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Student-Teacher Interactions and Math Anxiety as Determinants of Mathematics Performance in High School Students

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Abstract: One of the common problems that Grade 8 students experience is their anxiety towards the subject math. This can potentially hinder their performance at school. While a teacher's nurturing relationship with the student can improve academic performance, it is still unclear on how math anxiety and student-teacher relationship impact the learning outcomes of students at Abellana National High School. This research assessed the level of math anxiety, student-teacher relationship, and academic performance in Mathematics among the Grade 8 students of Abellana National High School for the school year 2024–2025 as the basis for an action plan using a descriptive-correlational research design. A total of 241 students participated in the study, selected through simple random sampling. The data were treated using frequency counts, percentages, weighted means, and Pearson's r. The results revealed that most students exhibited moderate levels of math anxiety, particularly before examinations and during algebraic problem-solving. The student-teacher relationship was rated as very satisfactory, showing that teachers were perceived as supportive and encouraging. The academic performance of the students was mainly within the satisfactory and very satisfactory range. Furthermore, there was no significant relationship between math anxiety and academic performance, nor between the student-teacher relationship and academic performance. It is concluded that math anxiety and student-teacher relationships do not have a significant impact on students' math performance. Hence, it is recommended that the action plan crafted will be utilized.

Keywords: Teaching Mathematics, math anxiety, student-teacher relationship, mathematics achievement, descriptive-correlational, Cebu City, Philippines.

Chapter 1

THE PROBLEM AND ITS SCOPE

INTRODUCTION

Rationale of the Study

Math is everywhere. It deals with numbers, shapes, patterns, and how things are related to each other. It is important as it enhances problem-solving, critical thinking, and logical reasoning skills. Once developed, these skills will help an individual develop a better approach to solving problems systematically and guide them to better decision-making. Today, technologies, innovations, and

AIs depend heavily on math. In our daily lives, math is the foundation for budgeting, planning, cooking, and managing our finances. Despite these, many students still consider math a complex subject.

Most Filipino students find it challenging to learn Math due to several factors, such as difficulty in comprehension and problem-solving, math anxiety, teacher-student relationships, and a perceived lack of relevance to the real world. Students often struggle to interpret problems and identify the operations and relationships between variables. Furthermore, when students have a weak understanding of the fundamental concepts, it is harder for them to understand advanced topics. The teacher-student relationship also plays a vital role when teachers are perceived as authoritative or distant figures, leading to math anxiety among students. Hence, this anxiety translates into poor performance on the world assessment of math skills.

Filipino students ranked among the world's weakest in math according to the 2022 Program for International Student Assessment. The Philippines ranked 77th out of 81 countries and performed worse than the global average in all categories (Business World, 2024). They lagged behind other countries in the international assessment for mathematics and science for grade 4, the Trends in International Mathematics and Science Study 2019 (TIMSS). The Philippines only scored 297 in mathematics and 249 in science, which are "significantly lower" than any other participating country. The country also scored the lowest among all 58 participating countries for both tests. In mathematics, only 19% of Filipino students were on the low benchmark, indicating they possessed "some basic mathematical knowledge." In comparison, 81% did not even reach this level (Education in the Philippines, 2020).

It has been observed that students in both public and private schools within the division of Cebu City oftentimes manifest anxiety in learning math and show a weak relationship with their teachers. The student-teacher relationship often remains limited to lesson delivery, homework completion, and task performance, without fostering a personal connection or offering emotional and psychological support. As a result, students hesitate to ask for help, questions, and clarifications, which further intensifies their anxiety about the subject. The lack of communication between the student and the teacher frustrates the students and creates a perception that Math is complex.

However, students' anxiety towards math can be mitigated if teachers nurture a positive relationship with the students. By actively promoting communication and engaging students in lessons, teachers can create a more personalized connection. Students will start to feel comfortable asking questions, sharing their opinions, and expressing their thoughts. Anxiety will be replaced with interest, and students will start to feel that their teachers are genuinely concerned for their success. Consequently, in the process, students will feel more at ease knowing that their teachers understand them both mentally and emotionally, which will encourage them to exert more effort in building a stronger relationship.

This research assessed the math anxiety, student-teacher relationship, and mathematics performance of the High school students at the identified public high school in Cebu City for the school year 2024-2025 as a basis for the proposed action plan. It will benefit the students by helping to reduce anxiety and develop confidence in math. The teachers can also reflect on the specific causes of math anxiety in their students, allowing them to create teaching strategies and a classroom environment that fosters a more supportive learning atmosphere.

Theoretical background

This study is anchored on the **Cognitive Load Theory** by John Sweller, the **Ecological Systems Theory** by Urie Bronfenbrenner, the **Enhanced Basic Education Act of 2013**, and the **DepEd Order No. 42, s. 2017, DepEd Order No. 13, s. 2018 and DepEd Order No. 21, s. 2019**.

Cognitive Load Theory (CLT), introduced by John Sweller, highlights the role of cognitive load in learning and problem-solving difficulties, which can be artificially manipulated through instructional design. Sweller also described how

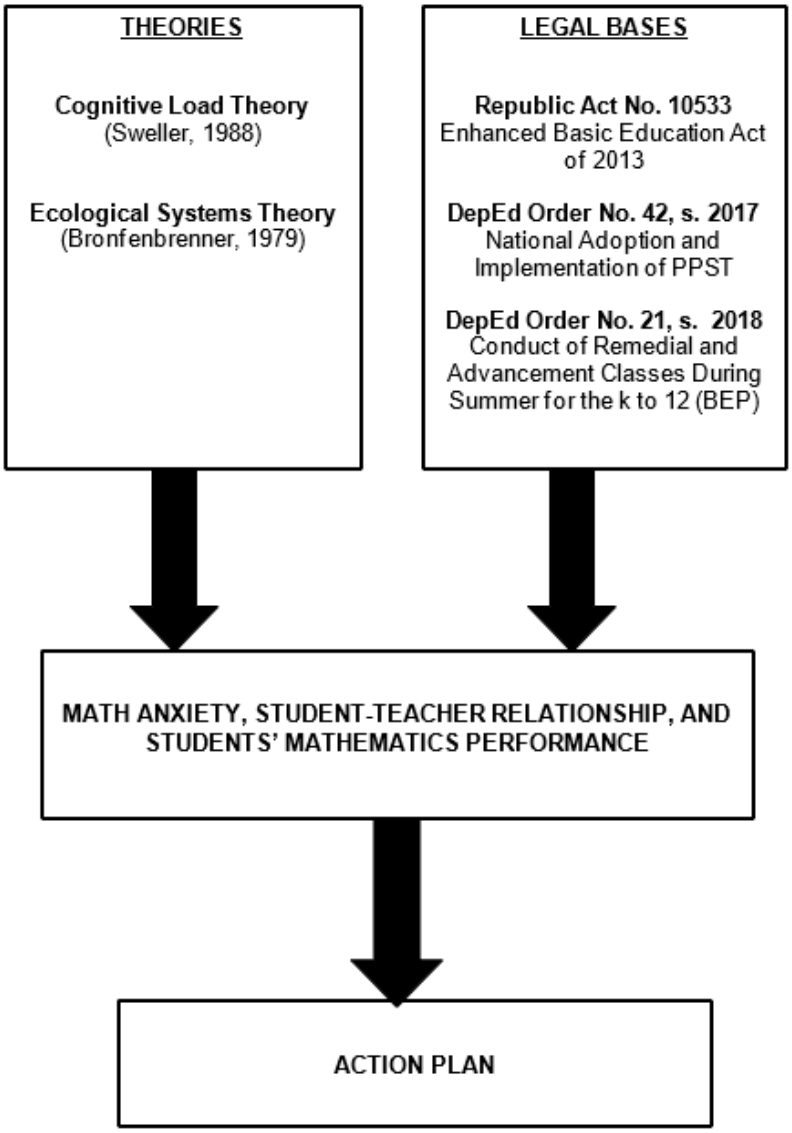

Figure 1. Theoretical Background of the Study

the humans intrinsic cognitive load process on working memory capacity imposed by element interactivity is intrinsic to the material being learned. Math anxiety is directly associated with cognitive load theory, where students experience stress and fear that affects their mathematical problem-solving. The students' mathematical performance will suffer due to negative thoughts, and their memory will hinder the productive learning process. The correlation between cognitive load theory and math anxiety is significant in structured learning environments that minimize cognitive load and enhance students' mathematical confidence. Cognitive processes play a vital role in solving mathematical problems, as they require knowledge to answer mathematical questions.

The Ecological Systems Theory by Urie Bronfenbrenner was later expanded by Nancy Darling. This theory studies the microsystems in the environment. Although this accurately represents the first phase of Bronfenbrenner's work, it is argued that the core feature of Bronfenbrenner's later work is its attention to the patterning and interrelationship of multiple determinants of development and the active role of the developing person. The microsystems highlight the vital role of connection in shaping student experiences, particularly in the microsystems where student-teacher relationships occur.

The effective student-teacher connections within the microsystems are designed to reinforce a learning environment, thereby boosting students' motivation, confidence, and academic production. Support for student-teacher connections can help reduce math anxiety by building trust, uplift, and fruitful communication. Teachers who create engaging and compassionate classroom environments, enabling students to develop resilience and reduce anxiety, will lead to improved mathematical performance. This theory highlights the significant role teachers play in students' lives, affecting both their mathematical performance and mental health. Building a classroom that fosters strong student-teacher connections will help students grow academically, as they perceive the support of their teachers. A strong connection can contain emotions and improved higher self-esteem. When students can build trust in the teacher, it can make the classroom environment productive.

Enhanced Basic Education Act of 2013 (Republic Act No. 10533). The Enhanced Basic Education Act of 2013 aims to build up the K to 12 educational system in the Philippines by ensuring that learners receive a holistic and adaptable education. This law focuses on learner-centered education, as well as pedagogical strategies that concern individual differences, including math anxiety.

This law aims to enhance mental health and psychological factors, such as student-teacher connections, and improve students' mathematical performance by incorporating instructional strategies that consider cognitive load and mental welfare. Teachers align with the main goal of enhancing the learning outcomes of the Enhanced Basic Education Act.

DepEd Order No. 42, s. 2017 – National Adoption and Implementation of the Philippine Professional Standards for Teachers (PPST). Outlines competencies that foster positive Student-teacher connections in the Development of this DepEd order. The teacher must demonstrate the importance of an inclusive and reinforcing classroom environment in enhancing participation and learning outcomes, especially regarding math.

DepEd Order No. 13, s. 2018—Guidelines for the Implementation of Remedial and Advancement Classes during the Summer for K to 12 Basic Education Program. It is an order for students who need to assist their peers who have difficulty learning concepts in mathematics. Remedial activity for addressing math anxiety is consistent with the findings of this study related to enhancing performance in learners and instructional strategy effectiveness.

DepEd Order No. 21, s. 2019 – Policy Guidelines on the K to 12 Basic Education Program. DepEd's latest policy aims to empower teachers in supporting students' emotional and cognitive growth. By aligning teaching strategies with learners' developmental needs, this policy can help reduce math anxiety and boost academic performance. One common problem teachers observe in the classroom is students' fear when facing mathematical questions. This problem affects students of all ages worldwide (Luttenberger et al., 2018).

Students feel demotivated each time they encounter math questions, and this anxiety is remarkably increasing among middle school students. When an individual experiences stress, nervousness, or tension that interferes with math performance, it is math anxiety (Ashcraft & Krause, 2007). Math anxiety results in poor mathematical performance.

Several factors contribute to students' anxiety about mathematics, and various studies have identified these causes. According to Hembree (1990), negative early experiences with math—such as poor exam performance or unsatisfactory interactions with teachers—significantly increase students' anxiety. The level of math anxiety a student experiences is influenced by the behaviors of both their parents and teachers. Maloney and Beilock (2012) studied the origin of students' apprehension when dealing with math. They found that teachers who experience intense math anxiety can unintentionally transmit their fears to students, particularly in early academic settings.

The fear of math among students harms their cognitive memory and critical-thinking skills (Ashcraft & Ridley, 2005). Research conducted by Ramirez et al. (2013) revealed that individuals who experience an intense fear of math tend to avoid involving themselves in mathematical tasks, leading to poor academic performance. The avoidance behavior becomes particularly evident in High school, when students encounter more abstract mathematical concepts, such as algebra and geometry, that require higher cognitive processing.

Many researchers have proposed strategies that may help attenuate the negative effects of test anxiety. Bellinger and Decaro (2015) found that mindfulness-based interventions improve the emotional response to anxiety-producing testing situations, freeing working memory resources and improving performance. In addition, Boaler (2016) presented a method for addressing mathematics as a growth and multifaceted subject. Boaler demonstrated how teachers, parents, and other caregivers shape children's ideas and experiences of math by fostering a positive growth mindset. This approach encourages individuals who experience anxiety toward math to view situations with silver linings rather than failures. Similarly, Peer tutoring and cooperative learning strategies have also effectively reduced math anxiety by fostering a supportive learning environment (Zakaria & Nordin, 2008).

Deleg, Zanavar, and Rabdan (2022) investigated the relationship between the teacher-related factors, students' mathematics anxiety, and mathematical performance of the 916 students taking the General Entrance Exam (GEE) in mathematics at the National University of Mongolia and Mongolian National University of Education using the Abbreviated Mathematical Anxiety Test (A-MARS). It was found that there was a significant relationship between the mathematical anxiety and teacher-related factors. In addition, it has been demonstrated that anxiety related to mathematics can impact students' performance in the subject.

Velez (2023) also studied mathematics anxiety and its influence on 250 Junior High School students' mathematics performance at Muertegui National High School using a survey questionnaire. The results showed that the students performed well in Mathematics.

Also, the study found that students at Muertegui National High School performed worse in mathematics when they had anxiety related to the subject. Additionally, the study found no connection between students' performance in mathematics and their worry about the subject. Thus, it is advised that the school has pertinent teaching methods and resources to enhance the efficacy of mathematics instruction for the pupils.

Palestro and Jameson (2024) took a closer look at how math anxiety, math self-efficacy, and emotional self-efficacy interact in undergraduate students. Their research found that students who feel more confident in their math abilities tend to experience less anxiety and perform better. On the other hand, emotional self-efficacy, how well students believe they can regulate their emotions, did not seem to have a major effect on their math performance. These findings suggest that boosting students' confidence in their math skills could be a key strategy in helping them overcome math anxiety and improve their academic success.

Ramirez et al (2018) studied the significant impact of teacher math anxiety on students' math achievement, emphasizing that students' perceptions of their teachers' beliefs about math can mediate this effect. The findings suggest that teachers with high math anxiety tend to use fewer process-oriented teaching strategies, which in turn may shape students' understanding of math ability.

Zhou et al (2019) also conducted a study investigating how self-efficacy and anxiety mediate the impact of the teacher-student relationship on mathematical problem-solving skills in 1667 fifth graders from central China through a large-scale survey. The findings imply that a strong teacher-student relationship directly improves students' ability to solve mathematical problems. Additionally, this positive relationship boosts students' confidence (self-efficacy), which in turn helps with their problem-solving skills. However, while both confidence and math anxiety play a

role, self-efficacy has a weaker effect on reducing anxiety. The findings highlight the crucial role of teacher-student relationships in education and offer insights for future research on enhancing student learning experiences.

Akin and Kurbanoglu (2011) investigated the relationships between math anxiety, math attitudes, and self-efficacy in 372 university students who were enrolled in Sakarya University, in Turkey, using the Revised Mathematics Anxiety Rating Scale, the Mathematics Attitudes Scale, and the Self-efficacy Scale. The study found that math anxiety was negatively related to positive attitudes and self-efficacy. Math anxiety was inversely predicted by self-efficacy and positive attitudes, whereas it was positively predicted via negative attitudes. The outcomes were examined in the context of books.

In addition, Cates and Rhymer (2003) investigated the relationship between mathematics anxiety, fluency, and error rates in basic mathematical operations among college students assigned to either a high-anxiety or low-anxiety group, who then took a timed test in these operations.

The outcome of the study suggested that the anxiety group had significantly lower fluency levels on the mathematical operations tests. However, no significant differences were found in error rates between the two groups.

Hajovsky, Oyen, Chesnut, and Curtin (2019) conducted a study on teacher–student relationship quality and student achievement of 881 children in the National Institute of Child Health and Human Development Study using the longitudinal structural equation modeling. A close teacher-student relationship significantly enhances teacher self-efficacy. On the other hand, conflicts between teachers and students have a moderate impact on it. Additionally, teacher-student closeness influenced math achievement only indirectly through teacher self-efficacy, whereas conflict has impacted math achievement both directly and indirectly. The findings remained consistent on different grade levels, which reinforced their validity. Thus, this study offers researchers and educators valuable insights into a factor that can be leveraged to improve student success in math.

Dodongan (2022) investigated the relationship between math anxiety, learning interaction, and their perception of how useful technology is to Mathematics among the selected second-year college students from the Teacher Education Institution in Davao de Oro. The results highlighted the significance of elevated anxiety in enhancing students' math performance. Furthermore, both math anxiety and the perceived benefits of technology were identified as key factors influencing students' mathematical achievement.

These findings suggest that anxiety, engagement, and perceptions of technology's usefulness should be considered when aiming to enhance overall math performance.

Additionally, Moroscallo (2024) studied the relationship between math anxiety and the academic performance of 49 Grade 11 students using Ellen Freedman’s standardized Self-Test for Math Anxiety. The study found that respondents had moderate math anxiety and satisfactory performance in General Mathematics. A significant link was observed between math anxiety and sex. Additionally, higher math anxiety correlated with lower academic performance, while lower anxiety was associated with better performance.

Fear in math significantly impacts students in terms of intellectual processing, confidence, and overall academic performance in class. Cognitive Load theory highlights how working memory works in learning, associating high anxiety with adverse effects on cognitive capacity. The ecological systems theory emphasizes the significance of teachers' relationships with students in molding students' motivation and emotional welfare, which impacts educational outcomes. Two national policies reinforce student-centered strategies addressing psychological and mental needs: the Enhanced Basic Education Act and the DepEd Orders. The study shows that a positive learning environment, strong instructional practices, and teacher efficacy can address students' apprehension towards math and improve students' overall performance

THE PROBLEM

Statement of the Problem

This research assessed the math anxiety, student-teacher relationship, and mathematics performance of high school students at Abellana National School for the school year 2024-2025 as a basis for an action plan.

Specifically, this study sought to answer the following queries:

1. What is the level of anxiety of the respondents in learning Mathematics?
2. What is the level of student-teacher relationship experienced by the respondents?
3. What is the level of academic performance of the respondents in Mathematics?
4. Do the two have a meaningful connection?
5. math anxiety among respondents and their academic achievement in mathematics;
6. the interaction between students and teachers and respondents' academic achievement in mathematics?
7. Based on the findings, what action plan could be crafted?

Statement of the Null Hypotheses

Based on the objectives of the study, the following null hypotheses were tested at a 0.05 level of significance:

Ho_1: There is no significant relationship between the respondents' math anxiety and their academic performance in Mathematics.

Ho_2: There is no significant relationship between the student-teacher relationship and the academic performance of the respondents in Mathematics.

Significance of the Study

The researchers believe that this study is important because it has a potential impact and contributes to existing knowledge. It highlights the benefits for various stakeholders, including researchers, educators, policymakers, and other sectors and individuals mentioned below.

DepEd Officials. This study will serve as a basis for curriculum design and policies that focus on reducing math anxiety. This will help promote new educational practices aimed at fostering positive math attitudes.

School Administrators. This study will serve as a reference for the school in assessing High school students.

Teachers. They can gain insights and ideas on the reasons behind the students' anxiety and will adapt their teaching strategies to create an environment conducive to learning. They can provide students with all the necessary support and encouragement to develop an interest in math.

Students. This study aims to reduce their math anxiety and improve their confidence and performance in math. It will change their negative attitude and feelings toward the subject. Their academic success will be maximized.

Researcher. The result of this study will help researchers understand the importance of identifying the underlying reasons. A query on why students have low performance in mathematics and how to help them.

Future Researchers. The results of this study will inform them about the effects of math anxiety, the relationship between students and teachers, and the math performance of High School students, and will guide the conduct of further studies similar to this research.

RESEARCH METHODOLOGY

This section explained the methodical approach undertaken in this research study. It provided an overview and justification of the research design's methodological approach. It provided the research environment setting, including details about the location and a description of where the study was conducted. It also explicated the respondents' population and sampling, the research instruments, data gathering procedure, as well as the data analysis techniques and statistical treatment.

Design

This study aimed to determine the relationship between math anxiety and student-teacher relationships in relation to students' academic math performance. A descriptive correlational design, as the latest revision by Bhandari (2023), which investigated relationships between variables without the researcher manipulating or controlling them. In this correlational research, two variables were used: Math anxiety and student-teacher relationship, wherein data were collected and highly studied to establish the relationship with the academic performance of the students.

Flow of the study

The research followed a systematic process to ensure a clear and organized investigation. The flow of the study was structured into several key phases. The researchers used an Input – Process - Output (IPO) system model in gathering the essential data needed for the study, as illustrated in Figure 2.

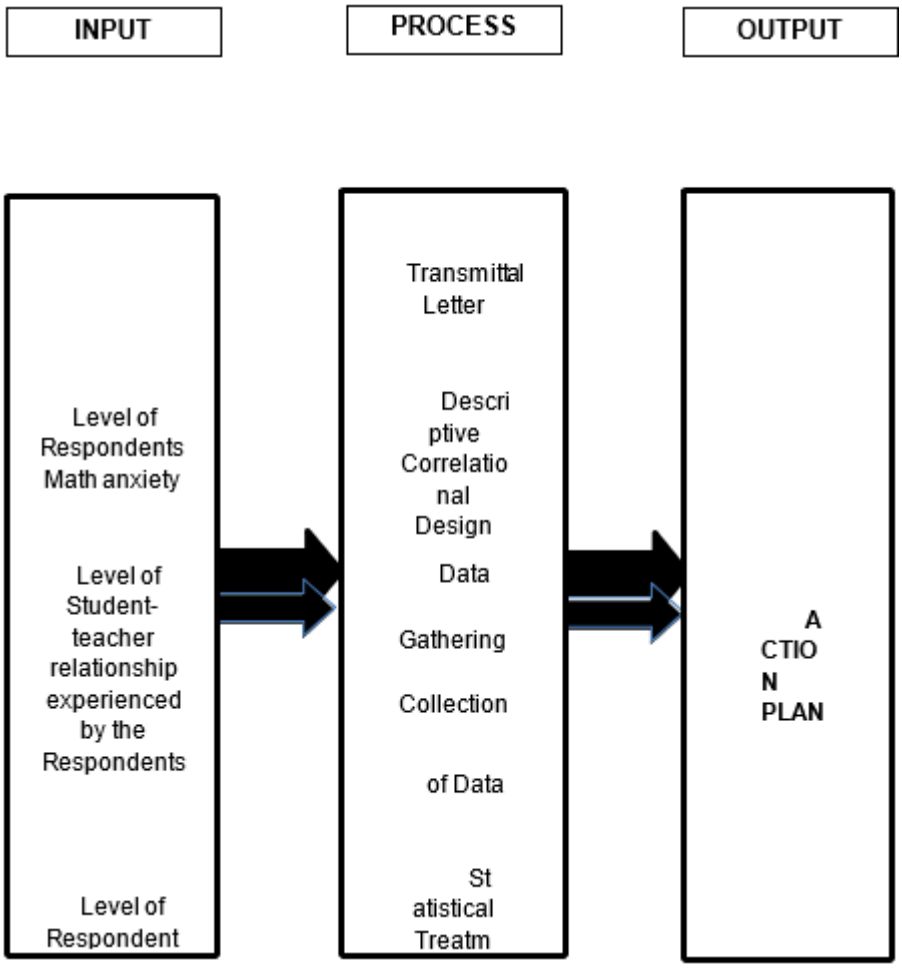

Figure 2: Flow of the Study

Input Phase. The researcher first conducted a respondents' profile, measured the level of math anxiety, the level of student-teacher relationship, and the level of academic performance using differentiated questionnaires. For the level of academic performance, scores from the unit test were used. For assessing the levels of math anxiety and student-teacher relationships, 5-point scale questionnaires were utilized, followed by a scoring procedure. After gathering the data on variables, the researcher tests the significant relationship.

Process Phase. The researcher made a transmittal letter asking permission from the head of the school to conduct the study. After the school head approved the letter, the consent form was distributed to the identified students, requesting parental permission for their participation in the study. The study employed a descriptive correlational design, wherein researchers gathered data to address their problem statement.

For data gathering, identified respondents completed three sets of verified and validated questionnaires, and the data were then collected. After that, the researchers utilized different statistical tools to analyze and interpret the data gathered as part of the study. Following the interpretation of the data, the findings and recommendations were presented.

Output Phase. The output of the study involved the proposed learning action plan. Based on the results and findings, the researcher recommended the proposed action plan.

Environment

This research was conducted at the Abellana National School. This was established in 1902 at Osmeña Boulevard, Barangay Sambag II, in Cebu City. The school was formerly part of the Cebu State College of Science and Technology (CSCST) but later became an extension campus. Before this, the school was known as the first provincial high school, established under Act No. 372 of the Philippine Commission in 1902. After World War II, the school took the name Abellana High School in honor of the governor of Cebu, Hilario Abellana, a local hero killed during the Japanese occupation. Subsequently, the name changed to Abellana Technical School and then to Abellana Vocational High School until it became the current Abellana National School in 1993. To ensure a comprehensive education with a positive environment that reaches students' interests and career expectations, the school provides various educational programs, such as technical-vocational and general academic curricula. Currently, the institution caters an enormous number of students from diverse barangays in Cebu City and nearby town. It consists of well-equipped laboratories, classrooms and well-structured buildings that supports academic and technical learning. Moreover, the school cultivates acceptance, encourages inclusiveness and community participation. These qualities make the school a well-suited environment for educational research, as it demonstrates stimulating and conducive learning space that supports both personal and intellectual growth among learners.

Figure 3. Location Map of the Research Environment

Respondents

This study was selected to ensure distinct representation and broad analysis. The selection criteria were based on their relevance to the study's objectives and their direct involvement in the subject matter. The respondents of this study were High school students from Abellana National High School. The level of experience in learning Mathematics from Elementary to High school was a significant factor for the researchers in conducting the study; they were suitable for participation, since the variables of the study focused on students' Math anxiety and student-teacher relationship towards their academic Math performance.

Table 1. Distribution of the Respondents

Grade 8 - Section	n	%
Grade 8- Anahaw	27	11.20
Grade 8- Bamboo	40	16.60
Grade 8 – Chestnut	40	16.60
Grade 8 – Ichigo	27	11.20
Grade 8 – Maguey	33	13.69
Grade 8 – Molave	35	14.52
Grade 8 - Oak	39	16.19
Total	241	100.00

A simple random sampling technique was used to select respondents. A sample is a subset of a population that is randomly selected, as described by Thomas (2023). This method ensures that every High school student in the selected schools has an equal chance of being included in the study, reducing selection bias and increasing the generalizability of the findings.

As shown in Table 1, the sections Bamboo and Chestnut of Grade 8 in Abellana National High School had the highest respondents, each with 40 students, accounting for 16.60% of the total sample. It was then followed by Grade 8 Molave (14.52%), Oak (16.19%), and Maguey (13.69%). The sections Anahaw and Ichigo had the lowest representation with 27 students each (11.20% each). Overall, all sections contributed as respondents, with varying proportions, totaling 241 respondents, giving a high response rate of 100% among learners of the same grade level.

Instrument

The researcher used a set of survey questionnaires to gather the information in order to assess the study aims.

Part I. The first part presents the respondents' profile, including their age and gender.

Part II. The second part of the questionnaire is the Math Anxiety, which was adapted from the Abbreviated Mathematics Anxiety Rating Scale (A-MARS) by Alexander and Mantray (1989). It is a 25-item questionnaire, a shortened version that assesses trait math anxiety by presenting situations that might cause anxiety, grouped into factors like math test anxiety, numerical task anxiety, and math course anxiety.

Part III. The third part is the Student-Teacher Relationship, a survey questionnaire developed by Aldhafri and Alhadabi (2019). Developmental and validation of a 25 - item Student - Teacher Relationship Measure, a self-report measure estimating students' perceptions of their relationship with teachers. The study was applied among adolescents in Grades 7-11 in Oman.

The Math Anxiety Questionnaire uses a 5-point Likert scale with the following descriptors: 5- Very High, 4- High, 3- Moderate, 2- Low, and 1- Very Low.

The Student-Teacher Relationship Questionnaire also uses a 5-point Likert scale with the following descriptors: 5- Strongly Agree, 4- Agree, 3- Neither Agree nor Disagree, 2- Disagree, and 1- Strongly Disagree. Both have a 25-item test wherein respondents need to put a check mark appropriate to the level of agreement towards each statement found in the questionnaire. A scoring procedure was followed right after the researcher gathered the score data for interpretation.

In addition, the researcher used and gathered the grades for the 3rd quarter unit examination to assess the mathematics performance of the respondents. However, at other private schools, the grades collected were already for the 4th quarter. The researcher checked and validated the grades and then analyzed the data. All the gathered data were held with utmost confidentiality and in accordance with the Data Privacy Act.

Data Gathering Procedure

This study followed meticulously the research process and stages as follows:

Preliminary Stage: The researcher first observed the school protocol in conducting the research. A transmittal letter was sent to the school's Division Superintendent to ask permission for the study. After the approval of the letter, the researcher visited the principal's office, informed them of the request's intention, and agreed on the schedule for data gathering.

Data Gathering Stage: On the scheduled date, the researcher provided the teacher and students with a brief orientation on how to accurately answer the questionnaire, allowing them sufficient time to finish and ensuring a high retrieval rate. A consent form was given to the students before they were considered to participate in the study.

Post Data Gathering Stage: The researcher tallied, organized, summarized, interpreted, and analyzed the collected results. Appropriate statistical tools were used in the treatment of data.

Ethical Considerations

This study adhered to the ethical rules for research. The school administrators and faculty from Abellana National HIghschool granted their approval to conduct the study. To assure discretionary participation, informed consent was acquired from the parents and legal guardians of the students. The participants were informed on the objectives of the survey. The researchers strictly maintained confidentiality, and all data gathered was solely for academic purposes. Personal data was kept private and handled with care. The researcher ensured that the participants would not harm or subjected to any form of mistreatment. It was vital to use appropriate words that would not offend or embarrassed while talking about their anxiety of math. The study adhered to the Data Privacy Act of 2012 (RA 10173) and the ethical principles of promoting well-being, justice and upholding respect.

Statistical Treatment of the Data

After data collection, the data underwent various statistical treatments. To arrive at good and reliable results, the following statistical tools were used:

Frequency Count. A tool used to determine the number of respondents in the same category regarding perception in Math.

Percentage. Used to illustrate the relationship between a part and a whole, and to represent the profile of Math students, including their ages and accomplishments in the subject.

Weighted Mean. Used to get the extent of the students' perception of the subject in Math.

Pearson's r. The statistics tool determined the strength of the correlation between the level of competency and the problems faced by the correspondents in executing statistical analysis.

Scoring Procedure

In academic research, a well-defined scoring procedure is essential to quantify and analyze variables accurately. This section outlines the rating scales used to measure math anxiety, student-teacher relationships, and mathematics achievement among High school students. These scales provide a structured way to interpret numerical scores, ensuring consistency and clarity in data analysis.

Scoring procedure for Math Anxiety

Scale	Numerical Rating	Descriptive Rating	Verbal Interpretation
5	4.21-5.00	Very High	Students at this level experience extreme fear and nervousness when dealing with mathematical tasks. They tend to avoid math activities since they have low confidence in solving math problems.
4	3.41-4.20	High	Students show considerable distress when engaging with math. They might feel tense and uneasy when solving problems but can still attempt them with difficulty.
3	2.61-3.40	Moderate	Students experience occasional worry and tension in math-related activities. Anxiety is present but manageable, allowing them to still perform adequately.
2	1.81-2.60	Low	Students have minimal math-related stress or nervousness. They may face some challenges in math, but anxiety does not significantly impact their performance or confidence.
1	1.00-1.80	Very Low	Students at this level are confident and comfortable with math. They show little to no stress when solving problems and can easily engage with mathematical concepts.

Scoring procedure for Student-teacher Relationship

Scale	Numerical Rating	Descriptive Rating	Verbal Interpretation
5	4.21-5.00	Outstanding	Students have a strong, positive relationship with their teacher, characterized by trust, open communication, and encouragement. They feel supported academically and emotionally, leading to higher engagement and motivation in learning.
4	3.41-4.20	Very Satisfactory	Students experience a good relationship with their teacher. They receive guidance and encouragement, which positively impacts their learning, though some aspects of communication or support could be improved.
3	2.61-3.40	Satisfactory	The teacher-student relationship is neutral. While students do not feel negatively about their teacher, there may be a lack of strong rapport or engagement that affects their motivation.
2	1.81-2.60	Fairly Satisfactory	Students may feel disconnected from their teacher, experiencing limited support or engagement in class. This can lead to decreased motivation and participation.
1	1.00-1.80	Did not Meet the Expectations	The relationship is weak or strained, with students feeling unsupported or disconnected from their teacher. This may negatively impact their confidence, participation and overall academic performance.

Mathematics Achievement Rating Scale

Scoring Range	Descriptive Rating	Verbal Interpretation
90-100	Outstanding	The learner demonstrates an outstanding level of proficiency in mathematical skills and understanding.
85-89	Very Satisfactory	The learner demonstrates a very satisfactory level of proficiency in mathematical skills and understanding.
80-84	Satisfactory	The learner demonstrates a satisfactory level of proficiency in mathematical skills and understanding.
75-79	Fairly Satisfactory	The learner demonstrates a basic level of proficiency and needs help in improving understanding.
Below 75	Did not Meet the Expectations	The learner did not meet the required proficiency level and needs significant improvement.

DEFINITION OF TERMS

This section presents the concepts and terminologies used in the study to provide an overview on how they are specifically applied within the scope. The following concepts are defined operationally:

Academic Performance in Mathematics. Refers to a student's ability to understand, apply, and solve mathematical concepts and problems during Unit tests. It is typically measured through assessments, grades, standardized tests, and practical applications.

Anxiety. This refers to a feeling of worry, nervousness, or unease about an imminent event or something with an uncertain outcome.

Action Plan. This refers to the suggested program or project made by the researchers based on the results of this study. It helps in organizing tasks, ensuring progress, and achieving desired outcomes efficiently.

Math Anxiety. This is a feeling of tension, fear, or apprehension that interferes with a person's ability to perform mathematical tasks. It can occur in various settings, such as during tests, problem-solving activities, or even casual calculations

Student-teacher relationship. It refers to the connection, interactions, and dynamics between a teacher and a student, particularly in a learning or educational setting. It encompasses various aspects, including the emotional, intellectual, and behavioral elements of their interaction.

Unit Test. is a short assessment used to measure student's understanding of a specific unit or topic in a subject. It helps determine learning outcomes and the effectiveness of teaching strategies. It is a test that the teacher constructs, administers, and assesses after teaching a particular unit to the students.

Chapter 2

PRESENTATION, ANALYSIS, AND INTERPRETATION OF DATA

This chapter presents the analyses and interpretations of the data gathered from the study, which aimed to determine the level of anxiety of the respondents in learning Mathematics, their experiences regarding the student-teacher relationship, and their academic performance in the subject. This also assesses the relationship between students' level of anxiety and their academic performance, as well as between the student-teacher relationship and academic performance in Mathematics. With the help of the respondents' answers to the survey questionnaire, the following results and findings are hereby presented and discussed as follows:

LEVEL OF ANXIETY IN LEARNING MATHEMATICS

Math Anxiety is defined as a feeling of tension, fear, or apprehension that interferes with a person's ability to perform mathematical tasks. It can be seen in different circumstances. Students' anxiety is also subject to many influences, such as teachers' attitudes and self-efficacy. A high level of anxiety can lead to avoidance behaviors, demotivation to go to school, poor academic performance, and low confidence in doing any mathematical tasks.

Considering these possible impacts, the anxiety level of the respondents was examined to know its association with students' learning experiences and performance in Mathematics. The outcome of the assessment, which identifies whether they experience low, moderate, or high anxiety, is presented in Table 2.

Table 2. Level of anxiety of the respondents in learning Mathematics

S/N	Indicators	WM	SD	Verbal Description
1	Studying for a math test.	3.02	0.94	Moderate
2	Taking math section of the college entrance exam.	2.81	1.24	Moderate
3	Taking an exam (quiz) in a math course.	3.01	1.10	Moderate
4	Taking an exam (final) in a math course.	3.30	1.19	Moderate
5	Picking up math textbook to begin working on a homework assignment.	3.00	1.04	Moderate
6	Being given homework assignments of many difficult problems that are due to the next class meeting.	3.33	1.03	Moderate
7	Thinking about an upcoming math test one week before.	3.23	1.15	Moderate
8	Thinking about an upcoming math test one day before.	3.68	1.12	High
9	Thinking about an upcoming math test one hour before.	3.72	1.26	High
10	Realizing you have to take a certain number of math classes to fulfill requirements.	3.36	1.09	Moderate
11	Picking up math textbook to begin a difficult reading assignment.	3.11	1.03	Moderate
12	Receiving your final math grade in the mail.	2.92	1.37	Moderate
13	Opening a math or stat book and seeing a page full of problems.	3.24	1.23	Moderate
14	Getting ready to study for a math test.	3.22	1.10	Moderate
15	Being given a "pop" quiz in a math class.	3.31	1.14	Moderate
16	Reading a cash register receipt after your purchase.	2.80	1.38	Moderate
17	Being given a set of numerical problems involving addition to solve on paper.	3.26	1.20	Moderate
18	Being given a set of subtraction problems to solve.	3.07	1.23	Moderate
19	Being given a set of multiplication problems to solve.	3.27	1.21	Moderate
20	Being given a set of division problems to solve.	3.25	1.17	Moderate
21	Buying a math textbook.	2.50	1.16	Low
22	Watching a teacher work on an algebraic equation on the blackboard.	3.56	1.25	High
23	Enrolling for a math class.	2.73	1.27	Moderate
24	Listening to another student explain a math formula.	3.36	1.21	Moderate
25	Walking into a math class.	2.95	1.39	Moderate
Aggregate Weighted Mean		**3.16**		**Moderate**
Aggregate Standard Deviation			**1.18**	
Legend: 4.21-5.00-Very High; 3.41-4.20-High; 2.61-3.40-Moderate; 1.81-2.60-Low; 1.00-1.80-Very Low				

Table 2 reveals an aggregated weighted mean (WM) of 3.16, indicating that respondents in Abellana National High School exhibit a moderate level of anxiety in learning mathematics. According to the data, most respondents experienced an average level of anxiety across various situations. However, three specific scenarios stood out with higher anxiety ratings: one hour before a math test (WM = 3.72), one day before a math test (WM = 3.68), and while watching a teacher solve an algebraic equation on the board (WM = 3.56). These instances were classified as High anxiety. In contrast, the lowest level of anxiety was reported during the act of buying a math textbook (WM = 2.50), which was rated Low.

This pattern suggests that students tend to feel more anxious as the test date approaches, particularly when complex equations are involved in class discussions. It is supported by a study conducted by Cipra and Müller-Hilke (2019), which states that students experience a high intensity of anxiety before the exam starts, resulting in negative impacts on their performance due to cognitive overload and emotional strain (Cipra & Müller-Hilke, 2019, *PLOS ONE).*

Additionally, Barroso et al. (2020) conducted a meta-analysis and showed that anxiety towards math is associated with students' overall performance, especially when students feel a high intensity of anxiety during class discussions involving problem-solving equations, such as algebra, under time pressure. When a teacher solves complicated math problems - especially under time pressure - it can cause anxiety due to the distress of failure and comparison with others.

Moreover, a research by Brewster and Miller (2022) investigated the impact of various expressive writing protocols on pre-service teachers' math anxiety. They found that engaging in daily positive expressive writing during a university-level mathematics methods course helped lower anxiety levels—consistent with the current study's finding of reduced math anxiety in supportive, low-stakes environments.

Finally, Ramirez and Beilock (2018) indicated that providing emotional and instructional support in math classrooms - especially during high-intensity anxiety moments - can reduce students' anxiety and improve learning outcomes.

These research findings highlight the importance of addressing both test-related stress and instructional methods in mathematics education. Through a positive classroom environment and providing targeted interventions before assessments and during complex lessons, educators can help reduce students' anxiety and foster more positive attitudes toward learning mathematics.

LEVEL OF STUDENT-TEACHER RELATIONSHIP EXPERIENCED BY THE RESPONDENTS

The student-teacher relationship refers to the connection between learners and their teachers. This kind of relationship influences various aspects of academic, social, and behavioral, as well as emotional development. In the world of mathematics education, where it is viewed as a challenging and anxiety-inducing subject, the student-teacher relationship becomes even more critical. A supportive relationship between students and teachers can help reduce students' anxiety, improve self-confidence, and foster a place where it is conducive to meaningful learning.

Table 3 illustrates the learners' perceptions of the nature of student-teacher relationships in mathematics.

Table 3. Level of student-teacher relationship experienced by the respondents

S/N	Indicators	WM	SD	VD
1	My teacher listens to what I say.	3.70	1.08	VS
2	My teacher excites me for the lesson at the beginning of the class.	3.43	1.07	VS
3	My teacher strengthens my confidence in my ability and talents.	3.60	1.03	VS
4	My teacher encourages me to ask questions about the subject	3.60	1.10	VS
5	My teacher provides practical implications about the taught	3.75	1.02	VS

	lessons			
6	My teacher cares about my academic performance.	3.98	1.07	VS
7	My teacher uses teaching methods that captivate my attention.	3.90	1.03	VS
8	My teacher uses a variety of methods that captivate my attention.	3.78	1.06	VS
9	My teacher links the subject's topics related to the characters that matter to use.	3.77	1.01	VS
10	My teacher asks interesting questions related to the subject.	3.82	1.04	VS
11	My teacher expects me to participate effectively in the classroom.	3.50	1.03	VS
12	My teacher encourages positive interaction between students.	3.87	1.07	VS
13	My teacher makes me feel that I am able to solve difficult questions.	3.62	1.15	VS
14	My teacher encourages good behavior in the class.	4.14	0.98	VS
15	My teacher encourages me to ask about things that I did not understand.	4.04	1.11	VS
16	My teacher encourages me to be the best I can.	4.14	0.99	VS
17	My teacher makes me feel proud when I achieve certain goals.	3.90	1.08	VS
18	My teacher gives some hints to provide the right answer.	3.89	1.06	VS
19	My teacher uses teaching methods that develop my ability to cooperate with others.	3.94	0.96	VS
20	My teacher shows remarkable enthusiasm while teaching the subject.	3.75	1.04	VS
21	My teacher believes in me and my potential.	3.76	1.08	VS
22	My teacher gives students an opportunity to think before answering questions.	4.14	0.95	VS
23	My teacher involves students to answer the questions that are asked by their peers.	3.65	1.00	VS
24	My teacher develops my self-confidence.	3.76	1.10	VS
25	My teacher encourages students to find more than one away to solve problems.	3.98	1.05	VS
Aggregate Weighted Mean		**3.82**		**VS**
Aggregate Standard Deviation			**1.05**	
Legend: 4.21-5.00-Excellent (E);3.41-4.20-Very Satisfactory(VS);2.61-3.40- Satisfactory (S);1.81-2.60-Less Satisfactory(LS);1.00-1.80-Poor(P)				

As can be seen from the table, these relationships are important in determining students' motivation, participation, behavior, and general attitude toward learning. The results are based on 25 specific indicators measured using Weighted Mean (WM), Standard Deviation (SD), and a verbal description scale. Overall, the data reflect how students experience emotional, behavioral, and instructional support from their teachers.

The students rated all indicators as very satisfactory. However, indicators such as "My teacher allows students to think before answering questions" (WM = 4.14), "My teacher encourages me to ask about things that I did not understand" (WM = 4.04), and "My teacher encourages me to be the best I can" (WM = 4.04) had the highest rated indicators. The data reveal that students feel supported in expressing confusion, thinking critically, and striving for personal growth. According to Trigueros et al. (2020), autonomy-supportive teachers create a vital impact on students' motivation and academic success. Encouraging critical thinking and perseverance also reflects an effective teaching environment where students are not afraid to engage in discussions.

Some indicators emphasized the importance of the emotional and psychological impact of teachers on students' learning experiences. These indicators are *"My teacher develops my self-confidence"* (WM = 3.90), *"My teacher believes in me and my potential"* (WM = 3.74), and *"My*

teacher makes me feel proud when I achieve certain goals" (WM = 3.90). Emotional reinforcement supports a sense of belonging and resilience, a finding supported by Zuo et al. (2022), who found that emotional teacher support reduces mathematics anxiety and promotes student self-efficacy.

There are also indicators like "*My teacher uses a variety of methods that captivate my attention"* (WM = 3.78) and *"My teacher provides practical implications about the taught lessons"* (WM = 3.75) that highlight teachers' efforts to make lessons engaging and relevant. This shows that the teaching methods are tailored to meet learners' learning needs by aligning with their interests and practical application connections. Numerous studies support these findings. For instance, a 2024 study in Frontiers in Psychology highlighted the development of students' attention and classroom participation when teachers employ varied and engaging instructional strategies (Wang et al., 2024). Likewise, a study by Scarparolo and MacKinnon (2022) substantiates that when teachers employ different instructional methods that cater to diverse learning styles and classroom dynamics, there is a positive impact on students' participation.

Social connection and collaborative learning are also evident in the response. It can be seen that indicators such as "My teacher encourages positive interaction between students" (WM = 3.87) and "My teacher uses teaching methods that develop my ability to cooperate with others" (WM = 3.94) highlight the significance of cooperative learning and social engagement in improving students' academic achievement. Several recent studies have strengthened the findings and highlighted the advantages of collaborative learning strategies. A study by Hortigüela Alcalá et al. (2019) found that collaborative learning improves learners' social interaction, incitement, and attitude across diverse educational stages. Similarly, Van Ryzin et al. (2020) demonstrated a positive impact on peer relations, academic support, and interaction among learners of different nationalities when cooperative learning is incorporated. Furthermore, Pulgar et al. (2022) revealed that students' academic performance in remote and hybrid teaching modalities improves when they work together for a longer time, especially among students with strong friendship ties.

There are different ways to improve students' academic performance —one way of enhancing learners' experiences in mathematics is through a healthy relationship with their teachers. Students' performance in class improves when they view teachers as supportive, encouraging, and attentive. Thus, emotional support, flexible teaching methods, and collaborative learning opportunities significantly enhance students' motivation, confidence, and academic engagement.

LEVEL OF ACADEMIC PERFORMANCE OF THE RESPONDENTS IN MATHEMATICS

The level of academic performance reflects how well students can acquire and apply mathematical concepts. Evaluating students' academic performance not only assesses their knowledge of the subject, but it also provides insight into the effectiveness of the teaching style and learning environment. Through this, it helps identify educational gaps and enhance learning approaches, take extraordinary measures, and design instructional methods that fit student learning needs. It is vital for teachers and policymakers to know and understand the academic performance of the students, as it guides in improving the curriculum and enhancing their learning outcomes.

This section presents the respondents' level of academic performance in mathematics, as shown in Table 4.

Table 4. Level of academic performance of the respondents in Mathematics

Level	Numerical Range	f	%
Outstanding	90-100	46	19.01
Very Satisfactory	85-89	71	29.34
Satisfactory	80-84	72	29.75
Fairly Satisfactory	75-79	49	20.25

Did not Meet the Expectations	below 75	4	1.65
Total		**242**	**100.00**
Mean		84.22	
St. Dev.		5.76	

Table 4 presents the academic performance levels of 242 participants in mathematics from Abellana National High School, categorized by predefined numerical ranges. The results show that the majority of students fall within the *Very Satisfactory* (85–89) range, comprising 29.34% (n = 71) of the total sample, followed closely by those in the *Satisfactory* (80–84) category at 29.75% (n = 72). Meanwhile, 19.01% (n = 46) of respondents achieved *Outstanding* performance (90–100). A smaller portion of the sample rated as *Fairly Satisfactory* (75–79) accounts for 20.25% (n = 49), and only 1.65% (n = 4) fell below expectations.

Based on the mean score of 84.22, it is evident that students' performance in class falls within the Satisfactory range. With a standard deviation of 5.67, this indicates that although many students are performing well, some still encounter challenges due to variations in approaches to learning, extrinsic educational factors, or prior knowledge.

This pattern of academic performance supports the notion that, while some students are performing well in mathematics, there are still minority students who require targeted support to prevent academic disparity from widening. Various studies highlight the multifactorial nature of math performance. For instance, a study by Usán-Supervía and Quílez Robres (2021) found that mental ability and environmental and psychological factors, including academic support and emotional management, predicted academic performance in mathematics among adolescents (ages 12–18), emphasizing the role of individual cognitive factors and psychological support. Cardinal et al. (2024) also noted that student learning outcomes improve, and healthier student-teacher relationships are fostered when interactive teaching methods are employed. Thus, teachers' pedagogical styles and their relationships with students are closely linked to one another.

Moreover, critical determinants of mathematical achievement are motivation and engagement. Wang et al. (2020) found that college students with higher inner motivation and self-discipline tend to perform better academically in math, indicating that enhancing psychological factors such as inner motivation and self-discipline can lead to better performance. The learning environment, combined with an educator's emotional support, creates positive effects on student mathematics success (Pianta et al., 2021).

Research has established that individual learner profiles require differentiated instruction to achieve optimal results. According to Tomlinson and Imbeau (2020), students achieve better educational results when teachers provide challenging work for high-achievers and supportive assistance to those who need help. Similarly, Rakoczy et al. (2019) emphasized that formative assessment and constructive feedback should be performed regularly to identify learning gaps and achieve ongoing progress in mathematics. The study showed that students develop higher self-efficacy and interest when they receive applicable feedback, which leads to better academic achievement.

Furthermore, recent research demonstrates that external elements such as parental involvement and socioeconomic status play a vital role in shaping student academic success. Tan et al. (2020) conducted a meta-analysis revealing that the academic benefits of parental involvement are stratified by parental socioeconomic status, indicating that students from higher socioeconomic status (SES) backgrounds tend to gain more from such involvement. Supporting students holistically, including emotional and social development, is therefore essential to closing achievement gaps and ensuring equitable access to quality math education.

TEST OF SIGNIFICANCE OF THE RELATIONSHIP BETWEEN MATH ANXIETY AND ACADEMIC PERFORMANCE

This section presents the link between students' anxiety in mathematics and their academic performance. The impact of anxiety and stress among grade 8 students on their academic performance is provided in this section. To know whether high-intensity anxiety is associated with poor academic performance or whether moderate anxiety might serve as a motivational factor is the primary focus here. The results support the study of the connection between emotional and academic aspects. It highlights the importance of addressing psychological gaps in math education. The data is presented in Table 5.

Table 5. Test of relationship between respondents' anxiety and their academic performance in Mathematics

Variables	r-value	Strength of Correlation	p - value	Decision	Remarks
Anxiety and Mathematics Performance	0.052	Negligible Positive	0.422	Do not reject Ho	Not Significant

*significant at $p<0.05$ (two-tailed)

As can be seen in Table 5, there is a negligible positive correlation ($r = 0.052$) between the anxiety levels of Grade 8 students and their academic performance in mathematics. The p-value of 0.422 is greater than the 0.05 level of significance, which suggests that this relationship is not statistically significant. As a result, the null hypothesis is not rejected, indicating that there is no meaningful correlation between anxiety and mathematics performance among the respondents from Abellana National High School. This implies that math anxiety, in this context, has no significant influence on students' mathematics achievement.

Although anxiety is often viewed as detrimental to academic performance, the slight positive correlation observed may hint at the possibility that mild anxiety can act as a motivator—a concept explored in several contemporary studies. For instance, Chen, Jamaludin, and Tan (2023) found that behavioral and psychological patterns such as persistence and attention regulation often mediate the effects of math anxiety on performance, especially in tech-assisted learning environments. Similarly, Szczygieł et al. (2021) found that trait-level math anxiety did not consistently predict poor performance and was often moderated by students' coping strategies and classroom support.

Moreover, Namkung, Peng, and Lin (2019) highlight in their meta-analysis that the relationship between math anxiety and performance is context-dependent, varying based on grade level, instructional environment, and individual psychological traits. These findings support the idea that while anxiety is a valid concern, its actual impact on student performance may be less straightforward than assumed.

In the case of Abellana National High School, the absence of a statistically significant relationship suggests that other factors—such as instructional quality, peer influence, learning materials, or even teacher feedback—might play a more central role in determining students' math outcomes than anxiety alone.

This result emphasizes the relevance of adopting a multifactorial approach in addressing math performance issues. While anxiety remains a relevant consideration, educators and policymakers should also investigate complementary variables such as student motivation, self-efficacy, and classroom dynamics.

TEST OF SIGNIFICANCE OF THE RELATIONSHIP BETWEEN THE STUDENT-TEACHER RELATIONSHIP AND THE ACADEMIC PERFORMANCE OF THE RESPONDENTS IN MATHEMATICS

This section discusses the relationship between student-teacher relationships and students' academic performance in mathematics. The main objective is to measure whether the quality of social interactions between students and their teachers has a significant influence on students' academic success in mathematics. Healthy relationships between teachers and students are often assumed to foster a conducive learning environment that enhances student motivation, engagement, and academic outcomes. This section presents findings on whether such a correlation holds for Grade 8 students at Abellana National High School.

Table 6. Test of relationship between student-teacher relationship and academic performance in Mathematics

Variables	r-value	Strength of Correlation	p - value	Decision	Remarks
Student-teacher Relationship and Mathematics Performance	0.034	Negligible Positive	0.597	Do not reject Ho	Not Significant

*significant at $p<0.05$ (two-tailed)

Based on Table 6, the results show a negligible positive correlation ($r = 0.034$) between the student-teacher relationship and students' academic performance in Mathematics. The p-value of 0.597 is greater than the 0.05 level of significance, which suggests that this relationship is not statistically significant. Therefore, the null hypothesis is not rejected, implying that there is no significant association between the student-teacher relationship and math performance among the respondents from Abellana National High School.

Although several studies have emphasized the advantages of positive student-teacher relationships, this result reveals that in this specific context, the quality of that relationship may not have a direct or measurable impact on academic achievement in mathematics. This is supported by those of Xu and Qi (2019), who reported that while teacher-student relationships and self-efficacy can significantly predict mathematics academic achievement, self-efficacy plays a mediating role between teacher-student relationships and mathematics achievement, accounting for 68% of the total effect.

Moreover, some scholars argue that in mathematics education, cognitive and instructional factors might outweigh socio-emotional influences. For instance, Yang et al. (2021) emphasize that a teacher's emotional support has a positive influence on math performance through the mediating effects of academic self-efficacy and math behavioral engagement. Similarly, Ren et al. (2025) suggest that teacher-student relationships have an indirect effect on mathematics achievement through the mediating roles of a sense of belonging and gender differences.

Additionally, a study by Jia et al. (2024) found that involvement in school facilitates the relationship between implicit self-identity theories and cognitive health problems, emphasizing the relevance of psychological factors in academic achievement.

While fostering strong student-teacher relationships remains essential for holistic student development, the current findings suggest that other factors—such as teaching strategies, student aptitude, and curriculum structure—may have a more significant influence on math performance. Therefore, it is recommended that schools adopt a more comprehensive approach, addressing both interpersonal dynamics and instructional quality, to improve student achievement in mathematics.

Chapter 3

SUMMARY, FINDINGS, CONCLUSION, AND RECOMMENDATION

This chapter presents the summary, findings, and conclusion of the study. This also contains the recommendations, which are based on the results and findings of the study aimed at improving the attitudes and performance of repeaters in math.

SUMMARY

Many Grade 8 students experience math anxiety that disrupts their learning performance. Nonetheless, it remains unclear whether teachers' relationships with students can influence the outcome in the context of Abellana National High School. This study was to measure the levels of math anxiety, student-teacher relationship, and academic performance of Grade 8 students, and to determine whether there is a significant relationship among these variables. The study was conducted during the school year 2024-2025 with a sample of 241 Grade 8 students selected through random sampling.

The research used a descriptive-correlational research design. Three validated tools were utilized: (1) the Abbreviated Mathematics Anxiety Rating Scale (A-MARS), (2) the Student-Teacher Relationship Measure by Aldhafri and Alhadabi (2019), and (3) actual unit test scores to represent mathematics academic performance. Descriptive statistics (frequency, percentage, weighted mean) and inferential analysis using Pearson's r were employed.

The study was based on the Cognitive Load Theory by John Sweller and the Ecological Systems Theory by Urie Bronfenbrenner, which highlighted the roles of mental stress and social dynamics in influencing students' learning outcomes. The findings aimed to foster an action plan that addresses the psychological and relational barriers to math success.

FINDINGS

Based on the data gathered, the following significant findings emerged:

First, the level of math anxiety among the students was found to be moderate, with an aggregate weighted mean of 3.16. Intense anxiety was observed before exams – one hour before the test (WM = 3.72) and when watching teachers solve algebra problems on the board (WM = 3.56), whereas lower anxiety was noted during less pressured tasks, such as buying textbooks (WM = 2.50).

Second, the student-teacher relationship was rated as very satisfactory, with a weighted mean of 3.82. Students strongly supported that teachers used interactive methods, provided emotional support, encouraged participation, and helped them feel confident in their abilities.

Third, in terms of academic performance, most students achieved scores within the satisfactory to outstanding range, with a mean score of 84.22. Most of the students performed at a very satisfactory (29.34%) or satisfactory (29.75%) level, while a few (1.65%) did not meet expectations.

Lastly, the relationship between math anxiety and academic performance showed a negligible correlation ($r = 0.034$, $p = 0.597$). It implies that there is no statistically significant correlation between the two variables in this context.

CONCLUSION

The study concludes that math anxiety and the student-teacher relationship are measurable among Grade 8 students; however, they do not have a significant statistical effect on mathematics performance based on the analyzed data.

Students experience moderate math anxiety, particularly during evaluative situations, but this anxiety does not significantly undermine academic performance. Similarly, the student-teacher

relationship does not influence math achievement outcomes, even though the level of perceived support from the teacher is rated as very satisfactory.

These results suggest that academic performance in math may be affected more by other factors, such as teaching styles, student motivation, learning styles, or extrinsic socio-emotional support. Nevertheless, a nurturing classroom environment and efforts to minimize anxiety remain crucial in fostering a positive attitude toward learning math.

RECOMMENDATION

Based on the findings of this study, it is recommended that the proposed action plan be adapted and implemented. Also, teachers can keep and foster emotionally supportive and interactive classroom environments. Utilize active learning strategies, positive reinforcement, and various methods to sustain students' interest and alleviate anxiety.

Chapter 4

OUTPUT OF THE STUDY

This chapter outlines the suggested intervention strategy aimed at reducing math anxiety and strengthening the connection between students and teachers, ultimately enhancing students' performance in Mathematics.

Rationale

The study reveals that there was no statistically significant relationship between students' level of math anxiety and the student-teacher relationship, despite math anxiety among grade 8 students at Abellana National High School being at a moderate level, and the student-teacher relationship is viewed as very satisfactory. However, research suggests that alleviating anxiety and fostering stronger connections between students and teachers would still result in positive academic outcomes over time. Therefore, an action plan is crucial for maintaining a safe learning environment that addresses potential emotional and mental gaps, thereby enhancing math performance from an early stage. interventions, supportive strategies, and open classroom practices.

The MathEase Support Framework intervention plan is created to address both mental and environmental factors that affect students' learning in math. By applying research-supported teaching methods, promoting supportive classroom engagement, and aligning with DepEd laws, the framework strives to improve student interaction, reduce math anxiety, and foster a positive, student-centered math environment.

Objectives

By administering this action plan, the following objectives are expected to be achieved.

- To reduce students' math anxiety through systematic, supportive, and interactive strategies.
- To enhance the academic performance of students through adaptive learning strategies, targeted interventions, and active learning approaches.
- To provide teachers with relevant strategies that address both affective and cognitive needs in math education.
- To involve parents and stakeholders in supporting the math learning journey of the students.

Scheme of Implementation

The MathEase Support Framework will implement a holistic and staged approach designed to cultivate a low-anxiety and highly supportive mathematics learning environment. The initial stage is a capacity-building and planning phase, during which all stakeholders—teachers, school administrators, and selected student leaders—are oriented on the program's fundamental objectives. During this phase, teachers will participate in training sessions designed to create

emotionally safe learning environments, employ anxiety-sensitive teaching strategies, and foster strong rapport with students.

The intervention phase follows, highlighted by the introduction of targeted classroom-based and co-curricular activities. These include weekly math meditation breaks, classroom math reflection boards, positive reinforcement strategies, and after-school math coaching sessions. Emphasis will also be placed on student-led peer support groups to encourage collaborative problem-solving. Teachers will engage students in short, non-evaluative math tasks to rebuild confidence and enjoyment in the subject. Simultaneously, parents will be encouraged to participate in workshops designed to support math learning at home and help them understand the triggers of math anxiety.

To ensure accountability and responsiveness, the monitoring phase will include monthly feedback loops using short surveys and learning journals. Teachers will facilitate reflection sessions to modify teaching approaches based on student response and behavior. School heads and academic coordinators will conduct classroom walkthroughs to observe teaching practices and offer coaching support as needed.

The final evaluation and consolidation phase will focus on measuring the effectiveness of the interventions. Comparative data will be gathered using pre- and post-program measures on math anxiety, teacher-student relationships, and academic performance. Focus group discussions with students and teachers will be conducted to gather insights. Based on the findings, successful interventions will be institutionalized and incorporated into the school improvement plan. A toolkit will also be developed to ensure sustainability and replication in other grade levels.This comprehensive implementation scheme ensures that all key factors—emotional support, instructional adaptation, student participation, and community involvement—are integrated to address math-related challenges and improve student outcomes holistically

A PROPOSED ACTION PLAN FOR THE IDENTIFIED SECONDARY EDUCATION IN A PUBLIC HIGH SCHOOL FOR THE SCHOOL YEAR 2024-2025

Areas of Concern	Objectives	Strategies	Persons Involved	Budget	Source of Budget	Time Frame	Expected Outcome	Actual Accomplishment	Remarks
Math Anxiety Reduction	To help reduce math-related stress and fear among students	-Mindfulness s training before math exam -Non-evaluative activities	Math teachers, Guidance counselor	₱7,000	MOOE	October – December 2025 - 2026	Lowered anxiety levels, improved student self-confidence		
Student-Teacher Relationship	To improve trust, openness, and support	-Weekly math check-ins (5-minute 1:1) - Peer praise sessions - Open Forum with teacher	Math teachers	₱5,000	MOOE	January-December 2025 - 2026	Improved student engagement		
Academic Performance	To improve student math achievement	-Remedial classes - Math tutoring program - Math competition	Math teachers, Peer Tutors	₱6,000	MOOE	January – December 2025 - 2026	Increase test scores and greater participation in class activities		

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