalogan became the provincial capital when Samar separated from Leyte and became an independent province.

On December 31, 1898, during the Philippine Revolution, Gen. Vicente Lukban arrived in Catbalogan and put Samar under his jurisdiction. On January 27, 1900, the Americans captured Catbalogan during the Philippine–American War (1899–1902). On June 17, 1902, a provincial civil government was established on Samar Island by an act of the Philippine

Commission with Julio Llorente of Cebu as the first governor of Samar.

On May 24, 1942, during World War II, Japanese forces landed in Barrio Pangdan on early morning and occupied the capital. On December 18, 1945, American and Filipino forces liberated Catbalogan from the Japanese. In 1948, the barrios of Jiabong, Jiaan, Malino, San Fernando, Casapa, Camoroboan, Lologayan, Magcabitas, Paglayogan, Dogongan, Bayog, and Malobago were separated to form the municipality of Jiabong. On June 19, 1965, the Philippine Congress, along with the province's three congressmen, Eladio T. Balite (1st District), Fernando R. Veloso (2nd District) and Felipe J. Abrigo (3rd District), approved Republic Act No. 4221 dividing Samar into three provinces, namely Western Samar, Eastern Samar and Northern Samar, respectively. Catbalogan thus ceased to be the capital of the whole island-province after enjoying the prestige of being the premier town of Samar for 197 years since 1768.

On June 21, 1969, under Republic Act No. 5650, Western Samar was renamed Samar with Catbalogan remaining as the capital. The greatest calamities to occur in Catbalogan were big fires. The April 1, 1957 conflagration, considered as the most destructive one, caused damage to properties in the amount of thirty million pesos. The next was on May 19, 1969, where damage was estimated at twenty million pesos and the

more than century-old Saint Bartholomew Roman Catholic Church was razed to the ground. Paradoxically, like the proverbial Phoenix, each time Catbalogan suffered under the throes of these calamities, better buildings and infrastructures emerged from the ashes.

As early as 1960, Catbalogan already agitated to become a city. In 1969, Rep. Fernando P. Veloso sponsored House Bill No. 1867 creating Catbalogan into a city. The bill was being deliberated in the Philippine Senate, but the blaze of 1969 unfortunately caused it to be shelved. Subsequent efforts were made by Catbalogan political leaders, including former Representative Catalino V. Figueroa, during his term, to make Catbalogan's cityhood dream a reality despite strong and rabid opposition by the League of Cities of the Philippines, particularly Catbalogan City's neighboring Calbayog under the administration of Mayor Mel Senen Sarmiento.

On March 15, 2007 Catbalogan finally attained its cityhood. Under the sponsorship of Senator Alfredo S. Lim and by virtue of Republic Act No. 9391, Catbalogan was converted into a component city known as the CITY of CATBALOGAN following a unanimous vote by the Philippine Senate. Senator Manuel Villar, Jr. (President of the Senate), Congressman Jose De Venecia, Jr. (Speaker of the House of Representatives), Oscar G. Yabes (Secretary of the Senate), Roberto P. Nazareno (Secretary General, House of

Representatives) and Gloria Macapagal Arroyo (President of the Philippines) were among its signatories. The residents of Catbalogan overwhelmingly ratified this change through a Comelec plebiscite on June 16, 2007, with over 92% "Yes" votes for cityhood.

However, Catbalogan temporarily lost its cityhood, along with 15 other cities, after the Supreme Court of the Philippines, in a very close 6–5 vote, granted a petition filed by the League of Cities of the Philippines, and declared the cityhood law (RA 9391) which allowed the town to acquire its city status, unconstitutional.

On December 10, 2008, Catbalogan and the other 15 cities affected filed a motion for reconsideration with the Supreme Court. More than a year later, on December 22, 2009, acting on said appeal, the Court reversed its earlier ruling as it ruled that "at the end of the day, the passage of the amendatory law (regarding the criteria for cityhood as set by Congress) is no different from the enactment of a law, that is, the cityhood laws specifically exempting a particular political subdivision from the criteria earlier mentioned. Congress, in enacting the exempting law/s, effectively decreased the already codified indicators."[10] As such, the cityhood status of Catbalogan was effectively restored (City Culture & Tourism Records, 2021).

Instrumentation

The researcher utilized a questionnaire, a test, and documents as research instruments.

Questionnaire. The questionnaire was a standard one which was adopted from standard sources and was composed of four major parts. There was only be one set of questionnaires for the student-respondents.

Part I of the questionnaire consisted of supply type and checklist type of items pertaining to the profile of the student-respondents. This part included the variates of age, sex, gross monthly family income, parents' highest educational attainment, parents' occupation, and final grade in Mathematics in Grade 4. In this part of the questionnaire, the student-respondents placed a check mark (/) on the blank line spaces provided before each item or filled in the appropriate blank line spaces provided in each item such as on the items about their age and final grade in Mathematics in Grade 4.

Part II of the questionnaire was a checklist composed of 40 statement indicators reflective of the attitude toward Mathematics of the student-respondents. This part of the questionnaire was adopted from the Attitudes toward Mathematics Inventory by Tapia and Marsh (2004). In this part of the questionnaire, the student-respondents placed a check mark on the appropriate column of their responses using the

following five-point scale: 5 for Strongly Agree (SA), 4 for Agree (A), 3 for Undecided (U), 2 for Disagree (D), and 1 for Strongly Disagree (SD).

Part III of the questionnaire was also a checklist composed of 25 statement indicators adopted from the Abbreviated Mathematics Anxiety Rating Scale developed by Alexander and Martray (1989). This part of the questionnaire measured the anxiety in Mathematics of the student-respondents who placed a check mark on the appropriate column of their responses using the following five-point scale: 5 for Very Much (VM), 4 for Much (M), 3 for A Fair Amount (AFM), 2 for Little (L), and 1 for Not at All (NA).

Part IV of the questionnaire was a checklist which was composed of 23 statement indicators adopted from the Numeracy Self-Assessment Scale (NSAC) of Awofala (2014). This part of the questionnaire indicated the level of numeracy skills development of the student-respondents by checking the appropriate column of their responses along three major categories of basic numeracy, numeracy in future employment tasks, and mathematical numeracy. In this part of the questionnaire, the student-respondents placed a check mark on the appropriate column of their responses using the following five-point scale: 5 for Very Highly Skilled (VHS), 4 for Very Skilled (VS), 3 for Moderately Skilled (MS), 2 for Fairly Skilled (FS), and 1 for Not Skilled (NS).

Test. There was one type of test, the Numeracy Skills Test of the Department of Education (DepEd) which was a 25-item test taken with time limitations, and with a four-letter choice.

Lastly, documents such as the report cards or Form 137 of the student-respondents were secured by the researcher to get the final grades in the said subject during the First and Second Quarters of School Year 2021-2022 to secure data regarding their academic performance in Mathematics.

Validation of Instrument

The questionnaire and test were only validated as to their content through expert analysis but were not anymore validated as to their reliability since they were adopted from standard sources and hence, not researcher-made.

The Attitude toward Mathematics Inventory measured the attitude toward Mathematics of the student-respondents was adopted from Tapia and Marsh (2004), the Abbreviated Mathematics Anxiety Rating Scale to measure the anxiety in Mathematics of the student-respondents was adopted from Alexander and Martray (1989), and the Numeracy Self-Assessment Scale (NSAC) to measure the level of numeracy development skills of the student-respondents was adopted from Awofala (2014).

Likewise, the Numeracy Skills Test measured the level of

numeracy skills development of the student-respondents was adopted from the Department of Education (DepEd).

Therefore, draft copies of the questionnaire and the tests were submitted to the research adviser and to the members of the panel of oral defense for content analysis. Once their suggestions had been incorporated, these two instruments were finalized and prepared for actual data gathering.

Sampling Procedure

The respondents of the study were the Grade 5 students in District X of the Schools Division of Catbalogan City, during the School Year 2021-2022. They were taken from the seven public elementary schools from said district, namely: Rama Central Elementary School, the central school in the said district, Cagutsan Elementary School, Buluan Elementary School, Cinco Elementary School, Bagongon Elementary School, Mombon Elementary School, and Canhawan Elementary School.

There were 140 Grade 5 students enrolled in District X during the current school year, as shown in Table 1 below. Therefore, total enumeration or universal sampling was used to take all the 140 Grade 5 students as respondents of the study.

It is evident from the table that there were 43 student-respondents from Rama Central Elementary School, 37 from

Table 1

The Respondents of the Study by School

Schools	Population
Rama Central Elementary School	43
Cagutsan Elementary School	37
Buluan Elementary School	7
Cinco Elementary School	19
Bagongon Elementary School	9
Mombon Elementary School	20
Canhawan Elementary School	5
Total	**140**
Response Rate	**100.00%**

Cagutsan Elementary School (ES), 20 from Mombon ES, 19 from Cinco ES, nine from Bagongon ES, seven from Buluan ES, and five from Canhawan ES.

Data Gathering Procedure

The data were collected by the researcher only after approval had been secured from concerned DepEd school authorities. First, a letter was submitted to the Schools Division Superintendent of the Schools Division of Catbalogan City to request approval to conduct the study in District X of said school division. Once approved, said letter was attached to another letter addressed to the Public Schools District Supervisor of District X to seek approval to administer the questionnaire and conduct the tests to the

Grade 5 students in the seven public elementary schools under said district. Lastly, letters to the School Principals or Head Teachers or Teachers-in-Charge of these seven public elementary schools were submitted to request approval to conduct the study among the student-respondents enrolled in their schools of jurisdiction.

Once approval was given, the researcher gave the questionnaires for distribution to the class advisers of the student-respondents as research coordinators in charge with the inclusion of these questionnaires in their students' learning kits. Hence, the distribution of the questionnaires was done by the researcher through the Grade 5 class advisers. Said distribution was made coincidentally with the distribution of the student-respondents' learning kits with their self-learning modules in the different learning areas.

However, the test, on the Numeracy Skills Test of the Department of Education (DepEd) was done personally by the researcher. The Numeracy Skills Test of DepEd was administered first for a period of 30 minutes.

Before the presentation, the researcher provided the student-respondents with answer sheets and pen. Likewise, the questionnaire was distributed prior to the start of the presentation. At this point, the student-respondents were given 10 minutes to answer the questionnaire, after which, it was retrieved.

After the actual data gathering, the researcher tabulated, computed, analyzed, and interpreted the data of the study. Appropriate statistical software package was used to facilitate the computation of the data collected.

Finally, essential health requirements to avoid the infection from and transmission of the COVID-19 disease was observed by the researcher such as wearing of face masks, face shields, and the observance of physical distancing. The researcher also guaranteed the safety of the student-respondents of the study by requiring them to observe the said essential health requirements.

Statistical Treatment of Data

Descriptive and inferential statistical tools were used to provide quantitative analysis to the data. On one hand, the descriptive problems of the study were quantified using Frequency Count, Percentage, Mean Absolute Deviation, Mode, and Weighted Mean. On the other hand, the hypotheses were tested using the following inferential statistical tools: Chi Square Test, Spearman's Rank Coefficient of Correlation (Spearman's Rho), and the Fisher's t-Test.

Frequency Count. This statistical tool described the profile of the student-respondents regarding their age and sex, gross monthly family income, parents' highest educational attainment, parents' occupation, final grade in

Mathematics in Grade 4, and among others as to their number of occurrences.

Percentage. The conversion to percentage measured the magnitude of occurrence of each variable by category with reference to the total number of observations.

The following formula was used (Sevilla et al., 1992:200):

$$P = [f/N] \times 100$$

where: P refers to the percentage;

f refers to the number of occurrences; and

N refers to the total number of samples.

Median. This statistical tool used used to express the middle most point of some of the identified characteristics of the respondents specifically on the not normally distributed ratio and interval scale data. The following formula (Freud & Simon, 1992:35) was used:

$$M_d = \left(\frac{[1/2N - F]}{F}\right) i$$

where: M_d refers to the middle most point of an array of observations;

N refers to the total observations;

F refers to the accumulated frequencies equal or less than 1/2 of the total observations; and

f refers to the number of occurrences

in the assumed midpoint step distribution.

Mean Absolute Deviation. This tool was used to describe the extent to which not normally distributed data varied. The following formula (Freud & Simon, 1992:35) was used:

$$MAD = \frac{\sum /X_i - \mu/}{n}$$

where: MAD refers to the mean average deviation;

$/X_i - \mu/$ refers to the absolute difference between the observation and the mean; and

n refers to the number of observations.

Weighted mean. This statistic was used to ascertain the attitude toward Mathematics, anxiety in Mathematics, and the level of numeracy skills development of the student-respondents. The formula (Pagoso, 1997:111) was used as follows:

$$\bar{X}_w = \frac{\Sigma f_i X_i W_i}{n}$$

where: $\bar{X}_w$ refers to the weighted mean;

f_i refers to the frequency of a category of variable;

X_i refers to the identified category of a variable;

W_i refers to the weights which are Expressed in a five-point Likert or Thurston scales; and

n refers to the sample size.

In interpreting the foregoing data, the following scale was used:

4.50-5.00 –	Strongly Agree	(SA)
	Very Much	(VM)
	Very Highly Skilled	(VHS)
3.50-4.49 –	Agree	(A)
	Much	(M)
	Very Skilled	(VS)
2.50-3.49 –	Undecided	(U)
	A Fair Amount	(AFM)
	Moderately Skilled	(MS)
1.50-2.49 –	Disagree	(D)
	Little	(L)
	Fairly Skilled	(FS)
1.00-1.49 –	Strongly Disagree	(SD)
	Not at All	(NA)
	Not Skilled	(NS)

Chi-Square Test. This was used to determine the relationship between nominal dependent variables using the

following formula (Walpole,1989:389):

$$X^2 = \sum \frac{(O_i - E_i)}{E_i}$$

where: O refers to the observed frequency; and

E refers to the expected frequency.

Spearman's Rank Coefficient of Correlation. The Spearman's Rho was employed to associate linear relationship between two variables which were in a not normal distribution using the following formula (Walpole, 1997:460):

$$\rho = 1 - \frac{6\sum D^2}{N^3 - N}$$

where: ρ refers to the coefficient of linear association between paired ranks assigned to individual scores on two variables;

D refers to the deviation between paired ranks; and

N refers to the total number of paired observations.

The ranges shown below guided the researcher in interpreting the computed *p*-value:

Coefficient	Relationship
±0.00 to ±0.20	Negligible Correlation
±0.21 to ±0.40	Low Correlation

±0.41 to ±0.70	Moderate Correlation
±0.70 to ±1.00	High Correlation

Fisher's t-Test. To test for the significance of the coefficient of correlation between a set of paired variables, the Fisher's t-Test (Freud & Simon, 1992:481) was used. The formula was as follows:

$$t = r_{xy} \sqrt{\frac{n - 2}{1 - r_{xy}^2}}$$

where:

t - Fisher's t-value

n - number of paired observations

r - refers to the computed r_{xy} using Pearson Product Moment Correlation Coefficient

To test the normality of the distribution in a parametric test, the Shapiro Wilk test (Goss-Sampson, 2020:30) was employed using the following formula:

$$\omega = \frac{(\sum^{n}_{i=1} \alpha_i x_{(i)})^2}{\sum^{n}_{i=1} (x_i - \mu)^2},$$

where the $x_{(1)}$ was the smallest ordered sample value and α_1 was the constant value generated from the mean, variance, and covariance of the order statistics of a sample size n from a normal distribution. The higher the value of ω than the chosen alpha level, the normal the distribution was.

In deciding whether the null hypothesis was accepted or

rejected, the computed value was compared with the critical value or the p-value was compared with the α. The following rule guided the researcher: accept the null hypothesis if and when the computed value turned lesser than the critical value or the p-value turned greater than the α; reject the null hypothesis if and when the computed value turned equal or greater than the critical or tabular value or the p value turned equal or lesser than the α.

Finally, in testing the hypotheses, α = 0.05 level of significance was applied in all cases. For precision and accuracy in the data processing, the researcher used the computer as an aid in the data processing utilizing a free-ware statistical software known as Jeffrey's Amazing Statistical Package (JASP) version 0.16.2.0.

Chapter 4

PRESENTATION, ANALYSIS, AND INTERPRETATION OF DATA

This chapter presents the findings of the study with the corresponding analysis and interpretation of the data. Included in this chapter are: profile of the student-respondents, level of numeracy skills development of the student-respondents, academic performance in Mathematics of the student-respondents based on their mean grades of the first and second quarters, relationship between the level of numeracy skills development of the student-respondents based on the numeracy skills test and the identified factors, and relationship between the level of numeracy skills development of the student-respondents based on the numeracy self-assessment scale and the identified factors.

Profile of Student-Respondents

This part presents the profile of student-respondents in terms of age and sex, gross monthly family income, parents' highest educational attainment, parents' occupation, final grade in Mathematics in Grade 4, attitude toward Mathematics, and anxiety in Mathematics.

Age and Sex. Table 2 presents the age and sex distribution of the student-respondents.

The table shows that the oldest student-respondent was

Table 2

Age and Sex Distribution of Student-Respondents

Age	Sex		Total	%
	Male	Female		
12	1	1	2	1.43
11	25	31	56	40.00
10	27	44	71	50.71
9	3	8	11	7.86
Total	**56**	**84**	**140**	**100.00**
%	**40.00**	**60.00**	**100.00**	
Median		**10 years old**		
MAD		**0 year**		

ω=*p*=<.001<.05 not normally distributed

aged 12 years old while the youngest was nine years old. More than half of them, that is, 71 or 50.71 percent were aged 10 years old while 56 or 40.00 percent were aged 11 years old, and the rest were thinly distributed to the other identified ages.

The median age of the student-respondents was posted at 10 years old with a mean average deviation (MAD) of 0 year. The data showed that the student-respondents were clustered unanimously which suggested that they have similar level of understanding and interests.

Moreover, majority of the student-respondents belonged to the female sex accounting for 84 or 60.00 percent. The

male counterpart was composed of 56 or 40.00 percent. The data signified female dominance among the student-respondents. This was expected considering that in the roster of enrollment, the female students outnumbered the male ones in almost all educational units. This denoted that more of this sex group were inclined to schooling than their male counterpart who usually required to assist their parents in their field of endeavor.

Gross Monthly Family Income. Table 3 reveals the gross monthly family income of the student-respondents.

Table 3

Gross Monthly Family Income of Student-Respondents

Income	f	%
₱10,000	5	3.57
₱ 8,000	2	1.43
₱ 7,000	4	2.86
₱ 6,500	2	1.43
₱ 5,000	12	8.57
₱ 4,000	4	2.86
₱ 3,500	4	2.86
₱ 3,000	50	35.72
₱ 2,500	34	24.28
₱ 2,000	21	15.00
₱ 1,100	2	1.43
Total	**140**	**100.00**
Median	**₱3,000.00**	
MAD	**₱500.00**	

ω=*p*=<.001<.05 not normally distributed

Table 4 shows that the gross monthly family income of the student-respondents ranged from ₱1,100 to ₱10,000 whereby a number of them, that is, 50 or 35.72 percent registered a gross monthly family income of ₱3,000 while 34 or 24.28 percent earned ₱2,500 monthly, 21 or 15.00 percent disclosed to have a monthly gross family income of ₱2,000, and the rest were slimly distributed to the other identified incomes.

The median gross monthly family income of the student-respondents was posted at ₱3,000.00 with a MAD of ₱500.00. This signified that the student-respondents belonged to the lowest decile of the income distribution which denoted that they belonged to the low-earning income family which could hardly make both ends meet because of the rising prices of prime commodities. There was a disparity in the income distribution between families where some earned higher but most earned meager income.

Parents' Highest Educational Attainment. Table 4 reflects the parents' highest educational attainment of the student-respondents.

From the table, it can be gleaned that a number of the fathers of the student-respondents, that is, 50 or 35.17 percent were able to reach the elementary level while 29 or 20.72 percent of them were elementary graduates, 24 or 17.15 percent were high school graduates, and the rest were distributed to the other identified educational level, to

Table 4

Parents' Highest Educational Attainment of Student-Respondents

Educational Level	Father		Mother	
	f	%	f	%
College Graduate	5	3.57	14	10.00
College Level	8	5.71	5	3.57
Technological-Vocational Course Graduate	0	0.00	5	3.57
High School Graduate	24	17.15	11	7.86
High School Level	12	8.57	29	20.72
Elementary Graduate	29	20.72	44	31.43
Elementary Level	50	35.17	24	17.14
No Schooling	13	8.57	8	5.71
Total	**140**	**100.00**	**140**	**100.00**

include the 13 or 8.57 percent who disclosed that they were not able to attend school.

Table 4, likewise, reveals that a number of the mothers of the student-respondents, that is, 44 or 31.43 percent were elementary graduates while 29 or 20.72 percent were in the high school level, 24 or 17.14 percent were in the elementary level, 14 or 10.00 percent were college graduates, and the rest were distributed to the other identified educational levels.

The foregoing data signified that the parents of the student-respondents were functional literates, that is, they have the capability to read, write, and understand simple messages including simple calculations being schooled in a

formal educational system. This could be an advantage to their children during the new normal education for they could act as one of their learning facilitators.

Parents' Occupation. Table 5 reflects the parents' occupation of the student-respondents.

The table shows that a number of the fathers of the student-respondents, that is, 67 or 47.86 percent were engaged in agriculture-related activities while 25 or 17.86 percent were laborers, and the rest were thinly distributed to the other identified gainful occupations. Eighteen of them

Table 5

Parents' Occupation of Student-Respondents

Occupation	Father		Mother	
	f	%	f	%
Government Employee	1	0.71	6	4.29
Employee of Private Company	2	1.43	0	0.00
Public School Teacher	0	0.00	5	3.57
Private School Teacher	0	0.00	3	2.14
Self-Employed	9	6.43	5	3.57
PNP/BJMP/BFP Personnel	0	0.00	0	0.00
AFP Personnel	3	2.14	0	0.00
OFW/Seafarer	0	0.00	3	2.14
Laborer	25	17.86	0	0.00
Agriculture-Related Activities	67	47.86	40	28.57
Househusband/Housewife	7	5.00	76	54.29
No Employment	18	12.86	2	1.43
Not Stated	8	5.71	0	0.00
Total	**140**	**100.00**	**140**	**100.00**

or 12.86 percent disclosed that they have no employment while eight or 5.71 percent did not state their occupations, and seven or 5.00 percent were househusbands.

Likewise, the same table shows that majority of the mothers of the student-respondents were housewives accounting for 76 or 54.29 percent. The remaining respondents were engaged gainfully in the different fields of endeavor. However, two or 1.43 percent disclosed that they have no employment.

The foregoing data manifested that most of the fathers were gainfully engaged in an occupation which served as the main sourced of their living to support the family. The mothers being the housewives served as support system of the family that provided the needs of every member.

Final Grade in Mathematics in Grade 4. Table 6 presents the final grade in Mathematics of the student-respondents in their Grade 4.

From the table, it can be gleaned that the final grade of the student-respondents in Mathematics in their Grade 4 ranged from 75 to 89 whereby a number of them, that is, 29 or 20.71 percent obtained a grade of 80 while 28 or 20.00 percent got a grade of 78, 22 or 15.71 percent obtained a grade of 81, 19 or 13.57 percent got a grade of 75, and the rest were clustered in the other identified grades in Mathematics in Grade 4.

Table 6

Final Grade in Mathematics in Grade 4 of Student-Respondents

Grade	f	%
89	2	1.43
88	6	4.29
87	5	3.57
85	5	3.57
84	4	2.86
83	4	2.86
82	4	2.86
81	22	15.71
80	29	20.71
79	10	7.14
78	28	20.00
77	2	1.43
75	19	13.57
Total	**140**	**100.00**
Median	**80.00**	
MAD	**2.00**	

ω=*p*=<.001<.05 not normally distributed

The median grade in Mathematics in Grade 4 of the student-respondents was posted at 80.00 with a MAD of 2.00. This signified that the student-respondents showed favorable performance in Mathematics during their Grade 4 level with grade higher than the required passing mark by the DepEd which was 75. This can be construed that the entry knowledge of the student-respondents in Mathematics in their next grade level was favorable that needs to be sustained or enhanced by the next Mathematics teacher.

Attitude Toward Mathematics. Table 7 appraises the attitude toward Mathematics of the teacher-respondents. There were 40 attitude statements identified in this area whereby the respondents signified their agreement or disagreement in

Table 7

Attitude Toward Mathematics of Student-Respondents

Attitude Statement	WM	I
1. Mathematics is a very worthwhile and necessary subject.	4.21	A
2. I want to develop my mathematical skills.	3.76	A
3. I get a great deal of satisfaction out of solving a mathematical problem.	3.94	A
4. Mathematics helps me develop the mind and teaches a person to think.	3.78	A
5. Mathematics is important in everyday life.	3.73	A
6. Mathematics is one of the most important subjects for people to study.	3.99	A
7. High school math courses would be very helpful no matter what I decide to study.	3.77	A
8. I can think of many ways that I use math outside of school.	3.48	U
9. Mathematics is one of my most dreaded subjects.	3.52	A
10. My mind goes blank and I am unable to think clearly when working with mathematics.	3.28	U
11. Studying mathematics makes me feel nervous.	3.46	U
12. Mathematics makes me feel uncomfortable.	3.49	U
13. I am always under a terrible strain in a math class.	3.33	U
14. When I hear the word mathematics, I have a feeling of dislike.	3.17	U

Table 7 continued

Attitude Statement	WM	I
15. It makes me nervous to even think about having to do a mathematics problem.	3.36	U
16. Mathematics does not scare me at all.	3.46	U
17. I have a lot of self-confidence when it comes to mathematics.	3.19	U
18. I am able to solve mathematics problems without too much difficulty.	3.14	U
19. I expect to do fairly well in any math class I take.	3.04	U
20. I am always confused in my mathematics class.	2.92	U
21. I feel a sense of insecurity when attempting mathematics.	3.09	U
22. I learn mathematics easily.	3.08	U
23. I am confident that I could learn advanced mathematics.	3.23	U
24. I have usually enjoyed studying mathematics in school.	3.23	U
25. Mathematics is dull and boring.	2.79	U
26. I like to solve new problems in mathematics.	3.04	U
27. I would prefer to do an assignment in math than to write an essay.	3.05	U
28. I would like to avoid using mathematics in college.	2.99	U
29. I really like mathematics.	3.04	U
30. I am happier in a math class than in any other class.	3.01	U
31. Mathematics is a very interesting subject.	3.17	U
32. I am willing to take more than the required amount of mathematics.	2.94	U
33. I plan to take as much mathematics as I can during my education.	2.99	U
34. The challenge of math appeals to me.	3.64	A
35. I think studying advanced mathematics is useful.	3.52	A
36. I believe studying math helps me with problem solving in other areas.	3.77	A
37. I am comfortable expressing my own ideas on how to look for solutions to a difficult problem in math.	3.45	U

Table 7 continued

Attitude Statement	WM	I
38. I am comfortable answering questions in math class.	3.55	A
39. A strong math background could help me in my professional life.	3.22	U
40. I believe I am good at solving math problems.	3.05	U
Grand Weighted Mean	**3.35**	
Interpretation	**Undecided**	

Legend:

4.50-5.00	Strongly Agree	(SA)
3.50-4.49	Agree	(A)
2.50-3.49	Undecided	(U)
1.50-2.49	Disagree	(D)
1.00-1.49	Strongly Agree	(SA)

It can be noted from Table 8 that the student-respondents "agreed" 12 attitude statements with weighted means ranging from 3.52 to 4.21. Of these attitude statements, "Mathematics is a very worthwhile and necessary subject" was rated with the highest mean while the statements stating: "I think studying advanced mathematics is useful" and "Mathematics is one of my most dreaded subjects" equally obtained the least weighted mean. In the remaining 28 attitude statements, the same respondents were "uncertain" with them with weighted means ranging from 2.79 to 3.49. Of these attitude statements, the statements stating: "Mathematics makes me feel uncomfortable" and "Mathematics is dull and boring" obtained the highest and the least weighted means, respectively.

Taken as a whole, the student-respondents were "undecided" on their attitude toward Mathematics being shown by the grand weighted mean of 3.35. This signified that the student-respondents manifested a moderately favorable attitude toward Mathematics which indicated that they felt some difficulty with the said subject area.

Anxiety in Mathematics. Table 8 provides the anxiety in Mathematics of the student-respondents. There were 25 identified indicators included in this area whereby the respondents assessed each indicator.

The table shows that the student-respondents considered two indicators as "much" which corresponded to the statements stating: "getting ready to study for a math test" and "studying for a math test" with weighted means of 3.88 and 3.65, respectively. The remaining 24 indicators were considered by this same group of respondents as "a fair amount" with weighted means ranging from 2.67 to 3.48. Of these indicators, the statements stating: "being given a set of division problems to solve" and "taking an exam (final) in a math course" were rated with the highest and least weighted means, respectively.

Taken as a whole, the student-respondents appraised their anxiety in Mathematics as "a fair amount" being supported by the grand weighted mean of 3.15. This signified that the student-respondents felt moderate anxiety in

Table 8

Anxiety in Mathematics of Student-Respondents

Anxiety Statement	WM	I
1. Studying for a math test.	3.65	M
2. Taking math section of the college entrance exam.	2.88	AFA
3. Taking an exam (quiz) in a math course.	3.12	AFA
4. Taking an exam (final) in a math course.	2.67	AFA
5. Picking up math textbook to begin working on a homework assignment.	2.94	AFA
6. Being given homework assignments of many difficult problems that are due the next class meeting.	3.38	AFA
7. Thinking about an upcoming math test 1 week before.	3.19	AFA
8. Thinking about an upcoming math test 1 day before.	3.10	AFA
9. Thinking about an upcoming math test 1 hour before.	2.82	AFA
10. Realizing you have to take a certain number of math classes to fulfil requirements.	3.38	AFA
11. Picking up math textbook to begin a difficult reading assignment.	3.19	AFA
12. Receiving your final math grade in the mail.	3.10	AFA
13. Opening a math or stat book and seeing a page full of problems.	2.82	AFA
14. Getting ready to study for a math test.	3.88	M
15. Being given a “pop” quiz in a math class.	3.04	AFA
16. Reading a cash register receipt after your purchase.	3.08	AFA
17. Being given a set of numerical problems involving addition to solve on paper.	3.01	AFA
18. Being given a set of subtraction problems to solve.	2.99	AFA
19. Being given a set of multiplication problems to solve.	3.21	AFA

Table 8 continued

Anxiety Statement	WM	I
20. Being given a set of division problems to solve.	3.48	AFA
21. Buying a mathematics textbook.	3.30	AFA
22. Watching a teacher work on an algebraic equation on the blackboard.	3.10	AFA
23. Signing up for a math course.	3.30	AFA
24. Listening to another student explain a math formula.	3.23	AFA
25. Walking into a math class.	3.01	AFA
Grand Weighted Mean	**3.15**	
Interpretation	**A Fair Amount**	

Legend:

4.50-5.00	Very Much	(VM)
3.50-4.49	Much	(M)
2.50-3.49	a Fair Amount	(AFA)
1.50-2.49	Little	(L)
1.00-1.49	Not at All	(NA)

Mathematics which could be understood that they felt moderate difficulty with the subject. This meant that intervention activities should be developed and implemented to ease the anxiety felt by the students with Mathematics.

Numeracy Skills Development of Student-Respondents

This part contains the numeracy skills development of the student-respondents based on the following tools, namely: numeracy skills test of the DepEd and numeracy self-assessment scale of Awofala (2014).

Numeracy Skills Test. Table 9 reflects the numeracy skills of the student-respondents based on the numeracy

Table 9

Numeracy Skills of Student-Respondents Based on the Test of DepEd

Numeracy	f	%
Highly Numerates	24	17.14
Moderately Numerates	114	81.43
Non-Numerates	2	1.43
Total	**140**	**100.00**
Overall	**Moderately Numerates**	

skills test of the DepEd.

As reflected in the table, it can be gleaned that majority of the student-respondents were rated as "moderately numerates" accounting for 114 or 81.43 percent. Twenty-four of them or 17.14 percent were rated as "highly numerates" and the remaining two or 1.43 percent were considered as "non-numerates".

In the overall, the student-respondents were rated as "moderately numerates" based on the result of the numeracy skills test of the DepEd. This signified that the student-respondents manifested moderate competency in their numeracy that suggests that they need intervention activities to enhance their numeracy skills.

Numeracy Self-Assessment Scale. Table 10 reflects the numeracy skills development of the student-respondents based

Table 10

Numeracy of the Student-Respondents Based on the Numeracy Self-Assessment Scale (NSAC)

Indicator	WM	I
A. Basic Numeracy		
I can . . .		
1. Perform simple calculations such as addition and subtraction.	2.54	MS
2. Count money and make change.	2.12	FS
3. Calculate the cost of items on an electric or water bill.	1.88	FS
4. Make comparisons (e.g. taller or shorter, heavier or lighter, greater than or less than).	1.97	FS
5. Record time using digital and standard clocks, watches, or timers.	2.38	FS
Sub-Weighted Mean	**2.18**	**FS**
B. Numeracy in Future Employment Tasks		
I can . . .		
6. Take simple measurements (e.g., length, weight, temperature).	1.99	FS
7. Estimate quantities (e.g. such as number of copies of modules).	2.12	FS
8. Estimate measurements (e.g. such as length of front yard).	1.94	FS
9. Create and balance budgets.	1.55	FS
10. Create and monitor schedules (e.g. schedule of study time for modules).	2.10	FS
11. Estimate the time required to complete specific tasks in the modules.	1.81	FS
12. Take precise measurements using specialized equipment like timer in a cellular phone.	2.22	FS
13. Compare similar products with differing cost structures to determine the best value.	1.99	FS
14. Manage complex budgets (e.g. like own allowance or “baon”).	1.99	FS
15. Make accurate estimates when information is limited.	2.19	FS
Sub-Weighted Mean	**1.99**	**FS**

Table 10 continued

Indicator	WM	I
C. Mathematical Numeracy		
I can . . .		
16. Perform calculations that require multiplication and/or division.	2.60	FS
17. Calculate percentages.	1.61	FS
18. Calculate the area of common shapes (e.g. square, triangle, circle).	2.21	FS
19. Perform measurement conversions (e.g. inches to centimeters, milliliters to liters).	1.39	NS
20. Calculate simple averages	2.00	FS
21. Calculate areas and volumes of irregular shapes.	1.89	FS
22. Measure curved and irregular lengths.	1.90	FS
23. Analyze and compare statistical data.	1.89	FS
24. Perform calculations that require multiple steps or operations.	1.87	FS
Sub-Weighted Mean	**1.93**	**FS**
Grand Weighted Mean	**2.03**	
Interpretation	**Fairly Skilled**	

Legend:		
4.50-5.00	Very Highly Skilled	(VHS)
3.50-4.49	Very Skilled	(VS)
2.50-3.49	Moderately Skilled	(MS)
1.50-2.49	Fairly Skilled	(FS)
1.00-1.49	Not Skilled	(NS)

on the numeracy self-assessment scale (NSAS) developed by Awofola in 2014. The NSAS was sub-divided into three parts, namely: basic numeracy, numeracy in future employment tasks, and mathematical numeracy. A total of 24 indicators were identified in this area whereby the respondents assessed each indicator.

Along basic numeracy, the student-respondents self-assessed themselves as "fairly skilled" being supported by the sub-weighted mean of 2.18 while along numeracy in future employment tasks, they considered themselves "fairly skilled" also with a sub-weighted mean of 1.99, and along mathematical numeracy, they also averred that they were "fairly skilled" being indicated by the sub-weighted mean of 1.93.

Taken as a whole, the numeracy skills development of the student-respondents based on their self-assessment using the NSAS, they considered themselves "fairly skilled" with a grand weighted mean of 2.03. This signified that the student-respondents believed in themselves that they lack competencies required for their numeracy skills and their development of the skills tend to be slower. Thus, a need for an intervention program is necessary to improve their numeracy skills.

Academic Performance of the Student-Respondents

Table 11 presents the academic performance of the student-respondents in Mathematics.

The table shows that the academic performance of the student-respondents ranged from 75 to 98 whereby a number of them, that is, 21 or 15.00 percent obtained a grade of 80 while 18 or 12.86 percent got a grade of 79, another 18 or 12.86 percent obtained a grade of 75, 14 or 10.00 percent

Table 11

Academic Performance of the Student-Respondents

Grade	f	%
98	3	2.14
90	3	2.14
88	6	4.29
86	4	2.86
85	10	7.14
84	8	5.71
83	14	10.00
81	6	4.29
80	21	15.00
79	18	12.86
78	14	10.00
77	12	8.57
76	3	2.14
75	18	12.86
Total	**140**	**100.00**
Median	**80.00**	
MAD	**3.00**	

ω=*p*=<.001<.05 not normally distributed

obtained a grade of 83, another 14 or 10.00 percent got a grade of 78, and the rest were slimly distributed to the other identified grades in Mathematics.

The median academic performance of the student-respondents in Mathematics was posted at 80.00 with a MAD of 3.00. This signified that based on the performance of the student-respondents, they manifested highly favorable grade in Mathematics higher than the require passing grade by the

DepEd which was 75. However, this manifested performance can still be enhanced through intervention activities.

Relationship Between the Level of Numeracy Skills of the Student-Respondents Based on the Numeracy Skills Test and the Identified Factors

This part contains the relationship between the level of numeracy skills of the student-respondents based on the numeracy skills test and the identified factors, namely: student-related variates and academic performance in Mathematics.

Student-Related Variates. Table 12 reflects the relationship between the level of numeracy skills of the student-respondents based on the numeracy skills test and the student-related variates in terms of age, sex, gross monthly family income, parents' highest educational attainment, parents' occupation, final grade in Mathematics in Grade 4, attitude toward Mathematics, and anxiety in Mathematics.

Age. In looking into the linear association between the numeracy skills of the student-respondents based on the numeracy skills test and their age, it can be noted that the correlation between the two variables was weak (ρ=0.230). The Fisher's t showed that the age of the students influenced significantly their numeracy skills based on the numeracy skills test (F(138)=2.776, p=0.006, ω=<.001). This signified that older students manifested higher numeracy skills than

Table 12

Relationship Between the Level of Numeracy Skills of the Student-Respondents Based on the Numeracy Skills Test and Their Profile Variates

Variates	Association		Fisher's t-Value	p-Value @ α=.05	Evaluation/ Decision
	Coeffi-cient	Degree			
Age	ρ = 0.230	Weak	2.776	0.006	S / Reject Ho.
Sex	X^2 = 0.694 (df = 2)	---	---	0.707	NS / Accept Ho.
Gross Monthly Family Income	ρ = 0.056	Very Weak	0.659	0.511	NS / Accept Ho.
Parents' Highest Educatio-nal attain-ment	ρ = 0.101	Very Weak	1.193	0.235	NS / Accept Ho.
Parents' Occupation	X^2= 46.122 (df = 20)	---	---	0.000	S / Reject Ho.
Final Grade in Mathe-matics in Grade 4	ρ = 0.287	Weak	3.520	0.000	S / Reject Ho.
Attitude Toward Mathema-tics	ρ = 0.103	Very Weak	1.216	0.224	NS / Accept Ho.
Anxiety in Mathema-tics	ρ = -0.038	Very Weak	0.447	0.656	NS / Accept Ho.

ω=*p*=<.001<.05 pairwise normality deviated from the norm
Fisher's t-Critical = ±1.977, df = 138 S = Significant
NS = Not Significant

the younger ones based on the result of the numeracy skills test.

Sex. In associating between the numeracy skills of the student-respondents based on the numeracy skills test and

their sex, the Chi-Square showed that sex of the students did not influence significantly their numeracy skills ($X^2(2)=0.694$, $p=0.707$) based on the result of the numeracy skills test.

Gross Monthly Family Income. In looking into the linear association between the numeracy skills of the student-respondents based on the numeracy skills test and their gross monthly family income, it can be noted that the correlation between the two variables was very weak ($\rho=0.056$). The Fisher's t showed that the gross monthly family income of the students did not influence significantly their numeracy skills based on the numeracy skills test ($F(138)=0.659$, $p=0.511$, $\omega=<.001$).

Parents' Highest Educational Attainment. In looking into the linear association between the numeracy skills of the student-respondents based on the numeracy skills test and their parents' highest educational attainment, it can be noted that the correlation between the two variables was very weak ($\rho=0.101$). The Fisher's t showed that the parents' highest educational attainment of the students did not influence significantly their numeracy skills based on the numeracy skills test ($F(138)=1.193$, $p=0.235$, $\omega=<.001$).

Parents' Occupation. In associating between the numeracy skills of the student-respondents based on the numeracy skills test and their parents' occupation, the Chi-Square

showed that parents' occupation of the students influenced significantly their numeracy skills ($X^2(20)=46.122$, $p=0.000$) based on the result of the numeracy skills test. This signified that parents of the students with regular jobs manifested higher numeracy skills than the students whose parents have no jobs or with irregular occupations.

Final Grade in Mathematics in Grade 4. In looking into the linear association between the numeracy skills of the student-respondents based on the numeracy skills test and their final grade in Mathematics in Grade 4, it can be noted that the correlation between the two variables was weak ($\rho=0.287$). The Fisher's t showed that the final grade in Mathematics in Grade 4 of the students influenced significantly their numeracy skills based on the numeracy skills test ($F(138)=3.520$, $p=0.000$, $\omega=<.001$). This signified that the student-respondents who obtained highly favorable grade in Mathematics in Grade 4 manifested higher numeracy skills also.

Attitude Toward Mathematics. In looking into the linear association between the numeracy skills of the student-respondents based on the numeracy skills test and their attitude toward Mathematics, it can be noted that the correlation between the two variables was very weak ($\rho=0.103$). The Fisher's t showed that the attitude of the students toward Mathematics did not influence significantly

their numeracy skills based on the numeracy skills test (F(138)=1.216, p=0.224, ω=<.001).

Anxiety in Mathematics. In looking into the linear association between the numeracy skills of the student-respondents based on the numeracy skills test and their anxiety in Mathematics, it can be noted that the correlation between the two variables was very weak (ρ=0.038). The Fisher's t showed that the anxiety of the students in Mathematics did not influence significantly their numeracy skills based on the numeracy skills test (F(138)=0.447, p=0.656, ω=<.001).

In summary, of the student-related variates, only age, parents' occupation, and final grade in Mathematics in Grade 4 significantly influenced their numeracy skills. The other variates did not show any significant influence to it.

Academic Performance in Mathematics. Table 13 reflects the level of numeracy skills of the student-respondents based on the numeracy skills test and their academic performance in Mathematics.

In looking into the linear association between the numeracy skills of the student-respondents based on the numeracy skills test and their academic performance in Mathematics, it can be noted that the correlation between the two variables was weak (ρ=0.238). The Fisher's t showed that the academic performance of the students in Mathematics

Table 13

Relationship Between the Level of Numeracy Skills of the Student-Respondents Based on the Numeracy Skills Test and Their Academic Performance in Mathematics

Association		Fisher's t-Value	p-Value @ α=.05	Evaluation/ Decision
Coefficient	Degree			
ρ = 0.238	Weak	2.879	0.000	S / Reject Ho.

ω=*p*=<.001<.05 pairwise normality deviated from the norm
Fisher's t-Critical = ±1.977, df = 138

S = Significant
NS = Not Significant

influenced significantly their numeracy skills based on the numeracy skills test (F(138)=2.879, p=0.000, ω=<.001). This signified that the students with higher academic performance manifested higher numeracy skills also than the students who showed poor academic performance in Mathematics.

Relationship Between the Level of Numeracy Skills of the Student-Respondents Based on the Numeracy Self-Assessment Scale and the Identified Factors

This part contains the relationship between the level of numeracy skills of the student-respondents based on the numeracy self-assessment scale and the identified factors, namely: student-related variates and academic performance in Mathematics.

Student-Related Variates. Table 14 reflects the relationship between the level of numeracy skills of the student-respondents based on the numeracy self-assessment

Table 14

Relationship Between the Level of Numeracy Skills of the Student-Respondents Based on the Numeracy Self-Assessment Scale and Their Academic Performance in Mathematics

Variates	Association		Fisher's t-Value	p-Value @ α=.05	Evaluation/ Decision
	Coeffi-cient	Degree			
Age	ρ = 0.151	Very Weak	1.794	0.074	NS / Accept Ho.
Sex	X^2 = 11.217 (df = 4)	---	---	0.024	S / Reject Ho.
Gross Monthly Family Income	ρ = 0.005	Very Weak	0.059	0.953	NS / Accept Ho.
Parents' Highest Educatio-nal attain-ment	ρ = 0.059	Very Weak	0.694	0.484	NS / Accept Ho.
Parents' Occupation	X^2= 169.044 (df = 40)	---	---	0.000	S / Reject Ho.
Final Grade in Mathe-matics in Grade 4	ρ = 0.112	Very Weak	1.324	0.188	NS / Accept Ho.
Attitude Toward Mathema-tics	ρ = 0.686	Mode-rate	11.076	0.000	S / Reject Ho.
Anxiety in Mathema-tics	ρ = -0.782	Strong	14.739	0.000	S / Reject Ho.

ω=*p*=<.001<.05 pairwise normality deviated from the norm
Fisher's t-Critical = ±1.977, df = 138 S = Significant
NS = Not Significant

scale and the student-related variates in terms of age, sex, gross monthly family income, parents' highest educational attainment, parents' occupation, final grade in Mathematics

in Grade 4, attitude toward Mathematics, and anxiety in Mathematics.

Age. In looking into the linear association between the numeracy skills of the student-respondents based on the numeracy self-assessment scale and their age, it can be noted that the correlation between the two variables was very weak (ρ=0.151). The Fisher's t showed that the age of the students did not influence significantly their numeracy skills based on the numeracy self-assessment scale (F(138)=1.794, p=0.074, ω=<.001).

Sex. In associating between the numeracy skills of the student-respondents based on the numeracy self-assessment scale and their sex, the Chi-Square showed that sex of the students influenced significantly their numeracy skills (X^2(4)=11.217, p=0.024) based on the result of the numeracy self-assessment scale. This signified that the male students manifested higher numeracy skills than the female students.

Gross Monthly Family Income. In looking into the linear association between the numeracy skills of the student-respondents based on the numeracy self-assessment scale and their gross monthly family income, it can be noted that the correlation between the two variables was very weak (ρ=0.005). The Fisher's t showed that the gross monthly family income of the students did not influence significantly their numeracy skills based on the numeracy self-assessment scale

(F(138)=0.059, p=0.953, ω=<.001).

Parents' Highest Educational Attainment. In looking into the linear association between the numeracy skills of the student-respondents based on the numeracy self-assessment scale and their parents' highest educational attainment, it can be noted that the correlation between the two variables was very weak (ρ=0.059). The Fisher's t showed that the parents' highest educational attainment of the students did not influence significantly their numeracy skills based on the numeracy self-assessment scale (F(138)=0.694, p=0.484, ω=<.001).

Parents' Occupation. In associating between the numeracy skills of the student-respondents based on the numeracy self-assessment scale and their parents' occupation, the Chi-Square showed that parents' occupation of the students influenced significantly their numeracy skills (X^2(40)=169.044, p=0.024) based on the result of the numeracy self-assessment scale. This signified that the students whose parents have stable and regular jobs manifested higher numeracy skills than the students whose parents have not jobs or irregular occupations.

Final Grade in Mathematics in Grade 4. In looking into the linear association between the numeracy skills of the student-respondents based on the numeracy self-assessment scale and their final grade in Mathematics in Grade 4, it can

be noted that the correlation between the two variables was very weak (ρ=0.112). The Fisher's t showed that the final grade of the students in Mathematics in Grade 4 did not influence significantly their numeracy skills based on the numeracy self-assessment scale (F(138)=1.324, p=0.188, ω=<.001).

Attitude Toward Mathematics. In looking into the linear association between the numeracy skills of the student-respondents based on the numeracy self-assessment scale and their attitude toward Mathematics, it can be noted that the correlation between the two variables was moderate (ρ=0.686). The Fisher's t showed that the attitude of the students toward Mathematics influenced significantly their numeracy skills based on the numeracy self-assessment scale (F(138)=11.076, p=0.000, ω=<.001). This signified that the students with highly favorable attitude toward Mathematics manifested higher numeracy skills also than the students who were apathetic to it.

Anxiety in Mathematics. In looking into the linear association between the numeracy skills of the student-respondents based on the numeracy self-assessment scale and their anxiety in Mathematics, it can be noted that the correlation between the two variables was strong (ρ=0.782). The Fisher's t showed that the anxiety of the students in Mathematics influenced significantly their numeracy skills

based on the numeracy self-assessment scale (F(138)=14.739, p=0.000, ω=<.001). This signified that the students with less anxiety in Mathematics manifested higher numeracy skills also than the students who felt higher stress with it.

In summary, of the student-related variates, only sex, parents' occupation, attitude toward Mathematics, and anxiety in Mathematics proved to significantly influence their numeracy skills based on the numeracy self-assessment scale. The other variated did not proved any influence to it.

Academic Performance in Mathematics. Table 15 reflects the level of numeracy skills of the student-respondents based on the numeracy self-assessment scale and their academic performance in Mathematics.

In looking into the linear association between the numeracy skills of the student-respondents based on the numeracy skills test and their academic performance in

Table 15

Relationship Between the Level of Numeracy Skills of the Student-Respondents Based on the Numeracy Self-Assessment Scale and Their Academic Performance in Mathematics

Association		Fisher's t-Value	p-Value @ α=.05	Evaluation/ Decision
Coefficient	Degree			
ρ = 0.088	Very Weak	1.038	0.297	NS / Accept Ho.

ω=*p*=.037<.05 pairwise normality deviated from the norm
Fisher's t-Critical = ±1.977, df = 138

S = Significant
NS = Not Significant

Mathematics, it can be noted that the correlation between the two variables was very weak (ρ=0.088). The Fisher's t showed that the academic performance of the students in Mathematics did not influence significantly their numeracy skills based on the numeracy self-assessment scale (F(138)=1.038, p=0.297, ω=<.001).

Chapter 5

SUMMARY OF FINDINGS, CONCLUSIONS, AND RECOMMENDATIONS

This chapter presents the summary of findings with the corresponding conclusions drawn from them and the recommendations based on the conclusions drawn from the findings of the study.

Summary of Findings

The following were the salient findings of the study:

1. The oldest student-respondent was aged 12 years old while the youngest was nine years old. The median age of the student-respondents was posted at 10 years old with a mean average deviation (MAD) of 0 year. Moreover, majority of the student-respondents belonged to the female sex accounting for 84 or 60.00 percent.

2. The median gross monthly family income of the student-respondents was posted at ₱3,000.00 with a MAD of ₱500.00.

3. A number of the fathers of the student-respondents, that is, 50 or 35.17 percent were able to reach the elementary level while a number of the mothers, that is, 44 or 31.43 percent were elementary graduates.

4. A number of the fathers of the student-respondents, that is, 67 or 47.86 percent were engaged in agriculture-

related activities while majority of the mothers were housewives accounting for 76 or 54.29 percent.

5. The median grade in Mathematics in Grade 4 of the student-respondents was posted at 80.00 with a MAD of 2.00.

6. The student-respondents were "undecided" on their attitude toward Mathematics being shown by the grand weighted mean of 3.35.

7. The student-respondents appraised their anxiety in Mathematics as "a fair amount" being supported by the grand weighted mean of 3.15.

8. The student-respondents were rated as "moderately numerates" based on the result of the numeracy skills test of the DepEd.

9. The numeracy skills development of the student-respondents based on their self-assessment using the NSAS, they considered themselves "fairly skilled" with a grand weighted mean of 2.03.

10. The median academic performance of the student-respondents in Mathematics was posted at 80.00 with a MAD of 3.00.

11. In associating relationship between the level of numeracy skills of the student-respondents based on the numeracy skills test and the student-related variates, it was found significant in terms of age, parents' occupation, and final grade in Mathematics in Grade 4. In terms of sex, gross

monthly family income, parents' highest educational attainment, attitude toward Mathematics, and anxiety in Mathematics, it was not significant.

12. In looking into the linear association between the numeracy skills of the student-respondents based on the numeracy skills test and their academic performance in Mathematics, it was found significant.

13. In associating relationship between the level of numeracy skills of the student-respondents based on the numeracy self-assessment scale and the student-related variates, it was significant in terms of sex, parents' occupation, attitude toward Mathematics, and anxiety in Mathematics. In terms of age, gross monthly family income, parents' highest educational attainment, final grade in Mathematics in Grade 4, it was found not significant.

14. In looking into the linear association between the numeracy skills of the student-respondents based on the numeracy self-assessment scale and their academic performance in Mathematics, it was found not significant.

Conclusions

From the findings of the study, the following conclusions were drawn:

1. The student-respondents were clustered unanimously which suggested that they have similar level of understanding

and interests. Furthermore, female dominance composed the majority of the respondents which was expected considering that in the roster of enrollment, the female students outnumbered the male ones in almost all educational units. This denoted that more of this sex group were inclined to schooling than their male counterpart who usually required to assist their parents in their field of endeavor.

2. The student-respondents belonged to the lowest decile of the income distribution which denoted that they belonged to the low-earning income family which could hardly make both ends meet because of the rising prices of prime commodities. There was a disparity in the income distribution between families where some earned higher but most earned meager income.

3. The parents of the student-respondents were functional literates, that is, they have the capability to read, write, and understand simple messages including simple calculations being schooled in a formal educational system. This could be an advantage to their children during the new normal education for they could act as one of their learning facilitators.

4. Most of the fathers were gainfully engaged in an occupation which served as the main sourced of their living to support the family. The mothers being the housewives served as support system of the family that provided the needs of

every member.

5. The student-respondents showed favorable performance in Mathematics during their Grade 4 level with grade higher than the required passing mark by the DepEd which was 75. This can be construed that the entry knowledge of the student-respondents in Mathematics in their next grade level was favorable that needs to be sustained or enhanced by the next Mathematics teacher.

6. The student-respondents manifested a moderately favorable attitude toward Mathematics which indicated that they felt some difficulty with the said subject area.

7. The student-respondents felt moderate anxiety in Mathematics which could be understood that they felt moderate difficulty with the subject. This meant that intervention activities should be developed and implemented to ease the anxiety felt by the students with Mathematics.

8. The student-respondents manifested moderate competency in their numeracy that suggests that they need intervention activities to enhance their numeracy skills.

9. The student-respondents believed in themselves that they lack competencies required for their numeracy skills and their development of the skills tend to be slower. Thus, a need for an intervention program is necessary to improve their numeracy skills.

10. Based on the performance of the student-

respondents, they manifested highly favorable grade in Mathematics higher than the require passing grade by the DepEd which was 75. However, this manifested performance can still be enhanced through intervention activities.

11. Of the student-related variates, only age, parents' occupation, and final grade in Mathematics in Grade 4 significantly influenced their numeracy skills. The other variates did not show any significant influence to it.

12. The students with higher academic performance manifested higher numeracy skills also than the students who showed poor academic performance in Mathematics.

13. Of the student-related variates, only sex, parents' occupation, attitude toward Mathematics, and anxiety in Mathematics proved to significantly influence their numeracy skills based on the numeracy self-assessment scale. The other variated did not prove any influence to it.

14. The academic performance of the students in Mathematics did not influence significantly their numeracy skills based on the numeracy self-assessment scale.

Recommendations

Based on the conclusions drawn from the findings of the study, the following are recommended:

1. Although the students showed favorable performance

in Mathematics during their Grade 4 level, this needs to be sustained or enhanced.

2. Inasmuch as the students felt moderate anxiety in Mathematics because of its difficulty, intervention activities should be developed and implemented to ease the anxiety felt by the students with Mathematics.

3. Since the students felt that they lack competencies required for their numeracy skills and their development of the skills tend to be slower, there is a need for an intervention program to improve their numeracy skills.

4. Academic performance of the students in Mathematics needs sustenance and enhancement inasmuch as it influenced significantly their numeracy skills.

5. Another study may be conducted to validate the finding of the study.

6. Another study may be conducted involving other areas on numeracy.

Chapter 6

INTERVENTION PROGRAM

This chapter presents the intervention program to enhance the numeracy skills and academic performance of the students by providing the teachers together with the parents a training matrix to enhance the learning outcomes.

Rationale

Numeracy skills and academic performance provided teachers with a framework for desired competencies for effective teaching and instruction among students. As a professional teacher, he is involved with learners, fellow teachers, school officials and community leaders and even the parents. At the heart of his involvement is the teaching-learning process, which is characterized by dynamism and relevance. In order to respond to the demand and the call of the profession, the teacher needs to continuously assess his teaching strategies with the help of parents as a partner in the development of desired skill in mathematics.

Thus, one way to address the issue through reinforcing competence through school administrators through intervention

program in a form of matrix that will be implemented at their level.

Objectives

This intervention program aims to enhance the teaching strategies of with the help of parents in the District X of Catbalogan City.

In enhancing the numeracy skills and academic performance of the students.

Specifically, it is expected to:

1. Commit the parents and teacher to individual accountability for professional growth and shared responsibility for the students in enhancing their numeracy skills and academic performance in mathematics;

2. Help the teachers use different learning strategies and techniques as an aid in the effective instruction in mathematics that would benefit the students in enhancing their numeracy skills and academic performance in mathematics;

3. Ensure quality education through support services from the parents improved learning outcomes of the students in mathematics by using varied approaches in teaching mathematics; and

4. Enhance teaching strategies in providing learning activities for diverse learners in mathematics among students and to use indigenous resources to improve their numeracy skills and

academic performance in building their confidence, better retention, and promoting friendly environment.

Features of the Program

The content of the Intervention Program covers the following areas, namely: 1) objectives; 2) methods/strategies; 3) resources; 4) time frame; and 5) success indicator.

The Intervention Program

Objectives	Methods/ Strategies	Resources	Time Frame	Success Indicator	
1. To improve Mathematics instruction to the students	Conduct orientation to parents on Ronda Kwenta.	Register in the District/ School Training.	Beginning of the SY 2022-2023	Knowledge and Skills in numeracy among the students	Increased interest of students to lesson activities in numeracy and mathematics
2. To gain more content knowledge and skills in teaching Mathematics among students	Make use of approaches in teaching Mathematics such as: Inquiry-based approach;	Realias and manipulative things that are available	Start to end of SY 2022-2023	Increased Competencies and mastery of the content and skills in teaching Mathematics among students	Increased students' performance in Mathematics among students

dents along building learners confidence, better retention, and promoting friendly environment	Demonstration Approach; Math Lab Approach; Discovery Approach; Practical Work Approach; Brainstorming; Problem-solving, and; Cooperative Approach Use of effective strategies in teaching such as: Making activities hands-on; use visuals and images; find opportunities to differentiate learning; and incorporate storytelling to make connection to real			Increased Competences and mastery of the content and skills in teaching Mathematics among students	Increased students' performance in Mathematics among students based on the Division/ Regional/ National Tests Results

	world scenarios.				
3. To acquire knowledge and skills in providing learning activities that respond to demands of the community	Engage in Community projects	Look for available NGO project	1st 2 Saturdays of October 2022	Enhanced competences in establishing learning environment conducive to community aspirations	Increased Mathematics Academic Performance and participation in school activities
	Professional readings on connecting classroom activities to community development	Research in Library/ LGU centers	2nd Quarter Break 2022		

Strategy of Implementation

There are many things that need to be done before the Intervention Program can be implemented, which include: 1) ask the help from the district supervisor in seeking the approval from the schools division superintendent for the implementation of the program; 2) once approved, request from the schools division superintendent in issuing a memorandum for the implementation of the Intervention Program in the district

and inviting support from the school administrators for its effective implementation; 3) the district supervisor, school administrators and general PTCA officers should invite cooperation among elementary school teachers for the participation in the activities of the program; and 4) seek alliance from the local government unit (LGU) or non-government organizations (NGO's) in the implementation of the program specially if budget is required.

Funding Source

Funding for this intervention may come from the following sources:

1. General PTA or Homeroom PTA funds;
2. Proceeds from an income-generating project launched by the school; and
3. Voluntary support and donations from the LGU and from education-oriented NGOs.

Budgetary Requirements

In implementing this intervention, the following budgetary requirements would be entailed:

Supplies and Materials	. . . . .	P 15,000.00
Meals and Snacks during assessment and planning	. . . . .	25,000.00

Other Incidental Expenses		10,000.00
Total	P	50,000.00

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B. JOURNALS AND OTHER SOURCES

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D. ELECTRONIC SOURCES

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A P P E N D I C E S

APPENDIX A

REQUEST LETTER FOR APPROVAL OF RESEARCH TITLES

Samar College
COLLEGE OF GRADUATE STUDIES
Catbalogan City

July 30, 2020

DR. NIMFA T. TORREMORO
Dean, College of Graduate Studies
Samar College

Madame:

The undersigned will enroll in thesis writing this **First** Semester, School Year 2020-2021. In this regard, she would like to present the following proposed thesis titles, preferably number **1** for your evaluation, suggestions, and recommendations:

1. **NUMERACY SKILLS AND ACADEMIC PERFORMANCE IN MATHEMATICS OF GRADE 5 STUDENTS**
2. NUMERACY AND ACADEMIC PERFORMANCE OF GRADE 5 STUDENTS: BASIS FOR INSTRUCTIONAL REDIRECTION
3. MATHEMATICAL SKILLS OF GRADE 5 STUDENTS AND THEIR ACADEMIC ACHIEVEMENT: INPUTS FOR AN INTERVENTION

Very truly yours,

(SGD.) **DOREEN C. ARSENIO**
Researcher

1 (SGD.) NATALIA B. UY, PhD

1 (SGD.) GUILLERMO D. LAGBO, DPA

1 (SGD.) PEDRITO G. PADILLA, PhD

Approved Title Number: **1**

Approved:

(SGD.) **NIMFA T. TORREMORO, PhD**
Dean, College of Graduate Studies

APPENDIX B

LETTER FOR ASSIGNMENT OF ADVISER

Republic of the Philippines
Commission on Higher Education
Region VIII
SAMAR COLLEGE
COLLEGE OF GRADUATE STUDIES
City of Catbalogan

NAME : DOREEN C. ARSENIO

COURSE : Master of Arts in Educational Management

MAJOR : Educational Management

TITLE OF THESIS : NUMERACY SKILLS AND ACADEMIC PERFORMANCE IN MATHEMATICS OF GRADE 5 STUDENTS

NAME OF ADVISER : PEDRITO G. PADILLA, PhD

(SGD.) **DOREEN C. ARSENIO**
Researcher

Conforme:

(SGD.) **PEDRITO G. PADILLA, PhD**
Adviser

Approved:

(SGD.) **NIMFA T. TORREMORO, PhD**
Dean, College of Graduate Studies

APPENDIX C

QUESTIONNAIRE FOR STUDENT-RESPONDENT

Samar College
Catbalogan City

May 5, 2021

Dear Respondent:

Good day!

I am a student of the College of Graduate Studies of Samar College, City of Catbalogan, who is taking up Master of Arts in Educational Management. One of the requirements of the degree for which I am enrolled is thesis writing for which I am currently undertaking. The thesis which I am currently conducting is entitled, **"Numeracy Skills and Academic Performance in Mathematics of Grade 5 Students".** In connection with this study, you are chosen to be one of the respondents.

Please be assured that your privacy will be treated with utmost confidentiality and your responses will be used solely for research purposes only.

Thank you very much and Godspeed!

Very truly yours,

(SGD.) **DOREEN C. ARSENIO**
Researcher

==========

PART I. PROFILE VARIATES

Directions: This part of the questionnaire is a supply type and a checklist consisting of items about your personal profile. Please fill in the needed information on the line spaces provided in each item and/or place a check (/) mark on the appropriate line spaces of your answers.

Name (Optional) _____

1. Age ___ 2. Sex ___ Male
___ Female

3. Gross Monthly Family Income: _____

4. Parents' Highest Educational Attainment

Father		Mother
___	No Education	___
___	Elementary Level	___
___	Elementary Graduate	___
___	High School Level	___
___	High School Graduate	___
___	College Level	___
___	College Graduate	___
___	Vocational-Technical	___

5. Parents' Occupation

Father		Mother
___	Government Employee	___
___	Private Employee	___
___	Public School Teacher	___
___	Private School Teacher	___
___	Self-Employed (i.e. Vendor)	___
___	PNP/BJMP/BFP Personnel	___
___	AFP Personnel	___
___	OFW/Seafarer	___
___	Labor (i.e. Carpenter)	___
___	Agriculture-Related (i.e. Farmer/Fisherman)	___
___	Househusband/Housewife	___
___	No Employment	___
___	Others, please specify _____	___

6. Final Grade in Mathematics in Grade 4: _____

PART II. ATTITUDE TOWARD MATHEMATICS

Directions: This part of the questionnaire is a checklist reflective of your attitude toward Mathematics based on the Attitudes toward Mathematics Inventory developed by Tapia and Marsh (2004). Please check the appropriate column of your responses using the following five-point scale:

5 – Strongly Agree (SA)
4 – Agree (A)

3 – Undecided (U)
2 – Disagree (D)
1 – Strongly Disagree (SD)

Attitude Statement	5 (SA)	4 (A)	3 (U)	2 (D)	1 (SD)
1. Mathematics is a very worthwhile and necessary subject.					
2. I want to develop my mathematical skills.					
3. I get a great deal of satisfaction out of solving a mathematical problem.					
4. Mathematics helps me develop the mind and teaches a person to think.					
5. Mathematics is important in everyday life.					
6. Mathematics is one of the most important subjects for people to study.					
7. High school math courses would be very helpful no matter what I decide to study.					
8. I can think of many ways that I use math outside of school.					
9. Mathematics is one of my most dreaded subjects.					
10. My mind goes blank and I am unable to think clearly when working with mathematics.					
11. Studying mathematics makes me feel nervous.					
12. Mathematics makes me feel uncomfortable.					
13. I am always under a terrible strain in a math class.					
14. When I hear the word mathematics, I have a feeling of dislike.					

15. It makes me nervous to even think about having to do a mathematics problem.					
16. Mathematics does not scare me at all.					
17. I have a lot of self-confidence when it comes to mathematics.					
18. I am able to solve mathematics problems without too much difficulty.					
19. I expect to do fairly well in any math class I take.					
20. I am always confused in my mathematics class.					
21. I feel a sense of insecurity when attempting mathematics.					
22. I learn mathematics easily.					
23. I am confident that I could learn advanced mathematics.					
24. I have usually enjoyed studying mathematics in school.					
25. Mathematics is dull and boring.					
26. I like to solve new problems in mathematics.					
27. I would prefer to do an assignment in math than to write an essay.					
28. I would like to avoid using mathematics in college.					
29. I really like mathematics.					
30. I am happier in a math class than in any other class.					
31. Mathematics is a very interesting subject.					

32. I am willing to take more than the required amount of mathematics.					
33. I plan to take as much mathematics as I can during my education.					
34. The challenge of math appeals to me.					
35. I think studying advanced mathematics is useful.					
36. I believe studying math helps me with problem solving in other areas.					
37. I am comfortable expressing my own ideas on how to look for solutions to a difficult problem in math.					
38. I am comfortable answering questions in math class.					
39. A strong math background could help me in my professional life.					
40. I believe I am good at solving math problems.					

PART III. ANXIETY IN MATHEMATICS

Directions: This part of the questionnaire is a checklist reflective of your anxiety in Mathematics based on the Abbreviated Mathematics Anxiety Rating Scale developed by Alexander and Martray (1989). Please check the appropriate column of your responses using the following five-point scale:

5 – Very Much (VM)
4 – Much (M)
3 – A Fair Amount (AFM)
2 – Little (L)
1 – Not at All (NA)

Indicator	**5 (VM)**	**4 (M)**	**3 (AFM)**	**2 (L)**	**1 (NA)**
1. Studying for a math test.					

2. Taking math section of the college entrance exam.					
3. Taking an exam (quiz) in a math course.					
4. Taking an exam (final) in a math course.					
5. Picking up math textbook to begin working on a homework assignment.					
6. Being given homework assignments of many difficult problems that are due the next class meeting.					
7. Thinking about an upcoming math test 1 week before.					
8. Thinking about an upcoming math test 1 day before.					
9. Thinking about an upcoming math test 1 hour before.					
10. Realizing you have to take a certain number of math classes to fulfil requirements.					
11. Picking up math textbook to begin a difficult reading assignment.					
12. Receiving your final math grade in the mail.					
13. Opening a math or stat book and seeing a page full of problems.					
14. Getting ready to study for a math test.					
15. Being given a “pop” quiz in a math class.					
16. Reading a cash register receipt after your purchase.					
17. Being given a set of numerical problems involving addition to solve on paper.					

18. Being given a set of subtraction problems to solve.					
19. Being given a set of multiplication problems to solve.					
20. Being given a set of division problems to solve.					
21. Buying a mathematics textbook.					
22. Watching a teacher work on an algebraic equation on the blackboard.					
23. Signing up for a math course.					
24. Listening to another student explain a math formula.					
25. Walking into a math class.					

PART IV. LEVEL OF NUMERACY SKILLS DEVELOPMENT

Directions: This part of the questionnaire is a checklist composed of 24 statement indicators reflective of your level of numeracy skills development. Please check the column that approximates your numeracy skills using the following five-point scale:

5 – Very Highly Skilled (VHS)
4 – Very Skilled (VS)
3 – Moderately Skilled (MS)
2 – Fairly Skilled (FS)
1 – Not Skilled (NS)

Indicator	5 (VHS)	4 (VS)	3 (MS)	2 (FS)	1 (NS)
A. BASIC NUMERACY					
I can . . .					
1. Perform simple calculations such as addition and subtraction.					
2. Count money and make change.					

3. Calculate the cost of items on an electric or water bill.					
4. Make comparisons (e.g. taller or shorter, heavier or lighter, greater than or less than).					
5. Record time using digital and standard clocks, watches, or timers.					
B. NUMERACY IN FUTURE EMPLOYMENT TASKS					
I can . . .					
6. Take simple measurements (e.g., length, weight, temperature).					
7. Estimate quantities (e.g. such as number of copies of modules).					
8. Estimate measurements (e.g. such as length of front yard).					
9. Create and balance budgets.					
10. Create and monitor schedules (e.g. schedule of study time for modules).					
11. Estimate the time required to complete specific tasks in the modules.					
12. Take precise measurements using specialized equipment like timer in a cellular phone.					
13. Compare similar products with differing cost structures to determine the best value.					

14. Manage complex budgets (e.g. like own allowance or "baon").					
15. Make accurate estimates when information is limited.					
C. MATHEMATICAL NUMERACY					
I can . . .					
16. Perform calculations that require multiplication and/or division.					
17. Calculate percentages.					
18. Calculate the area of common shapes (e.g. square, triangle, circle).					
19. Perform measurement conversions (e.g. inches to centimeters, milliliters to liters).					
20. Calculate simple averages					
21. Calculate areas and volumes of irregular shapes.					
22. Measure curved and irregular lengths.					
23. Analyze and compare statistical data.					
24. Perform calculations that require multiple steps or operations.					

Thank you so much!

APPENDIX D

NUMERACY TEST FOR THE STUDENT-RESPONDENTS

Name _____ Grade _____ Section _____

Date of Administration _____

Directions: Perform the indicated operations. You are given 15 minutes to answer all the items.

Add the following:

1) 312 + 546	2) 734 + 763	3) 659 + 122

Subtract the following:

4) 365 - 253	5) 872 - 531	6) 903 - 435

Multiply the following

7) 43 x 6	8) 98 x 8	9) 76 x 9

Divide the following

10) 90 ÷ 5 = 11) 72 ÷ 6 = 12) 96 ÷ 8 =

APPENDIX E

REQUEST LETTER TO THE SCHOOLS DIVISION SUPERINTENDENT

Samar College
Catbalogan City

May 5, 2021

DR. MARILYN B. SIAO
Public Schools Division Superintendent
Schools Division of Catbalogan City

Dear Madame:

Good day!

I am a student of the College of Graduate Studies of Samar College, City of Catbalogan, who is taking up Master of Arts in Educational Management. One of the requirements of the degree for which I am enrolled is thesis writing which is I am currently undertaking. The thesis is entitled, **"Numeracy Skills and Academic Performance in Mathematics of Grade 5 Students".** In connection with this study, I would like to respectfully request permission from your good office to allow me to conduct the said study among the Grade 5 students of District X in this Division.

Please be assured that there will be limited face-to-face interaction during the conduct of the study, and the minimum health requirements of wearing of masks, hygienic practices, and physical distancing will be observe should there be a need for physical administration of the research instrument. Likewise, virtual data gathering will also be made using the various social media platforms.

Please be assured that the privacy of the respondents of this study will be treated with utmost confidentiality and the data collected from them will be used solely for research purposes. A copy of the final manuscript will be provided to your office for reference. Thank you very much and Godspeed!

Very truly yours,

(SGD.) **DOREEN C. ARSENIO**
Researcher

Recommending Approval:

(SGD.) **NIMFA T. TORREMORO, PhD**
Dean, College of Graduate Studies

Approved:

(SGD.) **MARILYN B. SIAO, EdD, CESO VI**
Schools Division Superintendent

APPENDIX F

REQUEST LETTER TO THE PUBLIC SCHOOLS DISTRICT SUPERVISOR

Samar College
Catbalogan City

May 5, 2021

MA. JOHN REY ROSALES
District Supervisor
District of Catbalogan X
Schools Division of Catbalogan City

Dear Sir:

Good day!

I am a student of the College of Graduate Studies of Samar College, City of Catbalogan, who is taking up Master of Arts in Educational Management. One of the requirements of the degree for which I am enrolled is thesis writing which is I am currently undertaking. The thesis is entitled, **"Numeracy Skills and Academic Performance in Mathematics of Grade 5 Students".** In connection with this study, I would like to respectfully request permission from your good office to allow me to conduct the said study among the Grade 5 students in the different public elementary schools under your district of supervision.

Please be assured that there will be limited face-to-face interaction during the conduct of the study, and the minimum health requirements of wearing of masks, hygienic practices, and physical distancing will be observe should there be a need for physical administration of the research instrument. Likewise, virtual data gathering will also be made using the various social media platforms.

Please be assured that the privacy of the respondents of this study will be treated with utmost confidentiality and the data collected from them will be used solely for research purposes. A copy of the final manuscript will be provided to your office for reference. Thank you very much and Godspeed!

Very truly yours,

(SGD.) **DOREEN C. ARSENIO**
Researcher

Recommending Approval:

(SGD.) **NIMFA T. TORREMORO, PhD**
Dean, College of Graduate Studies

Approved:

(SGD.) **MA. JOHN REY ROSALES**
Public District Supervisor

APPENDIX G

REQUEST LETTER TO THE SCHOOL HEAD

Samar College
Catbalogan City

May 5, 2021

THE SCHOOL HEAD
Catbalogan X Central Elementary School
District of Cstbalogan X
Schools Division of Catbalogan City

Dear Sir/Madame:

Good day!

I am a student of the College of Graduate Studies of Samar College, City of Catbalogan, who is taking up Master of Arts in Educational Management. One of the requirements of the degree for which I am enrolled is thesis writing which is I am currently undertaking. The thesis is entitled, **"Numeracy Skills and Academic Performance in Mathematics of Grade 5 Students".** In connection with this study, I would like to respectfully request permission from your good office to allow me to conduct the said study among the Grade 5 students of District X in this Division.

Please be assured that there will be limited face-to-face interaction during the conduct of the study, and the minimum health requirements of wearing of masks, hygienic practices, and physical distancing will be observe should there be a need for physical administration of the research instrument. Likewise, virtual data gathering will also be made using the various social media platforms.

Please be assured that the privacy of the respondents of this study will be treated with utmost confidentiality and the data collected from them will be used solely for research purposes. A copy of the final manuscript will be provided to your office for reference. Thank you very much and Godspeed!

Very truly yours,

(SGD.) **DOREEN C. ARSENIO**
Researcher

Recommending Approval:

(SGD.) **NIMFA T. TORREMORO, PhD**
Dean, College of Graduate Studies

C U R R I C U L U M V I T A E

NAME	:	**DOREEN C. ARSENIO**
HOME ADDRESS	:	Brgy. Maulong, Catbalogan City
EMAIL ADDRESS	:	doreen.castanas@deped.gov.ph
BIRTH DATE	:	January 10, 1995
BIRTH PLACE	:	Catbalogan City
CIVIL STATUS	:	Married
SPOUSE	:	Jerry U. Arsenio
FATHER	:	Gerardo M. Castanas
MOTHER	:	Cristita A. Castanas
PRESENT POSITION	:	Teacher III
WORK STATION	:	San Vicente Elementary School
DEGREE PURSUED	:	Master of Arts in Education
SPECIALIZATION	:	Educational Management

EDUCATIONAL BACKGROUND

ELEMENTARY	:	Pangdan Elementary School Brgy. Pangdan, Catbalogan City 2001-2007
SECONDARY	:	Samar National School Catbalogan City 2007-2011
TERTIARY	:	Samar State University Catbalogan City 2011-2015
Course	:	Bachelor of Elementary Education
GRADUATE STUDIES	:	Samar College City of Catbalogan 2016-2017

ELIGIBILITY

Licensure Examination for Teachers (LET)	:	Rating 80.00 September 27, 2015 Tacloban City

WORK EXPERIENCE

Teacher III	:	Department of Education Schools Division of Catbalogan City District of Catbalogan IV San Vicente ES October 27, 2020-Present

TRAININGS, SEMINARS, WORKSHOPS, AND CONVENTIONS

Division Special Education (SPED) Training of Receiving Teachers conducted by the Department of Education, Catbalogan City Division on May 29-31, 2019.

Capability Building on the Enhancement and Finalization of DCC, and DCLRs in MAPEH for Elementary and Secondary Levels conducted by the Department of Education, Catbalogan City Division on July 4-6, 2019.

Regional Division-Based Coaching and Mentoring on School-Based Management to Schools with Certification of SBM Level III Practices conducted by the Department of Education, Samar Division on August 15-16, 2019.

2019 Division Enhancement Training-Workshop in Journalism for School Paper Advisers conducted by the Department of Education, Catbalogan City Division on September 5-7, 2019.

Capability Building on the Utilization of Math Equipment cum Strategies in Teaching Mathematics conducted by the Department of Education, Catbalogan City Division on September 16-18, 2019.

DCP Status Monitoring and Implementation Review cum Office 365 Empowerment for School ICT Coordinators conducted by the Department of Education, Catbalogan City Division on January 8, 2020.

Capacity Building on ICT Integration for School ICT Coordinators – Introduction to Open Educational Resources conducted by the Department of Education, Catbalogan City Division on January 9-11, 2020.