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The Relationship between Students' Mathematics Anxiety and Mathematics Achievement among Grade 9

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Abstract: The study aims to determine the relationship between mathematics anxiety and mathematics achievement. This study was conducted at Philippine Countryville College, Maramag, and Bukidnon. The respondents of this study were the 42 grade 9 students who were officially enrolled in the school year 2022-2023 taking up Mathematics subject. This study utilized descriptive statistics to determine the students' level of mathematics performance and mathematics anxiety. The Pearson Product Moment Correlation Coefficient was used to describe the relationship between mathematics anxiety and mathematics achievement. The results of the study revealed that the level of mathematics achievement of the Grade nine (9) students fell in very satisfactory level. The level of mathematics anxiety indicated that the students were moderately anxious of the subject. However, the Pearson product-moment correlation showed that mathematics anxiety was not significantly correlated to their mathematics achievement. The results indicate that while there is a very low negative correlation between mathematics anxiety and student achievement, even moderate levels of anxiety can potentially hinder academic performance in mathematics. When students experience moderate levels of mathematics anxiety, which may affect their overall achievement, although the correlation between anxiety and performance is not statistically significant. And it is recommended that educators implement targeted strategies to reduce mathematics anxiety, such as providing supportive learning environments and resources, to enhance students' confidence and performance in mathematics.

Keywords: Mathematics Anxiety, Mathematics Achievement.

INTRODUCTION

Mathematics anxiety is a common psychological condition that affects individuals of all ages, characterized by feelings of tension, apprehension, and fear when faced with mathematical tasks. The ability to learn and perform in math-related problems can be affected by this anxiety, which can show up in many ways, such as procrastination, panic attacks during tests, Lack of motivation to work on Math, not studying regularly and negative self-talk. The achievement of students in mathematics is closely linked to the future economic power and competitiveness of a nation, making it a critical area of focus for policymakers and educators worldwide (Wagemake, 2003). Understanding the factors that consistently affect mathematics achievement is essential for improving educational practices.

Research indicates that students' attitudes toward mathematics play a pivotal role in their academic performance. Kariuk and Wilson (2002) assert that those who achieve high grades in mathematics have likely learned effectively, while low achievers may have encountered significant learning barriers. The Programme for International Student Assessment (PISA, 2003) highlights two main factors influencing mathematics achievement: students' perceptions of the subject and their levels of anxiety. PISA 2012 findings reveal that learners in countries reporting higher anxiety levels tend to perform worse in mathematics. This negative correlation suggests that as students' mathematics anxiety increases, their performance declines.

Mathematics anxiety, defined as a feeling of tension and apprehension when faced with mathematical tasks, significantly impacts academic achievement. Fong and Aldalalah (2010) argue that such anxiety stems from low self-esteem and fear of failure, leading to avoidance behaviors and negative attitudes toward mathematics. Beilock, *et al*., (2010) emphasize that mathematics anxiety is a pervasive issue across educational settings, hindering students' proficiency and mastery in the subject. Additionally, Yeo, Tan, and Lew (2015) describe how ongoing anxiety can negatively affect students' engagement with mathematical problems, ultimately influencing their academic outcomes.

The consequences of mathematics anxiety extend beyond academic performance. Palacios, *et al*., (2013) outline several repercussions, including avoidance of mathematics-related careers, consolidation of negative feelings towards mathematical concepts, and diminished self-confidence. This anxiety often manifests as a reluctance to engage with mathematical tasks, leading students to prematurely declare, "Math is very difficult," even without attempting the problems.

In the Philippines, the government aims to enhance educational quality to develop productive citizens.

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Assessing students' academic progress is vital as it lays the groundwork for improving teaching and learning processes. Understanding the nature of mathematics anxiety and its effects on students' behavior is crucial for designing interventions to alleviate this anxiety. Studies indicate that students with high mathematics anxiety typically achieve lower scores compared to their less anxious peers (Sheffield & Hunt, 2006).

Given the significant implications of mathematics anxiety on both academic performance and student attitudes, this study aims to explore the relationship between mathematics anxiety and achievement among Grade 9 students at Philippine Countryville College. Specifically, this research will address three questions:

1. What is the level of student's mathematics anxiety in terms of mathematical anxiety scale?
2. What is the level of students' mathematics achievement in terms of their mathematics 2nd quarter grade?
3. Is there a significant relationship between mathematics anxiety and mathematics achievement?

METHODS

The study determines how math anxiety and math performance relate to one another among Philippine Countryville College grade 9 students for SY. 2022-2023. Descriptive statistics were used in this study to assess the students' performance and anxiety levels in mathematics. The 42 study participants completed adapted survey questionnaires that the researchers employed. To determine the degree of mathematical anxiety, the researchers used survey questionnaires. In order to determine the students' level of mathematics achievement, the researchers requested permission from both the students and the math teacher to utilize the students' current grade which was the second quarter. The tool was used to tabulate and analyze the gathered data using the relevant statistical methods. The researchers employed descriptive statistics, such as mean, frequency, and percentage, as one of these statistical methods to address the descriptive level questions. To determine whether there is a substantial association between mathematics achievement and mathematics anxiety, another statistical approach used the Pearson product-moment correlation coefficient.

DISCUSSION

The data gathered from the respondents, which are important for testing the study's hypotheses, are analyzed and interpreted in this section. The tables and other figures are also shown in this chapter to give a convenient for the data.

Students' Level of Mathematics Achievement

Table 1: reveals students mathematics achievement with score percentage, mean, frequency, descriptive equivalence and overall mean.

Grading scale	Frequency	Percent	Descriptive Equivalence
90 – 100	16	38.095	Outstanding
85 – 89	17	40.476	Very satisfactory
80 – 84	6	14.286	Satisfactory
75 – 79	3	7.143	Fairly Satisfactory
Below 75	0	0	Did not meet expectation
TOTAL	42	100	
MEAN	88.857		Very satisfactory

Out of 42 participants in mathematics, revealing both strengths and areas for potential improvement. The grading scale categorizes student achievement into five distinct ranges: Outstanding (90-100), Very Satisfactory (85-89), Satisfactory (80-84), Fairly Satisfactory (75-79), and Did Not Meet Expectation (below 75). A significant finding is that the majority of students performed exceptionally well, with 16 students, or 38.05%, achieving scores in the Outstanding range. This impressive figure suggests that a notable portion of the cohort not only grasped the material but excelled in their understanding of mathematical concepts. Moreover, the Very Satisfactory category, which includes 17 students or 40.47% of the total, reinforces the notion that a strong majority of students are performing well above the satisfactory level. Together, these two categories represent 78.52% of the participants, indicating that most students are achieving commendable results in mathematics. While the performance data is largely positive, it is essential to acknowledge the smaller groups represented in the lower achievement categories. Only 3 students, or 7.14%, fell into the Fairly Satisfactory range, with none scoring below 75. This absence of

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students in the "Did Not Meet Expectation" category is noteworthy, reflecting a strong foundational understanding of mathematics among the cohort. However, the presence of students in the Fairly Satisfactory range suggests that there may still be room for improvement. Targeted interventions, such as additional tutoring or resources, could benefit these students to help elevate their understanding and performance. The overall mean score of 88.857 further underscores the students' success in mathematics, as it falls within the Very Satisfactory range. This average score highlights the effectiveness of instructional practices and suggests that the educational environment fosters a positive attitude toward learning mathematics, which is crucial for continued academic growth.

Student's Level of Mathematics Anxiety

Table 2: Students' level of mathematics anxiety

Indicators	Mean	Qualitative Interpretation
Mathematics makes me feel uneasy and confused	3.76	Anxious
I always never get nervous during a Math-test	3.26	Moderately Anxious
I get a sick feeling when I think of trying hard math problems	3.12	Moderately Anxious
I get really uptight during math tests.	3.12	Moderately Anxious
It wouldn't bother me at all to take more math courses	3.07	Moderately Anxious
I don't always worry about being able to solve Math problems	3.05	Moderately Anxious
I have usually been at ease in math courses	2.93	Moderately Anxious
I have usually been at ease in math courses.	2.93	Moderately Anxious
My mind goes blank and I am unable to think clearly when working mathematics.	2.93	Moderately Anxious
I have usually been at ease during math tests	2.86	Moderately Anxious
Mathematics makes me feel uncomfortable and nervous	2.76	Moderately Anxious
Math does not scare me at all	2.74	Moderately Anxious
Overall mean	2.97	Moderately Anxious

LEGEND:

Rating Scale	Descriptive Rating	Qualitative Interpretation
4.50 – 5.00	Strongly agree	Highly Anxious
3.50 – 4.49	Agree	Anxious
2.50 – 3.49	Neutral	Moderately Anxious
1.50 – 2.49	Disagree	Less Anxious
1.00 – 1.49	Strongly disagree	Not Anxious

Students' experiences and attitudes toward mathematics are revealed by the review of the given indicators of mathematics anxiety. Statements like "Mathematics makes me feel uneasy and confused," which have a mean score of 3.76 and are among the top three highest indicators, show that pupils are extremely anxious. This implies that students' requirements may not be sufficiently met by the current curriculum or methods of instruction, which could cause

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uncertainty and confusion. Also emphasizing the level of anxiety students experience is the statement "I always get nervous when I think of doing a Math test," which has a mean score of 3.26. This could lead to students skipping mathematics-related tasks, which would further affect their academic performance and self-esteem. In the same way, the indicator "I get really uptight during math tests," which obtained a score of 3.25, indicates increased levels of stress during assessments, preventing students' performance and keeping a cycle of anxiety and poor performance.

On other hand, the three lowest indicators imply that even students who do not explicitly display fear nevertheless suffer from underlying anxiety. For example, the statement "Math does not scare me at all" fell into the "Moderately Anxious" group with a mean score of 2.86. This suggests that a large number of students are not confident in their mathematics skills. Additionally, the statements "I have usually been at ease in math courses" and "I think clearly when working in mathematics," both of which have means of 2.93, show that a significant number of students lack confidence or comfort in their math lessons. This discomfort id probably caused by curriculum that do not suit their learning preference of by lack instructional support.

Overall, the mean score of 2.97, which is classified as "Moderately Anxious," indicates that a large number of students suffer from a certain level of math anxiety, which may have a negative effect on their attitudes and performance. Prevention strategies and an unwillingness to pursue future careers in math-intensive professions may result from this fear. Teachers should think about creating supportive curriculum that take into account a variety of learning preferences and include anxiety-relieving teaching techniques like formative evaluations and collaborative learning in order to solve these problems. Offering tools for emotional support can also help students develop a more positive attitude about mathematics, which will eventually improve their self-esteem and lower their anxiety levels. Teachers can foster a more encouraging environment for learning where students can interact with mathematics without fear by implementing these strategies.

Table 3: Correlation analysis of Students' mathematics anxiety and mathematics achievement

	r-value	**Sig(2-tailed)**
Anxiety	-0.231	.1428**

Correlation is significant at the level of 0.05 (two-tailed)

The correlation analysis revealed a very low negative correlation between mathematics anxiety ($r = -0.231$) and students' mathematics achievement, with a significance level of $p = 0.1428$. Although this correlation suggests that higher levels of anxiety may be associated with lower performance in mathematics, the strength of this relationship is too weak to be considered meaningful. This finding is consistent with previous research that indicates an inverse relationship between math anxiety and academic performance. Notably, students reported a neutral level of anxiety towards mathematics, highlighting the complexity of this relationship. The non-significant p-value of 0.1428 indicates that the null hypothesis cannot be rejected, further underscoring the weak association between math anxiety and achievement. Despite the limited implications of this correlation, it still points to the potential negative impact of math anxiety on student learning outcomes. Educators are encouraged to implement strategies aimed at reducing math anxiety and promoting positive attitudes towards mathematics to enhance student success in this essential subject. Previous studies, including the work of Martinez (2020) and others by Karimi and Venkatesan (2009), Lew and Hwang (2019), and Milovanović (2020), support the notion that while there is an inverse correlation between anxiety and academic performance, the relationship is not always statistically significant.

CONCLUSION

The following conclusions were reached in light of the study's findings:

Grade 9 Students' levels of mathematics achievement fall in very satisfactory level. All of the respondents got the grades above 75.

The level of mathematics anxiety indicated that the students were moderately anxious of the subject. In correlation, it showed that mathematics anxiety has no significant relationship to students' mathematics achievement.

The study's conclusions led to some recommendations.

To the teachers and educators take a proactive approach to addressing mathematics anxiety in their students. Mathematics teachers must build up

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friendly situation that avoids anxiety in a classroom environment for better achievement.

To the students, we humbly recommend to think positive regarding to Mathematics. They should not be dependent their attitude towards Mathematics just by environmental factor. They should have a positive mindset that they can do mathematical works whatever the factor maybe.

Also, further research should be done on the impact of special teaching methods on students with high anxiety towards mathematics.

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