

Math Anxiety and Its Emotional Effects across Gender among BSED Math Students

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Abstract

This study examined the level of math anxiety and its emotional effects among Bachelor of Secondary Education (BSED) Mathematics students, with a focus on differences across gender and the relationship between these two variables. Using a descriptive-correlational research design, data were gathered from 79 respondents through a structured questionnaire measuring both the cognitive and emotional dimensions of math anxiety. Findings revealed that female students reported higher mean scores in both math anxiety and emotional impact compared to male and LGBTQ+ students; however, statistical analysis indicated no significant differences in either variable when classified by gender. Despite this, a significant positive relationship ($\rho = 0.331$, $p = 0.003$) was found between math anxiety and its emotional effects, suggesting that higher levels of math anxiety are associated with greater negative emotional responses such as embarrassment, tension, and fear. These results affirm that math anxiety is not only a cognitive barrier but also an emotional challenge that affects students across all genders. The study recommends the integration of anxiety-reduction strategies, emotional support programs, and inclusive teaching practices to address both the academic and affective needs of learners, as well as further research to explore additional factors influencing math anxiety in higher education settings.

INTRODUCTION

Background of the Study: Ideally, students in universities should approach mathematics with confidence, viewing it as an opportunity to develop essential cognitive abilities rather than as a source of apprehension. This is because Higher Education Institutions aim to cultivate positive attitudes toward mathematics so as to ensure that they engage actively in the subject, participate in class discussions, complete assignments effectively, and apply mathematical concepts in real-world context.

However, the reality is that many students perceive mathematics as one of the most difficult subjects, with challenges arising from both cognitive and emotional dimensions. This significant emotional barrier to success in mathematics is called math anxiety—defined as a feeling of tension and apprehension that interferes with the manipulation of numbers and the solving of mathematical problems in various academic and everyday situations (Khasawneh, 2021). This anxiety is characterized by persistent feelings of tension, apprehension, and fear that disrupt the manipulation of numbers and the solving of mathematical problems (Brooks, 2020).

In higher education, math anxiety can negatively influence students' willingness to participate in class, their efficiency in completing tasks, and their overall academic performance. In fact, empirical evidence from Essuman et al. (2021) shows that math anxiety has a detrimental effect on performance and that gender significantly influences its prevalence. Similarly, Daker (2021) claimed that math anxiety may partly explain the link between mathematical skills and success in STEM fields.

A consistent theme in the literature is the presence of gender differences in math anxiety at the university level. Female students are often found to report higher levels of anxiety compared to their male counterparts (Vos, 2023). These disparities have been linked to the influence of societal stereotypes, as well as formative educational experiences that shape perceptions of ability and self-confidence (Asomah, 2025). Nevertheless, the extent to which gender affects both the intensity of math anxiety and its emotional consequences have been understudied, hence the need for further investigation, particularly in diverse higher education environments where social, cultural, and institutional factors may interact in unique ways.

However, while most studies report that female students tend to experience higher levels of math anxiety than male students, the emotional mechanisms underlying this difference—such as the roles of stress, frustration, and self-esteem—remain less explored. In addition, few studies examine how gender influences these emotional experiences and how emotions interact with cognitive processes during mathematics learning in the local setting. Moreover, although the relationship between math anxiety and academic performance has been widely studied, there is limited research focusing on the emotional dimensions of math anxiety, particularly in the context of Guimaras State University.

Therefore, addressing this gap is essential for developing school-based interventions to reduce anxiety and foster positive emotional engagement in mathematics among students. As such, this study aims to explore the emotional dimensions of math anxiety among university students, with a specific focus on how gender influences these emotional experiences. It is anchored on the Control-Value Theory of Achievement Emotions by Pekrun (2006), which explains how students' emotions in academic contexts are shaped by their perceived control over learning tasks and the value they assign to them.

Objectives of the Study

The main objective of this study is to examine the level of math anxiety and its emotional effects across gender among BSED Math Students for Academic Year 2024-2025.

Specifically, this study aims to determine the:

1. level of math anxiety among BSED Math students across gender.
2. level of emotional effects associated with math anxiety among BSED math students across gender.
3. significant differences in the level of math anxiety among BSED math students across gender.
4. significant differences in the levels of emotional effects associated with math anxiety among BSED math students across gender.
5. significant relationship between math anxiety and its emotional effects across gender among BSED Math students.

METHODOLOGY

The researchers employed a descriptive-correlational quantitative research design to examine the relationship between gender and math anxiety, as well as to assess the emotional effects of math anxiety among BSED Mathematics students at Guimaras State University for Academic Year 2024–2025. This design was deemed appropriate because it allowed the researchers to describe the existing levels of math anxiety and determine whether a significant relationship existed between gender and the identified emotional effects.

The study involved the population of BSED Mathematics students enrolled at Guimaras State University during school year 2024-2025. The sample was selected using purposive sampling, targeting students who were officially enrolled in the BSED Mathematics program.

Data were gathered using researcher-modified questionnaire. Part I of the research instrument comprised the profile of the respondents, including gender. Part II was a researcher-modified questionnaire designed to measure the level of math anxiety. Part III consisted of a Likert-scale survey that assessed emotional responses related to math anxiety, such as stress, fear, and frustration.

The research instrument was validated by a panel of validators, and reliability tested on 30 non-students from the College of Teacher Education. Cronbach's Alpha analysis confirmed the constructs' reliability. After obtaining the necessary approvals from the appropriate professors and the college dean, the questionnaires were individually distributed to the respondents as part of the data collection process, with confidentiality strictly maintained. The collected data were checked for completeness and analyzed for statistical purposes

Data were analyzed using both descriptive and inferential statistics. Descriptive statistics such as frequency counts, percentages, means, and standard deviations were used to summarize the profile of the respondents and their levels of math anxiety.

To determine the level of math anxiety among BSED Math students, the following scale was used:

Scale Range	Description
4.21 – 5.00	Very High Math Anxiety
3.41 – 4.20	High Math Anxiety
2.61 – 3.40	Moderate Math Anxiety
1.81 – 2.60	Low Math Anxiety
1.00 – 1.80	Very Low Math Anxiety

On the other hand, the following scale was used to interpret the Perceived Emotional Effects of Math Anxiety among BSED Math Learners:

Scale Range	Description
4.21 – 5.00	Very High Emotional Effect
3.41 – 4.20	High Emotional Effect
2.61 – 3.40	Moderate Emotional Effect
1.81 – 2.60	Low Emotional Effect
1.00 – 1.80	Very Low Emotional Effect

Inferential statistics, including the Kruskal Wallis H-test and Spearman Rho Correlation co-efficient, were used to determine the significance of relationships and differences between variables at the 0.05 level of significance.

RESULTS

Math Anxiety among the Respondents When Grouped according to Gender

Data in table 1 shows the level of Math Anxiety among the respondents when grouped according to gender. The results show that the level of math anxiety among BSED Mathematics students varies across gender, with female students consistently exhibiting higher levels of anxiety compared to their male and LGBTQ+ counterparts. Female respondents recorded a high anxiety mean score ($M = 3.76$) across most situations, particularly in tasks involving exams ($M = 4.19$), studying for mathematics tests ($M = 4.03$), and dealing with multiple required mathematics classes ($M = 3.97$). This indicates that high-stakes assessments and workload expectations are strong anxiety triggers for female students. In contrast, male students displayed

a moderate anxiety mean score ($M=3.20$), with their highest anxiety observed during formal examinations ($M=3.85$) and when facing heavy homework loads ($M=3.46$). Meanwhile, LGBTQ+ respondents demonstrated a moderate overall anxiety level ($M=2.80$), but certain tasks such as realizing multiple required mathematics classes ($M=3.33$) and homework involving complex problems ($M=3.33$) still elicited moderate anxiety.

These findings align with Vos (2023) and Asomah (2025), who highlight gender-based disparities in math anxiety, with females often reporting higher anxiety levels due to societal stereotypes and past learning experiences that undermine mathematical confidence. The lower levels of anxiety among LGBTQ+ respondents, relative to females, may suggest differences in coping strategies or prior exposure to mathematics challenges, but their moderate levels still indicate the presence of emotional strain. Overall, the data reinforces that math anxiety is present across all gender groups but manifests most strongly among female students, particularly in testing and high-pressure academic contexts, warranting targeted interventions to mitigate its impact on performance and engagement.

Table 1. Math Anxiety among the Respondents When Grouped according to Gender

	Male	Description	Female	Description	LGBTQ+	Description
1. Waiting to receive a mathematics test I expected to do well.	3.08	Moderate Anxiety	3.62	High Anxiety	3.67	High Anxiety
2. Realizing that multiple mathematics classes to fulfill the requirements in your major.	3.46	High Anxiety	3.97	High Anxiety	3.33	Moderate Anxiety
3. Studying for a mathematics test.	3.15	Low Anxiety	4.03	High Anxiety	3.33	Moderate Anxiety
4. Taking an examination in a mathematics course.	3.85	High Anxiety	4.19	High Anxiety	3.00	Moderate Anxiety
5. Being given a homework assignment of several complex problems which is due the next class meeting.	3.46	High Anxiety	3.75	High Anxiety	3.33	Moderate Anxiety
6. Getting ready to review for a mathematics test.	3.00	Moderate Anxiety	3.73	High Anxiety	3.00	Moderate Anxiety
7. Dividing a four digit number by a two digit number in private with pencil and paper.	3.15	Moderate Anxiety	3.43	High Anxiety	2.67	Moderate Anxiety
8. Reading a store receipt.	3.23	Moderate Anxiety	3.73	High Anxiety	2.00	Low Anxiety

9. Figuring out your monthly budget.	3.38	Moderate Anxiety	3.90	High Anxiety	3.33	Moderate Anxiety
10. Being given a set of numerical problems involving subtraction to solve on paper.	3.08	Moderate Anxiety	3.86	High Anxiety	2.33	Low Anxiety
11. Responsible for collecting dues for an organization and maintaining accurate financial records.	2.92	Moderate Anxiety	3.59	High Anxiety	3.00	Moderate Anxiety
12. Observing someone work with a calculator.	3.00	Moderate Anxiety	3.62	High Anxiety	2.33	Low Anxiety
13. Being a set of division word problems to solve.	3.15	Moderate Anxiety	3.62	High Anxiety	2.33	Low Anxiety
14. Being given a set of subtraction word problems to solve.	3.08	Moderate Anxiety	3.67	High Anxiety	2.00	Low Anxiety
15. Being given a set of multiplication word problems to solve.	3.00	Moderate Anxiety	3.63	High Anxiety	2.33	Low Anxiety
As a whole	3.20	Moderate Anxiety	3.76	High Anxiety	2.80	Moderate Anxiety

Scale of Means: 4.21–5.00 (Very High Anxiety), 3.41 – 4.20 (High Anxiety), 2.61 – 3.40 (Moderate Anxiety), 1.81 – 2.60 (Low Anxiety), 1.00 – 1.80 (Very Low Anxiety)

Emotional Effects of Math Anxiety When Respondents Are Classified based on Gender

Data in table 2 shows the emotional effects of mathematics related task among BSED students when grouped according to gender.

The findings reveal notable differences in the emotional effects of mathematics-related tasks among BSED Math students when grouped by gender. Female students recorded the highest overall mean score of 3.23, interpreted as Moderate Emotional Effect, with High Emotional Effect observed in specific situations such as feeling embarrassed when unable to answer a teacher's question (M= 3.73), realizing the need to take several mathematics classes (M=3.54), and solving subtraction problems (M=3.46). Male students obtained the lowest overall mean of 2.41, categorized as Low Emotional Effect, indicating that mathematics-related tasks generally elicited fewer negative emotional responses from them. Their highest emotional reactions were in feeling embarrassed when unable to answer a question (M=3.23) and realizing the need for multiple mathematics classes (M=2.77), both still within the moderate range. LGBTQ+ students reported an overall mean of 2.95, signifying Moderate Emotional Effect, with the highest scores in solving addition (M=4.00) and subtraction (M=4.00) problems, both indicating High Emotional Effect. The heightened emotional impact among female students, particularly in high-pressure or evaluative situations, supports Vos (2023) and Asomah (2025), who point to gender differences in math-related

anxiety often shaped by societal stereotypes and formative educational experiences. Overall, the data highlight that while all groups experience some degree of emotional strain from mathematics, females tend to be more emotionally affected, and LGBTQ+ students show heightened reactions in certain computational tasks—underscoring the need for gender-sensitive and inclusive strategies to reduce the emotional barriers associated with learning mathematics.

Table 2. Emotional Effects of Math Anxiety When Respondents Are Classified based on Gender

	Male	Description	Female	Description	LGBTQ+	Description
1. I am embarrassed that I cannot answer my math teacher's questions well.	3.23	Moderate Emotional Effect	3.73	High Emotional Effect	3.33	Moderate Emotional Effect
2. Realizing that you have to take a number of mathematics classes to fulfill the requirements in your major.	2.77	Moderate Emotional Effect	3.54	High Emotional Effect	3.33	Moderate Emotional Effect
3. Studying for a mathematics test.	2.08	Low Emotional Effect	3.32	Moderate Emotional Effect	2.33	Low Emotional Effect
4. Taking an examination (quiz) in a mathematics course.	2.62	Moderate Emotional Effect	3.40	Moderate Emotional Effect	3.00	Moderate Emotional Effect
5. Being given a homework assignment of many difficult problems which is due the next class meeting.	2.38	Low Emotional Effect	3.25	Moderate Emotional Effect	3.33	Moderate Emotional Effect
6. Getting ready to study for a mathematics test.	2.69	Moderate Emotional Effect	3.46	High Emotional Effect	2.33	Low Emotional Effect
7. Dividing a five digit number by a two digit number in private with pencil and paper.	2.31	Low Emotional Effect	3.33	Moderate Emotional Effect	2.00	Low Emotional Effect
8. Reading a cash register receipt.	2.08	Low Emotional Effect	2.83	Moderate Emotional Effect	2.67	Moderate Emotional Effect

9. Figuring out your monthly budget.	1.85	Low Emotional Effect	3.16	Moderate Emotional Effect	2.67	Moderate Emotional Effect
10. Being given a set of numerical problems involving addition to solve on paper.	2.15	Low Emotional Effect	3.00	Moderate Emotional Effect	4.00	High Emotional Effect
11. Being responsible for collecting dues for an organization and keeping track of the amount.	2.08	Low Emotional Effect	2.75	Moderate Emotional Effect	3.00	Moderate Emotional Effect
12. Watching someone work with a calculator.	2.08	Low Emotional Effect	2.86	Moderate Emotional Effect	2.00	Low Emotional Effect
13. Being given a set of division problems to solve.	2.46	Low Emotional Effect	3.16	Moderate Emotional Effect	3.00	Moderate Emotional Effect
14. Being given a set of subtraction problems to solve.	2.62	Moderate Emotional Effect	3.46	High Emotional Effect	4.00	High Emotional Effect
15. Being given a set of multiplication problems to solve.	2.77	Moderate Emotional Effect	3.24	Moderate Emotional Effect	3.33	Moderate Emotional Effect
As a whole	2.41	Low Emotional Effect	3.23	Moderate Emotional Effect	2.95	Moderate Emotional Effect

Scale of Means: 4.21–5.00 (Very High Emotional Effect), 3.41 – 4.20 (High Emotional Effect), 2.61 – 3.40 (Moderate Emotional Effect), 1.81 – 2.60 (Low Emotional Effect), 1.00 – 1.80 (Very Low Emotional Effect)

Significant Differences in the Level of Math Anxiety among the Respondents When Classified According to Gender

Data in table 3 shows the significant differences in the level of math anxiety among the respondents when classified according to gender.

Based on the results, there is no significant difference in the level of math anxiety among respondents when classified according to gender, as indicated by the p -value of 0.102, which is greater than the 0.05 significance level. This suggests that male, female, and LGBTQ+ students experience relatively similar levels of math anxiety, with no statistically significant variation between the groups. This finding contrasts with much of the existing literature, such as Vos (2023) and Asomah (2025), which often report higher anxiety levels among female students compared to males, frequently attributed to societal stereotypes and formative educational experiences. The absence of a significant difference in this study may point to the

influence of other factors—such as institutional support, teaching strategies, or shared academic pressures—that might level out gender disparities in anxiety levels. The current results suggest that these impacts may be experienced across all genders at comparable levels, highlighting the need for broad-based interventions that address math anxiety inclusively rather than focusing on gender-specific approaches.

Table 3. Significant Difference in the Level of Math Anxiety When Respondents are Classified According to Gender

Variable		Df	H-test	p-value	Description
Gender					
Male		2	4.556	0.102	Not Significant
Female LGBTQ+					

Significant Difference in the Emotional Effect of Math Anxiety When Respondents are Classified According to Gender

Table 4 shows the significant difference in the emotional effect of math anxiety when respondents are classified according to gender.

The results show that there is no significant difference in the emotional effects of math anxiety among respondents when classified according to gender, as indicated by the p -value of 0.053, which is slightly above the 0.05 significance level. This means that male, female, and LGBTQ+ students experience the emotional impact of math anxiety at relatively similar levels, with no statistically significant variation between the groups.

This finding contrasts with previous studies, such as those by Vos (2023) and Asomah (2025), which often report greater emotional responses among female students due to societal stereotypes and early educational influences. The lack of a significant difference in this study may suggest that all gender groups are exposed to similar academic pressures, teaching environments, and assessment challenges that produce comparable emotional reactions to mathematics. While Brooks (2020) emphasize that math anxiety can lead to feelings of tension, apprehension, and reduced confidence, the present findings imply that these emotional burdens are not exclusive to one gender but are shared across all groups, indicating the need for inclusive emotional support strategies in mathematics learning.

Table 4. Significant Difference in the Emotional Effect of Math Anxiety When Respondents are Classified According to Gender

Variable		Df	H-test	p-value	Description
Gender					
Male		2	5.866	0.053	Not Significant
Female LGBTQ+					

Significant Relationship between Math Anxiety and Perceived Emotional Effect

Table 5 reveals the significant relationship between math anxiety and perceived emotional effect.

The results indicate a significant positive relationship between math anxiety and its perceived emotional effect, as shown by the Spearman correlation coefficient of 0.331 and a p -value of 0.003, which is below

the 0.05 significance level. This suggests that as students' levels of math anxiety increase, the emotional impact they experience—such as feelings of embarrassment, tension, or fear—also tends to intensify. The moderate strength of the correlation implies that while other factors may also influence emotional responses, math anxiety plays a substantial role in shaping them.

This finding supports Brooks (2020) describe math anxiety as an emotional burden that disrupts problem-solving and erodes students' confidence, particularly in higher education where mathematical concepts are more abstract and challenging. The significant association also aligns with Daker et al. (2021), who note that the emotional effects of math anxiety can contribute to avoidance behaviors, leading students to shy away from math-intensive tasks or courses. In essence, the data affirm that math anxiety is not merely a cognitive challenge but also a powerful emotional factor that can influence students' engagement, persistence, and overall academic experience in mathematics.

Table 5. Significant Relationship Between Math Anxiety and Perceived Emotional Effect

	Math Anxiety	Perceived Emotional Effect
Spearman Correlation	.331**	.331**
Sig. (2-tailed)	.003	.003
N	79	79

DISCUSSION

The findings of the study indicate a picture of how math anxiety and its emotional effects manifest among BSED Math students across gender groups.

Results on the level of math anxiety revealed that female students had the highest overall anxiety (High Anxiety), followed by male and LGBTQ+ students, both in the Moderate Anxiety range. This aligns with previous literature, particularly Vos (2023) and Asomah (2025), which report higher math anxiety among females, often linked to societal stereotypes and formative academic experiences.

Similarly, in terms of the emotional effects of math anxiety, female students again reported higher overall emotional impact compared to males and LGBTQ+ respondents, although all groups showed signs of embarrassment, apprehension, or discomfort in math-related situations.

However, statistical tests showed no significant difference in the level of math anxiety ($p = 0.102$) and in the emotional effect of math anxiety ($p = 0.053$) when respondents were classified according to gender. This suggests that despite observable variations in mean scores, these differences were not strong enough to be statistically meaningful. This finding deviates from much of the existing literature, which typically reports clear gender gaps in math anxiety. The results may indicate that similar academic pressures and learning environments in the program have leveled gender disparities in both anxiety and emotional impact.

Finally, the analysis found a significant positive relationship between math anxiety and its emotional effect ($\rho = 0.331$, $p = 0.003$), meaning that higher levels of math anxiety are associated with stronger negative emotional responses. This supports Brooks (2020) who note that math anxiety not only undermines cognitive performance but also heightens emotional strain, which can affect confidence and engagement. Taken together, the results highlight that math anxiety and its emotional consequences are interconnected and experienced across all genders, emphasizing the need for inclusive intervention strategies that address both the cognitive and emotional dimensions of learning mathematics.

CONCLUSION

The study revealed that BSED Math students experience varying levels of math anxiety and its emotional effects, with females showing higher mean scores compared to males and LGBTQ+ students. However, statistical analysis indicated no significant differences in either the level of math anxiety or its emotional effects when classified by gender, suggesting that similar academic pressures and shared learning environments may mitigate traditional gender disparities reported in previous studies. A significant positive relationship was found between math anxiety and its emotional effects, indicating that higher anxiety levels are associated with greater negative emotional responses. These findings affirm that math anxiety is both a cognitive and emotional challenge that affects students across all gender groups. Therefore, interventions aimed at reducing math anxiety should address not only problem-solving skills but also emotional resilience, fostering a supportive and inclusive learning environment that benefits all learners.

RECOMMENDATIONS

Based on the findings, it is recommended that strategies to reduce math anxiety be integrated into teaching practices, such as relaxation techniques, positive reinforcement, and step-by-step problem-solving approaches to help students manage stress during lessons and assessments. Emotional support programs, including counseling services, peer mentoring, and workshops on resilience and stress management, should be made available to address the emotional effects of math anxiety across all genders. An inclusive and supportive classroom climate must be fostered by encouraging open discussions about learning difficulties, avoiding public embarrassment for incorrect answers, and promoting collaborative learning. Targeted review and remediation sessions should be conducted regularly to address students' specific mathematical weaknesses and build mastery, thereby minimizing anxiety-triggering situations. Professional development for teachers is essential to equip them with the skills to identify and address signs of math anxiety, ensuring they can respond effectively to both the cognitive and emotional needs of learners. The use of real-life applications of mathematics should also be encouraged to make lessons more practical, relevant, and engaging. Finally, further research is recommended to explore additional factors influencing math anxiety, such as teaching styles, assessment types, or prior learning experiences, in order to design more targeted and evidence-based interventions.

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