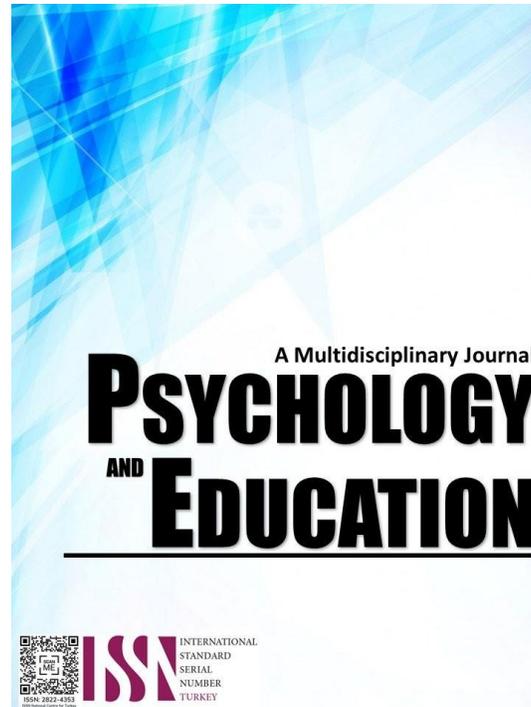


# **EFFECT OF T MATH MODULES TO THE NUMERACY LEVEL OF GRADE 6 LEARNERS OF PATABOG ELEMENTARY SCHOOL**



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## Effect of T Math Modules to the Numeracy Level of Grade 6 Learners of Patabog Elementary School

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### Abstract

This research sought to evaluate the impact of the T Math Module on the numeracy levels of an experimental group compared to a control group. Initial numeracy levels were assessed, with the experimental group scoring an average of 23.22 and the control group scoring 25.59, both indicative of non-numerate skills. Following the intervention, the experimental group's average numeracy level significantly increased to 51.18, classifying them as descriptively average numerate. In contrast, the control group exhibited a numeracy level of 37.43, indicating an emerging numerate status. The post-intervention difference in numeracy levels between the experimental and control groups was substantial at 14.237, signifying a significant disparity. The observed change in numeracy levels, with a notable variation of 2.62, underscores the effectiveness of the T Math Modules as an intervention strategy. In summary, both groups initially lacked numeracy skills, but after the intervention, the control group displayed emergent numeracy, while the experimental group achieved average numeracy. The significant improvement in the experimental group emphasizes the efficacy of T Math Modules in enhancing students' numeracy skills, supporting the recommendation for a district monitoring plan to guide the strategic utilization of T Math Modules as a Mathematics intervention.

**Keywords:** *T Math module, numeracy level, intervention*

### Introduction

Mathematics plays a predominant role in everyday life. Learning mathematics helps learners think analytically and have better reasoning abilities. Academically speaking, mathematics is a subject that many learners may either love or hate. Learners tend to develop negative attitudes and concerns towards the subject because of the formulas and rules involved in a mathematics lesson (Altintas & Ilgün, 2017).

According to the research conducted by Folk (2021), those who had trouble with math did not get any help that would help them improve their scores. Many schools provided more interventions in reading than in numeracy. According to Minnesota Report et al. (2018), research shows that, in 2017–2019, the number of learner's achievements in math was lower than that in reading.

According to the research conducted by Harris (2017), in the Philippines, the pandemic and the new normal greatly affect the learning system. One major challenge is teaching Mathematics, as there are a lot of factors that need to be considered in shifting from traditional learning to online classes, such as virtual location and access, replicating classroom training, assessment and feedback, cost savings, and doing it when government is not yet ready. According to Lunde (2021), while many educational institutions offer tier-two interventions to improve reading skills, they often neglect to provide any intervention beyond special education for students struggling with Mathematics.

In the PISA 2018 International Report, Filipino students' average score in mathematical literacy was 353 points, significantly lower than the Organization for Economic Cooperation and Development OECD average of 489 points, indicating a below Level 1 proficiency (OECD, 2018).

In the Division of Quezon, the result of the division-wide numeracy test conducted last February 2019 entails an urgent move to enhance the numeracy skills of our pupils in their early grades. Mastering four fundamental operations is far from what is expected of them. A considerable number of students are unable to solve straightforward real-life problems using fundamental mathematical operations effectively. Thus, Project T-Math (Teachers Materials /Activities for Active Teaching Habit) was conceptualized with one of its objectives of developing contextualized materials or activities that will help teachers efficiently and effectively the basic skills: Addition, Subtraction, Multiplication, and Division. It was introduced in the Division by Dr. Celestina M. Alba, the Education Program Supervisor in Mathematics. The said modules were intended for learners in grades 2–6 only.

According to Republic Act 10533, also known as the Enhanced Basic Education Act of 2013, Section 5h stipulates that "the curriculum must possess adaptability to empower and permit educational institutions to adapt, customize, and improve it in alignment with their specific educational and societal circumstances. The creation and advancement of teaching materials produced within the local community should be promoted, with the endorsement of such materials being delegated to the regional and division education units."

These instructional materials were created by the primary mathematics educators across the entire Quezon Province division, under the guidance of the following principles:

1. Develops and utilizes division-wide numeracy modules for non-numerates per grade level;
2. Improve mathematics achievement with emphasis on mathematical skills, problem-solving, and critical thinking; and

### 3. Enhances leadership and management of learning leaders in mathematics.

The developers of this module are confident that this project, T-Math, will give positive results as expected with consideration to the saying that "The essence of mathematics is not to make simple things complicated but to make complicated things simple".

This project collaborates with the Top Management, CID Chief, Mathematics EPS in charge, Head Teachers, Master Teachers, Key Teachers, and the Learning Resource Section. The distribution and utilization of the Project T Math Teachers Guide are intended to improve the division's numeracy level and mathematics education. Since the Division-Wide Numeracy Test conducted last March 2020 revealed that the mastery of the four fundamentals is far below the achievement standard of 75%, this will also serve as additional reference material in the teaching and learning process.

Mulanay District II had a Mean Percentage Score (MPS) of 65.16 in Mathematics in the First Quarter of SY 2020–2021, which is below the achievement standard of 75%, manifested that learners have difficulty understanding mathematical concepts in the new normal. To address the problem, Mulanay District II adopted Project T Math. Some schools implemented it as a part of their intervention program in Math, but some did not. Since the introduction of Project T-Math in the Division of Quezon, no empirical study has been conducted to evaluate its effectiveness. Hence, this proposed study.

In Patabog Elementary School, Grade 6 has the lowest MPS of 33.20 in Mathematics amongst the other five grade levels. This demonstrated that students face challenges when grasping mathematical concepts in the current educational environment.

To address this problem, Patabog Elementary School utilized T-MATH Modules to improve pupils' performance in this subject. This is also in response to Division Memorandum No. 151, Distribution and Utilization of T-MATH Modules, issued in 2021.

## Research Questions

This study determined the effect of T Math Modules in improving the numeracy level of Grade 6 learners of Patabog Elementary School. Specifically, it sought to answer the following questions:

1. What is the numeracy level of the control and experimental group before utilizing the T Math Module?
2. What is the numeracy level of the control and experimental group before utilizing the T Math Module?
3. Is there a significant difference between the numeracy level of the control group before and after utilizing T Math Modules?
4. Is there a significant difference between the numeracy level of the experimental group before and after utilizing T Math Modules?
5. Is there a significant difference between the numeracy level of the control and experimental group after utilizing T Math Modules?
6. What supervisory monitoring plan could be offered by the researcher based on the effect of T Math Modules in the numeracy level of Grade 6 learners?

## Literature Review

### *T Math Module as Localized Instructional Materials*

There are a number of some advantages to having localized materials implemented or adopted in our educational system. This be done in all learning areas. Localization maximizes materials, activities, events, and issues readily available in the local environment. In order to make the content relevant, educators should incorporate real-world materials and align their teaching with the experiences of the students. They should inspire students to raise questions and challenges and employ problem-solving approaches. The curriculum, adapted to local requirements and the students' lives, provides room for adaptability and innovative teaching methods. Additionally, teachers should leverage the available school resources and show consideration for the diversity in culture, language, and ethnicity. When students understand the practical applications of what they are learning and how it relates to the real world, their engagement in the learning process increases significantly. This motivates students to know more about their cultural heritage to appreciate and understand other cultures.

The localization of the curriculum can allow learning to become more meaningful and relevant. Localization will also involve making the local culture an integral part of the curriculum. Although there are benefits, there are also limitations, such as a shortage of local technical skills and material resources, apprehension about the unfamiliar, and reluctance to embrace change among teachers and local educators. However, these can be managed through developing a curriculum framework, including a clear set of curriculum standards, at the central level:

To ensure adherence to these standards in local and school-developed curricula, whether through traditional accreditation and endorsement processes or through oversight and monitoring activities (or a combination of both), it is vital to provide training for local curriculum developers. Moreover, it is essential to maintain transparent and effective communication between central educational authorities and local stakeholders. As per the Implementing Rules and Regulations (IRR) of Republic Act No. 10533, also known as the Enhanced Basic Education Act of 2013 (Department Order No. 43, series of 2013), the curriculum should be both contextualized and globally oriented. Furthermore, it should possess the flexibility required to enable educational institutions to adapt, customize, and

enrich it in accordance with their unique educational and social contexts. Under Rule II, Curriculum Section 10, 10.3, about the Production and Development of Materials, it is highly encouraged to produce and develop teaching and learning materials at the local level. The approval of such materials should be carried out by the regional and division education units, aligning with national policies and standards

Based on the study of Garin et al. (2017), it is recommended to use localized materials in teaching to improve the students' performance, however the materials provided should be unique and indigenous to be effective.

The advantages of adopting localized materials in the education system are that, first, it could bring awareness about the current topic being discussed and second, it does give a more specific and relevant topic to each student as the subject may be familiar to them; thus, students have a higher chance of engaging and participating during the discussion (Dimacali, 2018).

The result of the division-wide numeracy test demands a burning desire for change and advancement, it is evident that the mastery of the four (4) fundamental operations is far from what is expected. Likewise, the learners do not know what and how mathematics is, and many cannot even solve simple and real-life problems by applying the basic operations.

Consequently, the mathematics group led by Dr. Celestina M. Alba, education program supervisor, had to make a move to at least lessen or solve the said difficulty. This is the primary reason why this project, T-Math, is being introduced.

This module's creators strongly believe that this T-Math project will yield the expected positive outcomes. They bear in mind the adage that "The essence of mathematics is not to make simple things complicated but to make complicated things simple."

In accordance with Republic Act 10533, also known as the Enhanced Basic Education Act of 2013, Section 5h emphasizes that the curriculum must possess the necessary flexibility to enable schools to adapt, customize, and enrich it to suit their particular educational and social contexts. Additionally, it encourages the development and production of teaching materials at the local level, with approval authority delegated to the regional and division education units.

In response, the Curriculum Implementation Division (CID) crafted and reproduced Project T-Math (Teachers Materials for Active Teaching—Learning Habit) numeracy modules for grades 2–6.

Its main objective is to improve learners' proficiency level in four fundamental operations: addition, subtraction, multiplication, and division.

This initiative involves cooperation with the Top Management, CID Chief, Mathematics EPS in charge, Head Teachers, Master Teachers, Key Teachers, and the Learning Resource Section. The aim of distributing and using the Project T Math Teachers Guide is to enhance numerical proficiency and mathematics education within the division. The division-wide numeracy test conducted in March 2020 highlighted a significant gap, with mastery of the four fundamentals falling below the 75% achievement standard. Additionally, these materials will function as supplementary resources to support the teaching and learning process (DM. No. 151 s. 2021).

### ***Utilization of T Math Modules***

A module is an educational resource in print format, created to enable self-guided study by students, featuring detailed instructions for comprehending a subject. Among the instructional resources that educators can create is a module. Modules are methodically structured learning materials, enabling users to acquire knowledge independently, with or without a facilitator or teacher (Hasibuan, 2021). The advantages of using teacher-made teaching materials (modules) include making it easier for students to learn, having more immediate feedback, more complete mastery of the material, students being motivated to complete their modules according to their abilities, students more independence, and cooperation between teachers and students. The advantages of using modules for teachers include approaching students individually without disturbing the environment around students and increasing teacher professionalism because teaching modules raise questions that encourage teachers to think and be more scientific about their profession (Hasibuan, 2021). The module's learning goals aim to enable students to learn at their own pace, tailored to their abilities and the time they invest, utilize their preferred methods and techniques for learning, offer ample chances for rectifying mistakes through remedial activities and an increased number of assessments and pursue learning in alignment with their specific areas of interest (Hasibuan, 2021). The module provided is a stimulus for students that must be responded to or responded to students learn using modules, meaning that students respond to stimuli by understanding facts, principles, and concepts of mathematics and procedures for solving problems, which are student learning outcomes.

Consequently, the process of learning through modules encompasses three vital elements, which are as follows:

1. External conditions, encompassing the stimuli arising from the learning environment.
2. Internal conditions, characterizing the inner state and cognitive processes of students, including their understanding.
3. Learning outcomes, depicting the results of learning with modules, which encompass verbal information, intellectual skills, motor skills, attitudes, and cognitive strategies.

Rufii (2015) states that a learning module is an independently structured learning experience with a series of clear and coherent learning criteria and transparent assessment criteria.

The Distribution and Utilization of this Project T Math Teachers Guide is to improve the numeracy level and mathematics education in the Division, since division-wide Numeracy Test Conducted last March 2020 revealed that the mastery of the four fundamentals is far below the achievement standard of 75%. This will also serve as additional reference materials in the teaching and learning process (DM. No. 151 s. 2021).

### *Effects of T Math Module as Localized Materials to Enhance Performance of Learners*

The significance of a positive attitude toward mathematics is pivotal in achieving high performance in this subject. Hence, it is essential to implement educational interventions to foster a favorable outlook on mathematics among students. These interventions may encompass the following strategies:

- a) Educators can create engaging and intriguing mathematical tasks to captivate their students during math lessons, making the subject more enjoyable for them.
- b) School administrators can equip teachers with educational resources, such as technological devices, and offer professional development programs to empower them to employ diverse instructional approaches in the math classroom, enhancing students' enjoyment of the subject.
- c) Parents and teachers can provide precise feedback and support to assist students in acquiring accurate mathematical knowledge and building confidence in their math skills. d) Teachers can tailor the difficulty level of mathematical tasks by considering individual student performance to ensure that all students experience success in the math classroom. e) Parents and teachers can collaborate to instill in students an awareness of the practical value of mathematics in their present and future lives (Hwang & Son, 2021).

Based on the study of Garin et al. (2017), using localized materials in teaching is recommended to improve students' performance. However, the materials provided should be unique and indigenous to be effective.

According to the study of Landas and Alova (2022), instruction that involves the application of localized teaching and learning motivates students to learn and understand mathematics at the elementary school level. Localized teaching is an instructional strategy presenting the lesson directly on concrete applications in a specific context to appeal to the student's interest. Localized lessons in mathematics courses are positively related to student success.

Domantay and Rosals (2017) found that the group of students exposed to localized teaching performed better than those exposed to non-localized teaching.

The students exposed to contextualized and localized teaching significantly performed better than those exposed to contextualized but not localized teaching on the empirical type of test (Garin et al., 2017).

As per Shuttleworth's research in 2009, this design involves using two groups. One of these groups is subjected to a specific treatment, and their outcomes are collected upon completion of the study. Meanwhile, the control group does not receive any treatment during the same time frame yet undergo identical tests and assessments.

The study by Tanhal and Tanghal (2022) found that engaging with gadgets/devices like cell phones, cable TV, social media sites like Facebook, YouTube, and online gaming sites had a negatively significant relationship to the numeracy level of the grade 6 pupils.

According to the study of Capuyan et al. (2019) remedial instruction can help battling students shore up their fundamental abilities, which helps them make up for a lost time. Their findings reveal a positive relationship between the previous and the current grade levels' Mathematics grades of pupils who have attended the remediation sessions. The remediation sessions may have had positive effects on the pupils' interest in an attitude on their Mathematics lessons.

According to Rahmawati, Lestari, and Umam (2019), students who engaged with modules demonstrated superior average mathematical learning outcomes compared to those who did not utilize the modules. Additionally, the incorporation of Self-learning Modules significantly alleviated the teaching workload for educators. These modules enabled students to progress through the material at their own speed, fostering personalized and adaptable learning experiences.

According to the research conducted by Francisco, Alova, Alova, and Apohen (2022), the study concludes that the remediation program is highly effective in enhancing both test scores and overall student performance. This is evident as the post-test scores of students are notably higher than their pre-test scores. It is crucial to emphasize that there is a substantial improvement in students' performance in Mathematics, moving from the pre-test to the post-test, particularly under the remediation program. Additionally, when comparing the performance of students in Mathematics, those in the remediation program outperform those in the tutorial program.

According to the study of Blancia (2023), the remedial activities effectively improved the performance of the identified non-numerates. Significant difference between the pretest and the posttest numeracy performances revealed an improvement in the numeracy level of the learners.

The study conducted by Macalisang et al. (2021) found their study entitled General Mathematics Instruction with Code Switching

Application: Singapore and Hongkong Practices that the control and experimental groups had different performances during the post-test. The subjects in the control group had shown slight improvement. However, the subjects in the experimental group had shown significant improvement.

The study of Elorpe and Baggay (2020) found out that the conducted intervention program was effective in improving both the numeracy and literacy skills of the learners, as revealed by the mean difference between the pretest and the posttest. It explored the impact of an intervention program that focused on literacy and numeracy skills using the numeracy and literacy template developed by the researchers, which also incorporates student journal to affect understanding of integer problems among the Grade 7 students of Barasoain Memorial Integrated School (BMIS)-Mojon, City of Malolos, Bulacan for the school year 2019-2020.

### *Numeracy level*

Based on the Australian Core Skills Framework, numeracy is about applying mathematics in actual situations and communication in social purposes (personal, community, workplace, education, and training). This involves the understanding and application of mathematical skills when to use mathematics, extraction of mathematical information, and choosing appropriate mathematics when using.

In earlier stages of schooling, numeracy in children is highly observable, like recognizing patterns, numbers, and shapes that later on, high exposure to mathematics in their understanding, fluency, problem-solving, and reasoning. The State of Victoria (2016) stressed that numeracy, along with the concept of mathematics, helps children to be more confident and capable in modern times, as the skills associated with this are essential to the world today. There is also evidence suggesting that the development of numeracy skills can enhance resilience and persistence and contribute to academic achievement.

According to the Regional Memorandum No. 154 series 2023, the numeracy level is above average numeracy, average numeracy, emergent, and non-numerates. The DepED division of Quezon, through the online meeting of the school head in-charge in Mathematics, set a range for the numeracy level as 0-25% Non-numerate, 26-50% Emergent, 51-75% Average Numerate and 76-100% above average.

#### Numeracy Level

<i>Numeracy</i>			
Above Average	Average Numerate	Emergent	Non-numerate
76-100%	51-75%	26-50%	0-25%

### **Methodology**

In this research study, we employed the experimental research method, a meticulously structured and controlled approach. The primary aim of this method is to determine how the manipulated factors affect the dependent variables. In the context of this study, the experimental design was chosen to investigate the influence of the T Math module on the enhancement of the numeracy levels of the research participants. Specifically, it used the Pre-test and post-test Designs where respondents were selected systematically. It was given the same pre-test at the beginning and post-test at the end of the experiment.

### **Participants**

In this research investigation, the study population comprised 76 sixth-grade students in Patabog Elementary School during the academic year 2023-2024. The participants for this study were selected through a stratified-purposive sampling method. In this case, all grade 6 learners were assessed and ranked according to their final rating in Mathematics for the preceding School Year, 2022-2023. The distinctive feature of this sampling method is that it considers the entire population while considering specific characteristics, in this case, their past performance in Mathematics.

The learners were listed and numbered. The odd-numbered learners were assigned to the control group, while the even-numbered learners were assigned to the experimental group. This allocation allows for a controlled and balanced representation of learners from different performance backgrounds. By employing the stratified-purposive sampling method, the researcher ensured the inclusion of a wide spectrum of participants with diverse mathematical abilities in the sample. This approach facilitated a more thorough comprehension of how the T Math module influences numeracy levels among grade 6 learners. This sampling strategy aims to reduce bias and enhance the generalizability of the study's findings.

Table 1 provides a breakdown of the total number of grade 6 respondents in the study, organized by section and divided into two key groups: The Control Group (Set A) and the Experimental Group (Set B). The sections, namely "Marangal" and "Magiting," represent the different classes or groups of Grade 6 learners. The table shows that in the Marangal section, are 21 learners assigned to the Control Group and 18 learners in the Experimental Group. Similarly, in the Magiting section, there are 17 learners in the Control Group and 20 learners in the Experimental Group.

Table 1. Total Number of Grade 6 Respondents

Section	Control Group (Set A)	Experimental Group (Set B)
Marangal	21	18
Magiting	17	20
Total	38	38

Notably, there are an equal number of participants in both groups, with 38 learners in each group. This balance in group size is a noteworthy aspect of the research design, as it ensures that the two groups are comparable and minimizes the potential for bias in the study. The allocation of an equal number of participants to each group allows for a more robust comparison of the outcomes. It provides a basis for reliable conclusions about the impact of the T Math module on numeracy levels among grade 6 learners. This table serves as a foundational reference for understanding the distribution of participants in the study and underlines the researcher's commitment to a well-structured research design.

The Experimental Group, no participants were classified as "Above Average Numerate" or "Average Numerate" before the experiment. However, most fell into the "Emergent Numerate" and "Non-numerate" categories. Forty-seven percent, or 18 respondents were emergent numerates, and 53%, or 20 respondents, were non-numerates. In contrast the Control Group had one participant rated as "Average Numerate,". The majority of Control Group participants were also in the "Emergent Numerate" and "Non-numerate" categories. Three percent or 1 respondent was average numerate, 53% or 20 respondents were emergent numerates, and 44 percent or 17 respondents were non-numerates.

Before the study, a t-test had been applied to the final rating in Mathematics for the School Year 2022-2023 of the two groups to determine if the groups have no significant difference in terms of performance in Mathematics. The comparison of final ratings in Mathematics for School Year 2022-2023 of the two groups had been given in Table 2.

Table 2 provides a finding on the significant difference in the final rating in Mathematics for the school year 2022-2023 of the experimental and control groups.

Table 2. T-test on Finding the Significant Difference in the Final Rating in Mathematics for School Year 2022-2023 of the Experimental Group and Control Group

Variables Compared	df	Mean	N	Computed t-value	Critical Value	Decision	Impression at 0.05 level
Final Rating in Mathematics for School year 2022-2023 of Experimental Group and Control Group	74	X <sub>1</sub> = 84.34 X <sub>2</sub> = 84.26	n <sub>1</sub> = 38 n <sub>2</sub> =38	0.06208	1.66571	Accept Ho	Not Significant

When Table 2 is examined, it is seen that the averages of final ratings in Mathematics for School Year 2022-2023 of experimental and control groups are 84.34 and 84.26, respectively. Any significant difference between averages of final ratings could not be found due to the results of the t-test ( $t = 0.06208$ ), (74)  $p > 0.05$ ) with a critical value of 1.66571. It is safe to conclude that the two groups exhibit similar levels of performance in Mathematics, as evidenced by their final ratings in the subject for the academic year 2022-2023.

This established that at the beginning of the experiment, there was no significant difference in the performance level of the two groups. This further ensured the reliability and validity of the experiment.

## Instruments

The research tool used in this study was the Division Numeracy Test, a carefully crafted assessment created by highly skilled Mathematics educators within the Division of Quezon Province. This test comprises forty multiple-choice items and spans four pages in total. The primary purpose of this instrument was to assess the numeracy levels of Grade 6 learners, enabling the research to discern any significant differences in the learners' numeracy levels. This instrument was instrumental in addressing research questions number 2-4.

A validation process was conducted to ensure the instrument's reliability and validity. It involved the input and expertise of key educational figures, including the District School Head in charge of Governance and Operation, the District School Head in charge of Mathematics, and the District Mathematics Coordinator. This validation process, which occurred on July 26-27, 2023, provided a platform for assessing the instrument's content, relevance, and appropriateness. Feedback, suggestions, and recommendations from these educational experts were duly considered in the finalization of the instrument, ensuring that it effectively measured the intended variables in a reliable and valid manner.

Moreover, a pilot testing phase was carried out to assess the practicality and functionality of the instrument. It involved administering the Division Numeracy Test to 10 prospective Grade 6 learners from Canuyep Elementary School for the School Year 2023-2024, a process that took place during the enrolment period, and Brigada Eskwela from August 07 to 26, 2023. This pilot testing identified any

potential issues or challenges in the test administration and refined the instrument further, making it more suitable for the study's intended purpose.

In conclusion, the rigorous development, validation, and pilot testing of the Division Numeracy Test ensures that it is a robust and reliable tool for assessing the numeracy levels of Grade 6 learners in the study context. The thorough validation process involving vital educational stakeholders and the adjustments made based on their insights bolster the credibility and effectiveness of this research instrument.

## Procedure

The data-gathering procedures for this study were conducted at Patabog Elementary School and followed a systematic and ethical approach. To commence the procedure, authorization was requested from several essential figures within the educational system.

These individuals encompassed the school division superintendent, the education program supervisor in charge of Mathematics, the district supervisor, the school principal, the mathematics teacher, the sixth-grade advisor, and the sixth-grade students. A formal request letter, endorsed by the thesis adviser, was meticulously prepared and personally delivered to these responsible parties, ensuring transparency and approval for the research.

Once the necessary approvals were secured, the researcher gathered the essential materials required for the study. The issuance of Division Memorandum Number 685, dated September 8, 2023, marked the beginning of the experiment. This memorandum outlined the administration of the Division-Wide Numeracy Pre-test for the school year 2023-2024. Additionally, a significant step in the research process involved the re-grouping of two sections on September 15, 2023, based on pupils' final ratings in Mathematics for the previous school year, 2022-2023. The allocation of odd-numbered pupils to the control group and even-numbered pupils to the experimental group helped ensure an equitable distribution of participants and minimized potential biases.

On September 18, 2023, a brief orientation on the experiment was conducted to familiarize the participants with the process. This orientation took place from 3:30 p.m. to 4:00 p.m. subsequently, the pre-test was administered on September 21, 2023, organized by section following the Division memorandum for conducting the numeracy test during Mathematics class. The mathematics teacher supervised the pre-test, with the researcher overseeing the process. Learners used an Answer Sheet generated from the ZipGrade application, where they marked the circle corresponding to the letter of the correct answer. After completion, the mathematics teacher used the ZipGrade Application to evaluate the answer sheets, and the results were handed over to the researcher for thorough analysis.

The research continued with the control group engaging the class in regular math classes. In contrast, the experimental group participated in an intervention program emphasizing numeracy through the T MATH modules. The mathematics teacher, handled the regular class in mathematics and numeracy intervention also. The intervention program was conducted every Monday to Thursday from 3:30 to 4:30 in the afternoon.

The following lessons were tackled: Lesson 1, Addition of Similar Fractions – September 25, 2023, Lesson 2, Addition of Dissimilar Fractions – September 26, 2023, Lesson 3, Addition of Simple Fractions and Mixed Number – September 27, 2023, Lesson 4, Subtraction of Similar Fractions – September 28, 2023, Lesson 5 Subtraction of Mixed Fraction from a Whole Number – October 2, 2023, Lesson 6 Subtraction of Mixed Fractions without Regrouping – October 3, 2023, Lesson 7 Subtraction of Mixed Fractions with Different Denominators and with Regrouping – October 4, 2023, Lesson 8 Multiplication of Simple Fractions – October 16, 2023, Lesson 9 Multiplication of Mixed Numbers – October 17, 2023, Lesson 10 Division of Simple Fractions – October 18, 2023, Lesson 11 Multiplying Mixed Decimals by Mixed Decimals with Hundredths – October 19, 2023, Lesson 12 Division of Whole Numbers by Decimals – October 23, 2023 and Lesson 13 Division of Decimals and a Whole Number and Vice Versa – October 24, 2023.

The mathematics teacher facilitated these lessons, with pupils in the experimental group working through activities in the T MATH modules. Additional examples and techniques were provided to support their learning.

The research culminated on October 25, 2023, with the administration of the post-test, which mirrored the pre-test process. The researcher and the mathematics teacher supervised the post-test, beginning at 8:50 and concluding at 10:50 in the morning. Following the test, the answer sheets were scanned using the ZipGrade Application, and the results were once again, handed to the researcher for thorough analysis and interpretation.

## Ethical Considerations

The comprehensive and well-structured data-gathering procedures ensured that the research was conducted meticulously, from securing permissions to administering tests and intervention programs. This meticulous approach enhances the credibility and reliability of the study's findings, enabling the researcher to effectively address the research objectives and answer the underlying research questions.

## Results and Discussion

The first part of the presentation is the numeracy level of the experimental and control groups before and after the experiment. The second part presented the comparison of the numeracy level before and after the experiment of the experimental group through



dependent t-test. The third part compared the numeracy level of the control group before and after the experiment using the dependent t-test. The last part discussed the result of the independent t-test conducted to find out the significant difference in the numeracy level of the experimental and control groups after the experiment.

**Part I. Numeracy Level of the Control and Experimental group before utilizing T Math Module**

Table 3 provides essential insights into the numeracy levels of participants in both the Control Group and the Experimental Group before the commencement of an experiment. The data is categorized into different numeracy levels, each associated with a descriptive equivalent, a score range, and a rating in terms of percentage. The numeracy Pre-Test was consisting of 40 item tests. It shows that the average numeracy level of the control group is 10.24 and experimental group is 9.29. The control group has an MPS of 25.59 and the experimental group has an MPS of 23.22 percent with a numeracy level descriptive equivalent of non-numerate.

Table 3. *Numeracy Level of the Control and Experimental Group before the Experiment by Numeracy Level Descriptive Equivalent*

Numeracy Level Descriptive Equivalent	Control Group		Experimental	
	Frequency	Percentage	Frequency	Percentage
Above Average Numerate	0	0%	0	0%
Average Numerate	1	3%	0	0%
Emergent Numerate	20	53%	18	47%
Non-numerate	17	44%	20	53%
Total	38	100	38	100
Pretest Mean	10.24		9.29	
Mean Percentage Score (MPS)	25.59%		23.22%	
Descriptive Interpretation	Non-Numerate		Non-Numerate	

**Part II. Numeracy Level of the Control and Experimental group after Utilizing T Math Module**

Table 4 provides essential insights into the numeracy levels of participants in both the Control Group and the Experimental Group after the commencement of an experiment. The data is categorized into different numeracy levels, each associated with a descriptive equivalent, a score range, and a rating in terms of percentage. It shows that the average numeracy level of the control group is 14.97, and the experimental group is 20.47. The control group has an MPS of 37.43% percent while the experimental group has an MPS of 51.18 % with a numeracy level descriptive equivalent of Emergent numerate for the Control group and Average numerate for the Experimental Group after the experiment.

Table 4. *Numeracy Level of the Control and Experimental Group after the Experiment by Numeracy Level Descriptive Equivalent*

Numeracy Level Descriptive Equivalent	Control Group		Experimental	
	Frequency	Percentage	Frequency	Percentage
Above Average Numerate	0	0%	0	0%
Average Numerate	6	16%	22	58%
Emergent Numerate	24	63%	14	37%
Non-numerate	8	21%	2	5%
Total	38	100	38	100
Posttest Mean	14.97		20.47	
Mean Percentage Score (MPS)	37.43%		51.18%	
Descriptive Interpretation	Emergent Numerate		Average Numerate	

**Part III. Significant Difference between the Numeracy Level of the Control Group before and after utilizing T Math Module**

Table 5 provides the results of a t-test analysis for the Control Group, comparing their pre-test and post-test scores within the same group. This analysis is essential for assessing whether there are statistically significant differences in the control group's numeracy levels before and after the experiment to answer research question.

Table 5. *T-test Result of Pre-test and Post-Test of Control Group for Dependent Group*

Variables Compared	<i>x</i> Pretest	<i>x</i> Post-test	Computed t-value	Critical Value	Decision	Impression at 0.05 level
Numeracy Level of the Control Group Before and after the Experiment	10.24	14.97	6.266	2.026	Reject Ho	Significant

When Table 5 is examined it is seen that there is a difference between the averages of numeracy level of the control group before and after the experiment, like 6.266 points. A significant difference been observed between the averages of the pre-test and post-test of the control group related to their numeracy level due to the t-value calculated by using t-test analysis for dependent groups (CV =2.026, p<0.05). it is observed after the utilization of T Math Modules by the learners.

In summary, Table 5 provides compelling evidence of statistically significant changes in the Control Group's numeracy levels before and after the experiment. The positive t-value suggests improved numeracy levels within the group following the experiment. This means that the regular class with regular math lessons has slightly improvement.

#### Part IV. Significant Difference between the Numeracy Level of the Experimental Group before and after utilizing T Math Module

Table 6 presents the results of a t-test analysis conducted on the Experimental Group, examining explicitly the changes in their numeracy levels before and after the experiment. This analysis is of significant importance to answer question number 4, as it allows us to assess the experiment's impact on the Experimental Group and determine whether the observed differences are statistically significant.

Table 6. *T-test Result of Pre-test and Post-Test of Experimental Group for Dependent Group*

<i>Variables Compared</i>	<i>x</i> <i>Pretest</i>	<i>x</i> <i>Post-test</i>	<i>Computed</i> <i>t-value</i>	<i>Critical</i> <i>Value</i>	<i>Decision</i>	<i>Impression at 0.05</i> <i>level</i>
Numeracy Level of the Experimental Group Before and After the Experiment	9.29	20.47	14.237	2.026	Reject Ho	Significant

When Table 6 is examined, it is seen that there is a significant difference between the averages of numeracy level of the experimental group before and after the experiment, like 14.237 points. This implies statistically significant differences between the Experimental Group's numeracy levels before and after the experiment, given that the computed t-value exceeds the critical value of 2.026. The positive t-value suggests a notable improvement in numeracy levels within the group following the experiment.

#### Part V. Significant Difference between the Numeracy Level of the Control and Experimental Group after utilizing T Math Module

The post-experiment numeracy levels of both groups were compared to address the final question. This comparison was done by using t-test analysis for independent groups. Discoveries related to comparison are given in Table 7.

Table 7. *T-test Result of Numeracy Level of the Control and Experimental Group after the Experiment*

<i>Variables Compared</i>	<i>Mean</i>	<i>SD</i>	<i>t-stat</i>	<i>Computed t-</i> <i>value</i>	<i>Critical</i> <i>Value</i>	<i>Decision</i>	<i>Impression at</i> <i>0.05 level</i>
Numeracy Level of the Control and Experimental Group after the Experiment	X <sub>1</sub> = 14.97	SD <sub>1</sub> =4.81	4.91244	2.62	1.993	Reject Ho	Significant
	X <sub>2</sub> = 20.47	SD <sub>2</sub> =4.95					

When Table 7 is examined, it is seen that there is a difference between the averages of the numeracy level of the experimental and control groups after the experiment. A significant difference of 2.62 had been observed between the averages of the numeracy level of the experimental and control group with the computed t-stat of 4.91244 after the experiment. The table also shows that the average numeracy level of the experimental group after the experiment is 20.47, belonging to the numeracy level descriptive equivalent of average numerate with a standard deviation of 4.95. The control group, however got an average numeracy level of 14.97 with a numeracy level descriptive equivalent of emergent numerate having a standard deviation of 4.81 after the experiment.

If this difference and deviation values are taken into consideration, it is seen that this difference is in favor of the numeracy level of the experimental group after the experiment.

#### Part VI. Proposed Supervisory Monitoring Plan

The proposed Supervisory Monitoring Plan emerges as a crucial framework in response to the noteworthy surge in numeracy levels observed among participants in the experimental group following the implementation of the T Math module. This positive outcome substantiates the hypothesis that the T Math module significantly influences the numeracy levels of learners. The recognition of this impact underscores the necessity for a systematic approach to monitoring and supervising the utilization of T Math Modules within the realm of Mathematics education.

The Supervisory Monitoring Plan functions as an indispensable guide, offering a comprehensive manual for the effective deployment of T Math Modules as an intervention. Comprising an introduction, objectives, and a production section, the plan intricately details specific objectives, strategies, timeframes, budget allocations and sources, human and material resources, success indicators, and risk considerations.

To facilitate a meticulous monitoring process, a dedicated tool has been devised and structured into five distinct parts. The first part provides a holistic overview of the school context, the second part focuses on participating schools, the third part delves into pre-implementation considerations, the fourth part navigates through the intricacies of the implementation phase, and the fifth part concentrates on post-implementation assessment. Notably, the fifth part places a particular

emphasis on input assessment, encompassing data analysis and its consequential effects.

In conclusion, the Supervisory Monitoring Plan, coupled with its corresponding tool, serves as an invaluable resource attached in appendix A. Together, they establish a robust framework that not only acknowledges the impact of T Math Modules but also provides a structured and systematic approach to monitor and evaluate their utilization, ensuring the sustained enhancement of numeracy levels among learners.

## Conclusion

The findings of this study draw conclusive insights regarding the numeracy levels of both the control and experimental groups before and after the experiment. In the case of the control group, a substantial difference in numeracy levels was observed, prompting the confident rejection of the null hypothesis. Similarly, for the experimental group, the results indicate a significant disparity in numeracy levels before and after the experiment, leading to the rejection of the null hypothesis. Furthermore, when comparing the numeracy levels of the experimental and control groups post-experiment, a notable difference in favor of the experimental group was identified, reinforcing the rejection of the null hypothesis. These outcomes collectively highlight the impact of the experimental intervention on numeracy levels and provide robust evidence supporting the rejection of the null hypothesis in both group scenarios.

The research highlights the impact of utilizing T MATH modules on the numeracy levels of learners, revealing positive effects. In light of these favorable outcomes, several recommendations are proposed. Firstly, recognizing the positive influence of T Math modules on numeracy levels, it is suggested that school administrators allocate funds for the production of additional Mathematics learning materials to be used throughout the academic year. Secondly, building upon the findings, the encouragement of the utilization and production of other modules in Mathematics is put forth. Thirdly, considering the study's results, students are advised to actively engage with T MATH modules and allocate dedicated time to complete the exercises provided. Lastly, the study suggests that future researchers explore similar experimental inquiries on T MATH modules, focusing on their effectiveness in enhancing students' numeracy proficiency across diverse geographical locations. These recommendations aim to leverage the observed positive impact of T MATH modules for the benefit of educational practices and outcomes

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