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Research Article

College Students' Level of Mathematics Anxiety and Academic Performance: A Basis for a Proposed Intervention Program

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ABSTRACT

Mathematics anxiety is a concern in higher education, often linked to students' academics and emotional well-being. This study examined the mathematics anxiety level and academic performance of students enrolled in GEC 002-Mathematics in the Modern World, a general education course at the University of La Salette. It specifically explored students' demographic profile, academic performance, and mathematics anxiety level across the following factors: physical and emotional, assessment, and social. Differences or relationships between their anxiety levels and their profile or performance were also tested. This descriptive-correlational study involved 265 students from five departments, selected through stratified sampling. Data gathered through a questionnaire on mathematics anxiety and students' grades in GEC 002 were analyzed using frequency and percentage, weighted mean, independent samples t-test, one-way ANOVA, and Pearson correlation. Most students performed well academically, with moderate overall anxiety. Assessment-related factors ranked highest, followed by social factors, while physical and emotional symptoms were less evident. No significant differences in mathematics anxiety were found across age, gender, or department. However, students with "excellent" academic performance reported significantly lower anxiety ($p = 0.003$). A weak, statistically significant positive correlation ($r \approx 0.13$) emerged between mathematics anxiety and academic performance, suggesting that, in this context, anxiety may function as a slight motivator rather than a debilitating hindrance, implying other factors play a considerable role. An intervention program was proposed to promote academic success and emotional well-being. Although limited to a single institution and based on self-reported, cross-sectional data, the study highlights the importance of addressing mathematics anxiety in HEIs.

Keywords: *Mathematics anxiety, Intervention program, Academic performance, Physical and emotional factors, Assessment factors, Social factors, Higher education*

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Background

Mathematics has long been regarded as a fundamental discipline in both academic settings and everyday life. Its relevance spans numerous areas, including technology, business, science, and economics, as it plays a crucial role in problem-solving, logical reasoning, and decision-making. Mathematics is required in nearly all professions, making it a vital subject within the educational system (Kusmaryono et al., 2020). Despite its importance, many students experience intense anxiety when confronted with mathematical tasks, a condition known as "math anxiety." Of the various forms of domain-specific anxiety, math anxiety remains one of the most persistent across age groups and cultures (Luttenberger et al., 2019).

This type of anxiety can manifest in various forms, including uneasiness, avoidance, and even physiological symptoms during math-related activities (Dowker et al., 2019). For some, these feelings of anxiety affect their ability to perform well academically, creating barriers to both personal development and future professional opportunities. Students exposed to high anxiety are more likely to have negative attitudes toward learning. A 2019 literature review revealed that almost 17% of individuals globally experience anxiety-related disorders affecting both adults and young learners. Anxiety can also negatively impact students in learning environments. In educational settings, this emotional distress can be triggered by exams, classroom tasks, and unfamiliar subjects, especially in mathematics. Math anxiety among Filipino learners has been attributed to factors such as exam failure, mismatched teaching styles, lack of motivation, societal attitudes, and parental pressure (Lee-Chua, 2019).

Math anxiety is especially pronounced in higher education, where students are required to apply mathematical concepts more intensively. Studies have shown that anxiety can significantly impair students' ability to grasp mathematical concepts, affecting their academic performance and overall well-being (Luttenberger et al., 2019; Donolato et al., 2020). In the Philippines, a similar pattern emerges, with many students expressing strong aversions to mathematics and perceiving it as an inherently complex subject (Taguinod, 2022). Furthermore, research by Ma and Xu (2024) suggests that math anxiety often develops in early adolescence and can persist into college, further intensifying academic challenges. Futalan and Mamhot (2021) found that the math anxiety of students increases from the lower-grade levels to the upper-grade levels. Despite interventions and support, students with math anxiety often struggle more when confronted with unfamiliar or more challenging lessons, especially in higher grade levels where anxiety is more pronounced.

Despite various teaching strategies designed to make math more approachable, students still show signs of reluctance, disengagement, and avoidance, especially those from public schools (Villavicencio & Bernardo, 2023). Adverse emotional reactions, reluctance to participate, and avoidance of math-related tasks persist, suggesting that current interventions may not be sufficient to address the emotional challenges students face. Research has also shown that mathematics anxiety is not only widespread but also significantly affects students' academic performance and overall well-being (Luttenberger et al., 2019; Dowker et al., 2019; Donolato et al., 2020). International studies echo these concerns. Reports from the Programme for International Student Assessment (PISA, 2018) and the Trends in International Mathematics and Science Study (TIMSS, 2020) indicate that math anxiety significantly affects students' academic performance. In these studies, the Philippines consistently ranked among the lowest-performing countries in mathematics (SEI-DOST & MATHTED, 2023; Magsambol, 2020). Local research, such as that of Taguinod (2022), confirms that many Filipino students experience math anxiety, which often leads to low engagement and academic difficulties. This concern reflects a broader educational issue and aligns with the goals of the "No Filipino Child Left Behind Act of 2010," which upholds every learner's right to quality and holistic education. Recent academic performance data also reveal a consistent pattern of underachievement in mathematics among college students, emphasizing the need to address the emotional and psychological barriers that hinder learning. Understanding

how math anxiety affects academic performance is crucial in developing effective intervention programs that not only support student learning but also promote emotional well-being. Given the persistent challenges and the increasing reports of anxiety among learners, exploring this issue remains both timely and necessary.

While several studies have explored mathematics anxiety among students in public schools and across different countries, there remains limited research focused on how this anxiety manifests among students in private higher education institutions in the Philippines. Additionally, few studies have explicitly examined how mathematics anxiety relates to performance in general education mathematics courses, such as GEC 002 Mathematics in the Modern World. This gap highlights the need to explore math anxiety within this specific context to inform more targeted and inclusive academic support strategies.

Research Questions

This study aimed to assess mathematics anxiety among college students at a private institution and examine its relationships that can inform intervention strategies to help students manage anxiety, build confidence, and enhance academic outcomes. More specifically, it sought to answer the following questions:

1. What is the demographic profile of the respondents in terms of:
   1.1 Age;
   1.2 Gender; and
   1.3 Department?
2. What is the academic performance of the respondents in GEC 002 –Mathematics in the Modern World?
3. What is the level of mathematics anxiety among the respondents in terms of:
   3.1 Physical and Emotional Factors;
   3.2 Assessment Factors; and
   3.3 Social Factors?
4. Is there a significant difference in the respondents' mathematics anxiety level when grouped according to their profile, and their academic performance in GEC 002 – Mathematics in the Modern World?
5. Is there a significant relationship between the respondents' level of mathematics anxiety and their academic performance in Math?
6. What intervention program will be developed to address the students' mathematics anxiety?

Methods

1. Research Design

The descriptive-correlational method was employed to determine the demographic profile of the respondents, their mathematics academic achievement, to assess their level of mathematics anxiety, to investigate significant difference in the level of mathematics anxiety among the college students when grouped according to their profile, and to determine the relationship between the level of mathematics anxiety and mathematics academic performance of the respondents. According to Bhandari (2022), this design aims to investigate the association between variables without manipulating or applying interventions.

2. Participants of the Study

The respondents of the study were 265 students, as computed using Slovin's formula, chosen using stratified random sampling among college students enrolled in the subject GEC 002 – Mathematics in the Modern World during the first semester of the academic year 2024–2025, which was offered exclusively to five departments consisting of 783 students.

3. Instrumentation and Data Gathering Process

A survey questionnaire developed by Kevin Robert in 2013, adopted from Taguinod (2022), was used in this study. It comprised two parts: Part I gathered demographic information from respondents (age, gender, department, and grade in GEC 002 for academic performance). Given that only the midterm grades in GEC 002 were used to evaluate academic performance, it may not fully reflect students' overall achievement in the course. Part II assessed levels of mathematics anxiety related to physical, emotional, assessment, and social factors.

The level of mathematics anxiety was measured using the following scale: 4.20-5.00 (extremely anxious), 3.40-4.19 (very anxious), 2.60-3.39 (moderately anxious), 1.80-2.59 (slightly anxious), and 1.00-1.79 (not anxious).

Permission was obtained from the university president to conduct the study. Following endorsement, questionnaires were distributed to the target respondents and later retrieved for statistical analysis.

4. Data Analysis

The data analysis in this research employed various statistical tools. Frequency and percentage were used to assess the demographic profile of respondents and their academic performance in GEC 002. The mean measured the respondents' mathematics anxiety levels across different factors. An independent samples t-test identified significant differences in mathematics anxiety by gender, while a one-way ANOVA examined differences based on age, department, and academic performance, followed by a Scheffeé's post hoc test to determine the location of the significant difference. Lastly, the Pearson product-moment correlation coefficient assessed the relationship between respondents' mathematics anxiety levels and their academic performance in mathematics. All quantitative analysis was conducted using SPSS.

5. Ethical Consideration

The researcher thoroughly considered the ethical protocols, including maintaining data privacy, protecting confidentiality, and ensuring that no personally identifiable information was used. Respondents were assured that any information obtained would be used only for the purposes outlined in the objectives.

Moreover, the researcher acknowledges the use of AI tools, such as OpenAI's ChatGPT and Grammarly, to assist in information search and grammar polishing, thereby improving the flow and clarity of texts. Nevertheless, it is assured that all decisions, ideas, and results were made and collated by the author, and any content provided by the mentioned AI tools was reviewed and verified before being included in this study.

Result and Discussion

This section presents the analysed data concerning the study's research questions. Results are organized in tables, followed by corresponding interpretations and statistical analyses.

A. Demographic Profile of the Respondents

Table 1 presents the distribution of the respondents' demographic profile in terms of age, gender, and department affiliation.

Table 1. Respondents' Demographic Profile

Age	**f**	**%**
17 years old and below	9	3.4
18	182	68.7
19	48	18.1
20	12	4.5
21 years old and above	14	5.3
Gender	**f**	**%**
Male	127	47.9
Female	138	52.1
Department	**f**	**%**
College of Accountancy	28	10.6
College of Business Education	74	27.9
College of Engineering and Architecture	118	44.5
College of Information Technology	19	7.2
College of Medicine and Allied Medical Programs	26	9.8

Most respondents were 18 years old (68.7%), followed by those aged 19 (18.1%). A small percentage were aged 21 years old and above (5.3%), 20 (4.5%), and 17 years old and below (3.4%).

In terms of gender, the respondents were nearly evenly distributed, with 52.1% identifying as female and 47.9% as male.

Regarding department affiliation, most respondents came from the College of Engineering and Architecture (44.5%), followed by the College of Business Education (27.9%), the College of Accountancy (10.6%), and the College of Medicine and Allied Medical Programs (9.8%). The smallest number of respondents was from the College of Information Technology (7.2%).

B. The Academic Performance of the Respondents in GEC 002-Mathematics in the Modern World

Table 2 presents the respondents' academic performance in GEC 002-Mathematics in the Modern World as a basis of their mathematics academic performance. Grades were categorized using the university's grading scale: 94-100 = Excellent, 88-93 = Very Good, 83-87 Good, 78-82 = Fair, 75-77 = Passing, and below 75 = Failure.

Table 2. Respondents' Academic Performance in GEC 002

Academic Performance (Grade in GEC 002)	f	%
Excellent (94-100)	52	19.6
Very Good (88-93)	90	34.0
Good (83-87)	64	24.2
Fair (78-82)	37	14.0
Passing (75-77)	12	4.5
Failure (Below 75)	10	3.8

A large portion (34.0%) obtained a grade in the range of 88–93 classified as a Very Good performance, followed by 83–87 or Good performance (24.2%), and 94–100 classified as an Excellent performance (19.6%). Grades of 78–82 or performed fairly were recorded by 14.0% of the respondents, while only 4.5% and 3.8% had a passing performance with grades in the ranges of 75–77, and below 75 or performed poorly, respectively. These results indicate that most respondents performed well in their GEC 002 course, with the majority falling under the "very good" category (88–93).

C. The Level of Mathematics Anxiety Among the Respondents

The level of mathematics anxiety among the respondents is classified in terms of physical and emotional factors, assessment factors, and social factors.

Table 3. Level of Mathematics Anxiety Regarding Physical and Emotional Factors

Indicators	M	Interpretation
1. I get emotionally upset when doing or thinking about math (anger, crying, and extreme frustration)	2.58	Slightly anxious
2. I get sweaty or clammy hands when doing or thinking about math.	2.37	Slightly anxious
3. I feel butterflies in my stomach when doing or thinking about math.	2.52	Slightly anxious
4. My stomach gets physically upset (diarrhea, vomiting, constipation, nausea, etc.)	1.65	Not anxious
5. My muscles feel tense, and I feel stiff when doing or thinking about math.	2.13	Slightly anxious
6. I have trouble sleeping after working in math or the night before math class.	2.32	Slightly anxious

Indicators	M	Interpretation
7. I feel like I have to urinate more frequently when in math class or working on math assignments or tests.	2.00	Slightly anxious
8. I feel like I have no control over my grades in math.	2.79	Moderately anxious
9. I get headaches or neck stiffness when doing or thinking about math.	2.54	Slightly anxious
10. I feel my heart race when doing or thinking about math.	2.54	Slightly anxious
Category Mean	**2.34**	**Slightly Anxious**

Legend: 1.00 – 1.79 Never (Not Anxious); 1.80 – 2.59 Rarely (Slightly Anxious); 2.60 – 3.39 Sometimes (Moderately Anxious); 3.40 – 4.19 Very Often (Very Anxious); 4.20 – 5.00 Always (Extremely Anxious)

Table 3 shows the distribution of respondents' mathematics anxiety levels, specifically concerning physical and emotional factors. The results indicate that the respondents experience a moderate level of anxiety (M = 2.79) about having no control over their grades in mathematics. Results also show that respondents are slightly anxious when doing or thinking about math and manifest feelings such as anger, crying, and extreme frustration (M = 2.58); headaches or neck stiffness, and heart racing (M = 2.54); butterflies in the stomach (M = 2.52); sweaty or clammy hands (M = 2.37); trouble sleeping after working on math or the night before a math class (M = 2.32); muscle tension and stiffness (M = 2.13); and the need to urinate more frequently when in math class or working on math assignments or tests (M = 2.00). Lastly, the results indicate that most of the respondents did not experience anxiety (M = 1.65) in the form of severe physical symptoms such as upset stomach (e.g., diarrhea, vomiting, constipation, nausea).

The overall category mean of 2.34 indicates that respondents are slightly anxious regarding physical and emotional factors, suggesting that while students may feel uncomfortable during math-related tasks, intense physiological symptoms such as vomiting or insomnia are uncommon. This result highlights that although students experience discomfort, it rarely escalates into debilitating physical responses. These findings are consistent with a similar study by Taguinod (2022), in which the overall mean score for the physical and emotional factors was 2.16, indicating slight anxiety. Notably, that study found that students reported minimal physical symptoms. This pattern mirrors the current study's results, which also showed that while respondents did not experience intense physical symptoms of anxiety, emotional reactions like frustration and lack of control over grades scored higher. These similarities suggest a recurring trend in which emotional responses to mathematics contribute more to students' anxiety than physical manifestations.

Table 4. Level of Mathematics Anxiety Regarding Assessment Factors

Indicators	M	Interpretation
1. I tend to do very poorly on math tests than other subjects	2.85	Moderately anxious
2. I feel like I need to prepare much more for math tests than other subjects.	3.44	Very anxious
3. Math tests are much more stressful to me than other tests.	3.19	Moderately anxious
4. I feel I understand certain math concepts in class but do poorly on tests.	3.30	Moderately anxious
5. I have trouble concentrating during math tests (racing thoughts, can't focus, "blanking out", etc.)	3.16	Moderately anxious
6. I do not feel confident when taking math tests, no matter how much I study.	3.24	Moderately anxious
7. I feel that I can't trust my intuition and often second-guess myself during math tests.	3.24	Moderately anxious

Indicators	M	Interpretation
8. I generally feel that math tests are a reflection of my worth as a person.	2.80	Moderately anxious
9. When studying for a math test, I find myself showing anxious behaviour (fidgeting, pacing, making excuses, avoiding the situations, etc.)	2.53	Slightly Anxious
10. During math tests, I find myself comparing my process to those around me.	3.19	Moderately anxious
Category Mean	**3.09**	**Moderately anxious**

Legend: 1.00 – 1.79 Never (Not Anxious); 1.80 – 2.59 Rarely (Slightly Anxious); 2.60 – 3.39 Sometimes (Moderately Anxious); 3.40 – 4.19 Very Often (Very Anxious); 4.20 – 5.00 Always (Extremely Anxious)

Table 4 shows the distribution of respondents' mathematics anxiety levels related to assessment factors. The data reveals that the respondents feel very anxious (M = 3.44) when they believe they need to prepare much more for math tests compared to other subjects. The data also indicate that the respondents are moderately anxious when they feel they understand certain math concepts in class but still perform poorly on tests (M = 3.30); when they lack confidence during math tests regardless of how much they study; and when they cannot trust their intuition and often second-guess themselves during exams (M = 3.24). Similarly, moderate anxiety is observed when respondents find math tests more stressful than other assessments and compare their performance with peers (M = 3.19); when they have difficulty concentrating during math tests (M = 3.16); when they tend to perform worse in math tests than in other subjects (M = 2.85); and when they feel that math tests reflect their worth as a person (M = 2.80). In addition, the respondents report slight anxiety (M = 2.53) when studying for math tests, often resulting in anxious behaviors such as fidgeting, pacing, making excuses, or avoiding the situation.

Overall, the category yielded a mean of 3.09, indicating that the respondents are moderately anxious regarding assessment-related factors. Results reflect common fears tied to test preparation, performance, and comparison with peers. This aligns with existing literature that emphasizes that math assessments are high-stress contexts that trigger emotional and cognitive stress, regardless of preparation level. This result is consistent with a similar study by Taguinod (2022), which also reported a moderate level of mathematics anxiety along assessment factors. The similarity in findings suggests that mathematics assessments tend to consistently conjure a noticeable level of anxiety among students, regardless of differences in specific experiences or contexts.

Table 5. Level of Mathematics Anxiety Regarding Social Factors

Indicators	M	Interpretation
1. I feel that I will never be able to learn math no matter how I try.	2.28	Slightly anxious
2. I feel that others have more mathematical or logical minds than I do.	3.32	Moderately anxious
3. My parents and friends tell me about their struggles and frustration in math.	2.91	Moderately anxious
4. I feel that in math, an answer is either right or wrong, and there is little room for anything in between	3.08	Moderately anxious
5. I have had math teachers that I disliked for one reason or another.	2.07	Slightly anxious
6. I find myself worrying about other people's math abilities and comparing them to my own	2.91	Moderately anxious

Indicators	M	Interpretation
7. I feel that although I am quite talented at some things, none of them help me with math.	2.77	Moderately anxious
8. I rely on other people to help me with day-to-day math situations (calculating tips, balancing checkbooks, estimation, etc.)	2.92	Moderately anxious
9. I have been punished or embarrassed in math class for not understanding something.	2.18	Slightly anxious
10. I feel like I have never really understood math, and I am faking my way through it.	2.38	Slightly anxious
Category Mean	**2.68**	**Moderately anxious**

Legend: 1.00 – 1.79 Never (Not Anxious); 1.80 – 2.59 Rarely (Slightly Anxious); 2.60 – 3.39 Sometimes (Moderately Anxious); 3.40 – 4.19 Very Often (Very Anxious); 4.20 – 5.00 Always (Extremely Anxious)

Table 5 shows the distribution of respondents' mathematics anxiety levels related to social factors. The results indicate that the respondents are moderately anxious about feeling that others possess a stronger mathematical or logical mind than they do (M = 3.32), and about perceiving mathematics as rigid, with answers being either right or wrong and little room for flexibility (M = 3.08). Moderate anxiety is also reflected in their tendency to rely on others for help in everyday math situations (M = 2.92), hearing about struggles and frustrations in math from parents and friends (M = 2.91), and comparing their own math abilities with those of others (M = 2.91). Additionally, they feel moderately anxious when they perceive that their talents in other areas do not help them in math (M = 2.77).

On the other hand, slight anxiety is observed when respondents feel like they have never truly understood math and are only pretending to get by (M = 2.38); when they believe they will never learn math despite their efforts (M = 2.28); when they recall being punished or embarrassed for not understanding math in class (M = 2.18); and when they have had negative experiences with math teachers (M = 2.07). Overall, the category yielded a mean of 2.68, indicating a moderate level of anxiety related to social influences. Results show that more severe beliefs or experiences, like never being able to learn math (M = 2.28), hating math teachers (M = 2.07), or traumatic punishment or embarrassment (M = 2.18), are relatively uncommon among the respondents, contrasting with the moderate anxiety from social comparison (M = 3.32), reflecting an implicit yet prevalent form of social anxiety in mathematics learning. Supporting this, a study by Erdoğan, Kesici, and Şahin (2023) demonstrated that social comparison, alongside achievement motivation, significantly predicts mathematics anxiety in students. Their regression analysis revealed that social comparison alone accounted for a notable portion of the change in math anxiety levels. These findings underscore the impact of social dynamics on students' emotional experiences in mathematics, highlighting the importance of addressing social factors in educational strategies to mitigate math anxiety.

Table 6. Summary Table on Level of Mathematics Anxiety

Indicators	M	Interpretation
1. Physical and Emotional Factors	2.34	Slightly anxious
2. Assessment Factors	3.09	Moderately anxious
3. Social Factors	2.68	Moderately anxious
Overall Mean	**2.70**	**Moderately anxious**

Legend: 1.00 – 1.79 Never (Not Anxious); 1.80 – 2.59 Rarely (Slightly Anxious); 2.60 – 3.39 Sometimes (Moderately Anxious); 3.40 – 4.19 Very Often (Very Anxious); 4.20 – 5.00 Always (Extremely Anxious)

Table 6 presents the summary of the level of mathematics anxiety of the respondents based on the three categories: physical and emotional factors, assessment factors, and social factors. When comparing the mean scores across the three factors, it was observed that assessment factors had the highest mean (M = 3.09), followed closely by social factors (M = 2.68), while physical and emotional factors had the lowest mean (M = 2.34). While the differences in mean scores are not large, the result underscores that students experience greater anxiety during examinations and graded tasks rather than physical symptoms or social interactions. This finding suggests that the structure, or weight of tests, rather than the innate difficulty of the subject or physical symptoms of anxiety, serves as the most immediate emotional barrier for students. Hence, this highlights the need for policy and instructional interventions that promote more supportive assessment practices.

D. Test of Significant Difference in the Respondents' Mathematics Anxiety Level

Tests of differences were conducted between the respondents' level of mathematics anxiety and demographic profile in terms of age, gender, and department, as well as their academic performance.

Table 7. Respondents' Level of Mathematics Anxiety when Grouped According to Age

Age / Level of Mathematics Anxiety	N	M	SD	df	F	p-value	Decision
17 years old and below	9	2.63	0.49	4	0.135	0.970	Not Significant
18	182	2.70	0.63				
19	48	2.74	0.70				
20	12	2.80	0.73				
21 years old and above	14	2.68	0.65				

Note: Significant if p < 0.05

Table 7 shows a one-way analysis of variance (ANOVA) conducted to examine whether there were significant differences in mathematics anxiety levels across different age groups. The results revealed no statistically s ignificant difference in anxiety levels based on age, F (4) = 0.135, p = .970. This indicates that respondents, regardless of age, exhibit similar levels of mathematics anxiety.

Table 8. Respondents' Level of Mathematics Anxiety when Grouped according to their Gender

Level of Mathematics Anxiety	Gender	N	Mean	SD	t	df	p-value	Decision
	Male	127	2.72	0.61	0.252	263	0.801	Not Significant
	Female	138	2.70	0.67				

Table 8 shows result of an independent samples t-test conducted to determine whether there was a significant difference in mathematics anxiety levels between male and female respondents. The results indicated that there was no statistically significant difference between the two groups, $t(263) = 0.252$, $p = 0.801$. This suggests that both male and female respondents experience similar levels of mathematics anxiety, with sex not serving as a distinguishing factor in their reported anxiety.

Table 9. Respondents' Level of Mathematics Anxiety when Grouped According to Department

Department / Level of Mathematics Anxiety	N	M	SD	df	F	p-value	Decision
COA	28	2.59	0.57	4	1.124	0.345	Not Significant
CBE	74	2.73	0.67				
CEA	118	2.75	0.64				

Department Level of Mathematics Anxiety	N	M	SD	df	F	p-value	Decision
CIT	19	2.79	0.53				
CMAMP	26	2.50	0.70				

Note: Significant if p < 0.05

Table 9 shows the result of the one-way analysis of variance conducted to determine whether mathematics anxiety levels varied significantly across different academic departments. The results showed no statistically significant difference in anxiety levels among the groups, F (4) = 1.124, p = 0.345. This suggests that students from different departments experience comparable levels of mathematics anxiety.

Table 10. Respondents' Level of Mathematics Anxiety when Grouped According to Academic Performance in GEC 002

Academic Performance Level of Mathematics Anxiety	N	M	SD	df	F	p-value	Decision
Excellent	52	2.40	0.56	5	3.739	0.003	Significant
Very Good	90	2.82	0.63				
Good	64	2.68	0.70				
Fair	37	2.76	0.59				
Passing	12	3.01	0.68				
Failure	10	2.79	0.45				

Note: Significant if p < 0.05

Table 10 shows the result of the one-way analysis of variance conducted to examine whether there were significant differences in mathematics anxiety levels across different categories of academic performance. The results revealed a statistically significant difference, $F(5) = 3.739$, $p = .003$, indicating that anxiety levels varied among the performance groups. Further analysis using Scheffé post hoc test indicated that students with 'Excellent' academic performance had significantly lower mathematics anxiety compared to those with 'Very Good' performance ($p = .013$), while no other pairwise comparisons reached statistical significance (p > 0.05). This suggests that higher-performing students generally experience less mathematics anxiety compared to slightly lower-performing peers. This finding contrasts with Luu-Thi et al. (2021), who indicated that students with higher average scores may have greater anxiety. This discrepancy suggests that factors like motivation, instructional methods, and coping strategies may influence the relationship between mathematics anxiety and academic performance. Nonetheless, the current result denotes that reducing anxiety may be a required condition for advancing from very good to excellent academic performance, underscoring the role of emotional well-being in achieving optimal learning outcomes.

E. Test of Significant Relationship between the Respondents' Level of Mathematics Anxiety and their Academic Performance

Table 11 shows the result of the Pearson product-moment correlation analysis between academic performance and mathematics anxiety.

Table 11. Relationship between the Respondents' Level of Mathematics Anxiety and Academic Performance

Level of Mathematics Anxiety		Academic Performance	Decision
Physical and Emotional Factors	r	0.132	Significant
	p-value	0.032	

Level of Mathematics Anxiety		Academic Performance	Decision
Assessment Factors	r	0.141	Significant
	p-value	0.022	
Social Factors	r	0.128	Significant
	p-value	0.037	

Note: Significant if $p < 0.05$

The results revealed weak but statistically significant positive correlations between the respondents' academic performance and level of mathematics anxiety in terms of physical and emotional factors *(r = 0.13, p = 0.032)*, assessment factors *(r = 0.141, p = 0.022),* and social factors *(r = 0.128, p = 0.037)*. This finding suggests that as mathematics anxiety increases, academic performance also increases slightly, indicating the presence of facilitative anxiety. This interpretation contrasts with typical negative correlations found in most studies, although similar results were reported by Siaw et al. (2021), indicating that higher anxiety levels could be linked to improved performance. This unexpected result may be explained by the Yerkes-Dodson Law, which states that performance improves with increased stress up to an optimal point. Beyond this point, excessive anxiety can hinder performance. Some students might experience anxiety that motivates them to prepare better, supported by the facilitative vs. debilitative anxiety framework (Alpert & Haber, 1960) and Lazarus and Folkman's (1984) cognitive appraisal theory, which emphasizes that viewing anxiety as a challenge can lead to greater effort and better outcomes.

Nevertheless, a small correlation (r = 0.12-0.14) highlights that this relationship is weak, indicating that while a slight anxiety may serve as a motivator, several factors are likely to contribute considerably more to students' academic outcomes.

F. Proposed Intervention Program

Based on the study's findings, an intervention program was developed to directly address the three major sources of mathematics anxiety experienced by students and to improve their academic performance. The program, titled *Math Ease: From Stress to Success,* is designed for students identified with moderate to high levels of mathematics anxiety. Participation may be voluntary or upon recommendation by faculty members and guidance counselors.

The program includes four interrelated components:

1. *Assessment Simulation.* To address the assessment factors that produced the highest anxiety level (M = 3.09), mock quizzes and low-stakes practice tests were integrated into the intervention to reduce test-related anxiety. These simulations allow students to acclimate to test conditions in a stress-reduced environment and were designed to increase their confidence and performance in actual assessments.
2. *Peer Mentoring Sessions.* This component targets social factors of anxiety (M = 2.68), such as negative social comparison and self-doubt. To support students struggling with mathematical concepts, peer mentoring was proposed through structured group discussions and informal tutoring. High-performing students or math majors facilitate the sessions to encourage academic collaboration and shared coping strategies.
3. *Teacher Sensitivity Training*. Recognizing the role of classroom dynamics in shaping students' anxiety levels, training sessions for instructors were proposed. This component also addresses the social factors contributing to anxiety by enhancing teachers' awareness of students' emotional experiences and improving the classroom environment. Training sessions focus on identifying signs of mathematics anxiety and implementing classroom strategies that promote a supportive and non-judgmental learning atmosphere.
4. *Math Mindset Workshops.* These sessions aim to help students manage the physical and emotional symptoms associated with mathematics anxiety (M = 2.34) and promote self-reflection. Activities include guided discussions, journaling, and the

sharing of success stories to foster resilience and a growth-oriented perspective.

Each component is aligned with specific anxiety triggers identified in the study and was designed for flexible implementation—either every semester or throughout the academic year. Evaluation of the program's effectiveness will be based on pre- and post-assessments using the same standardized instrument employed in this study, student feedback surveys, and academic performance tracking.

Conclusion

This study investigated the levels of mathematics anxiety among college students and their academic performance in GEC 002, as well as the relationship between these two variables. Conducted at a single institution, the findings may not accurately represent broader student experiences, thereby limiting their generalizability. The cross-sectional design also restricts conclusions on cause-and-effect relationships, as academic performance was evaluated based only on midterm grades.

The results showed commendable academic performance in mathematics among respondents. Findings also revealed slight anxiety related to physical and emotional factors, moderate anxiety regarding social influences, and the highest anxiety concerning assessment-related experiences, leading to an overall moderate level of mathematics anxiety. This highlights the need for less pressure-inducing evaluation practices to help students manage anxiety better.

While no significant differences in anxiety levels were found based on demographics, a significant difference in academic performance suggests that lower anxiety may coincide with better outcomes. This implies that students who excel may experience less anxiety due to confidence or effective coping strategies.

The weak yet statistically significant correlation between anxiety and performance indicates that controlled anxiety might sometimes lead to improved performance due to increased effort, but other factors like study habits, motivation, and prior knowledge likely play more critical roles.

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