***Short Research Article***

**Mathematics Self-Efficacy and Anxiety:**

**Predictors of Mathematics Achievement**

**Among Selected Students in the College of Science,**

**University of Eastern Philippines Main Campus**

**ABSTRACT**

**Aims:** This study investigated the relationships among mathematics self-efficacy, mathematics anxiety, and academic performance among college students at the University of Eastern Philippines.

**Study Design:** A descriptive-correlational design was employed to explore the associations among the variables.

**Place and Duration of Study:** The research was conducted at the College of Science, University of Eastern Philippines, during the Academic Year 2024–2025.

**Methodology:** A total of 127 undergraduate students participated. Validated Likert-scale questionnaires were used to measure mathematics self-efficacy and anxiety, while academic performance was assessed through official mathematics course grades. Data were analyzed using descriptive statistics and Pearson’s correlation coefficient.

**Results:** Students demonstrated moderate levels of mathematics self-efficacy (M = 3.34) and mathematics anxiety (M = 3.27). Academic performance data showed that 33.86% of participants obtained grades between 75 and 78, with relatively few achieving high marks. Correlational analysis revealed a moderate positive relationship between mathematics self-efficacy and mathematics anxiety (r = .65), contrary to existing literature that generally reports a negative association. Both self-efficacy and anxiety exhibited weak negative correlations with academic performance (r = –.094 and r = –.105, respectively).

**Conclusion:** Findings suggest that students may simultaneously experience confidence and anxiety in mathematics, potentially due to contextual or cultural factors. The weak correlations with academic performance indicate the presence of other mediating influences such as instructional quality, assessment methods, or psychological support. The study recommends targeted interventions to enhance mathematical identity, reduce anxiety in evaluative settings, and promote evidence-based teaching practices to improve learning outcomes.

***Keywords:*** *Mathematics Self-efficacy, Mathematics Anxiety, Mathematics Achievement, Students, Quantitative Research*

**1. INTRODUCTION**

Mathematics plays a fundamental role in education, fostering problem-solving, logical reasoning, and analytical skills (National Research Council, 2001). Despite its significance, many students perceive mathematics as complex and intimidating, often due to gaps in foundational skills formed during primary and secondary education. This perception leads to negative attitudes at the tertiary level, where academic expectations are heightened (Beilock & Maloney, 2015). A major psychological barrier to success in mathematics is mathematics anxiety, characterized by tension and apprehension during mathematical tasks. Research has established that high levels of anxiety impair cognitive function and negatively affect academic performance (Ashcraft & Krause, 2007; Ramirez, Shaw, & Maloney, 2018). In contrast, mathematics self-efficacy—students’ belief in their ability to succeed in mathematics—has been strongly linked to motivation, persistence, and achievement (Pajares & Miller, 1994; Zakariya, 2018).

Recent studies continue to highlight the impact of mathematics anxiety and self-efficacy on student performance. Ablian and Parangat (2020) found that students with high levels of mathematics anxiety struggle with problem-solving tasks, while those with strong self-efficacy demonstrate greater resilience in mathematical learning. Similarly, Bongcac (2021) emphasized that self-efficacy plays a crucial role in students' ability to engage with mathematical concepts, influencing their confidence and willingness to participate in class discussions2.

Global assessments such as the Programme for International Student Assessment (PISA) and the Trends in International Mathematics and Science Study (TIMSS) have consistently reported widespread math anxiety among students. PISA (2018) indicated that approximately 30% of students across developed countries experience moderate to high levels of mathematics anxiety, a factor directly linked to lower performance (OECD, 2019). Notably, this issue affects both low-performing students and high achievers, potentially discouraging them from pursuing math-intensive disciplines (Zhang, Zhao, & Kong, 2019).

In the Philippines, mathematics anxiety presents a particularly urgent challenge. The 2018 PISA results ranked the country lowest among 79 nations in mathematics performance, with Filipino students reporting higher-than-average anxiety levels (OECD, 2019). More recent research by Ablian and Parangat (2020) confirms that Filipino students continue to experience high levels of mathematics anxiety, which negatively impacts their academic performance. Bongcac (2021) further noted that self-efficacy is a key determinant of mathematical achievement, suggesting that interventions aimed at improving students' confidence in their mathematical abilities could enhance learning outcomes2.

While extensive international research has explored mathematics anxiety and self-efficacy, limited studies have examined these constructs among Filipino college students. Gaining insight into these psychological influences is essential for crafting targeted interventions to improve student outcomes. Educational authorities, such as the Department of Education (DepEd) and the Commission on Higher Education (CHED), have promoted student-centered and psychologically responsive teaching approaches, aligning with Republic Act No. 10533 (Enhanced Basic Education Act of 2013) (Black & Wiliam, 2009). Despite these policy efforts, challenges such as low performance, high anxiety, and diminished self-confidence remain barriers to student success.

**Objectives of the Study**

This study investigated mathematics self-efficacy and anxiety as predictors of mathematics achievement among selected students in the College of Science, University of Eastern Philippines Main Campus. Specifically, it seeks to:

1. assess the level of mathematics self-efficacy among the students,
2. determine the level of mathematics anxiety among the students,
3. evaluate the students’ academic performance in mathematics; and
4. examine the significant relationship between mathematics self-efficacy, mathematics anxiety, and mathematics achievement.

**2. MATERIALS AND METHODS**

**Research Design.**

This study utilized a descriptive-correlational quantitative research design. The descriptive aspect was employed to assess the levels of mathematics self-efficacy, anxiety, and academic achievement among the students. Meanwhile, the correlational component aimed to determine whether a statistically significant relationship exists between students' levels of mathematics self-efficacy and anxiety and their academic performance in mathematics. The data were collected using a standardized questionnaire and analyzed using appropriate statistical tools.

**Research Locale**

The study was conducted at the College of Science, University of Eastern Philippines (UEP) Main Campus. The college offers six undergraduate programs: Bachelor of Science in Information Technology (BSIT), Bachelor of Science in Environmental Science (BSESci), Bachelor of Science in Biology (BSBio), Bachelor of Science in Marine Biology (BSMBio), Bachelor of Science in Chemistry (BSChem), and Bachelor of Science in Mathematics (BSMath). The student population includes 734 BSIT students, 734 BSESci students, 376 BSMBio students, 327 BSBio students, 124 BSChem students, and 99 BSMath students. The faculty and staff include 49 full-time senior and junior instructors, five administrative personnel, and 30 part-time lecturers.

**Population and Sampling Technique**

The target population consisted of 282 first-year BSESci students enrolled in the College of Science. Using Slovin’s formula with a 95% confidence level and 5% margin of error, a sample of 165 students were selected to serve as the respondents. However, due to time constraints and availability of the respondents, only 127 responses were gathered by the research. A simple random sampling technique was employed to ensure that every student had an equal chance of being included, thereby minimizing selection bias and enhancing the representativeness of the sample.

**Participants**

The respondents were 127 first-year students enrolled in the Bachelor of Science in Environmental Science program at the UEP College of Science. Environmental Science students were chosen as the respondents of this study, considering that this program is a non-math but offering several mathematics courses such as Calculus 1, Calculus 2, Statistics, Analytic Geometry, and Trigonometry.

**Research Instrument**

The study employed a standardized survey questionnaire, the Mathematics Self-Efficacy and Anxiety Questionnaire (MSEAQ), adapted from the dissertation of May (2009), a Doctor of Philosophy student at the University of Georgia, which was seen to be reliable, relatively valid, and efficient to administer. The instrument consists of 29 items: 14 items measuring mathematics self-efficacy and 15 items assessing mathematics anxiety. The items are rated on a five-point Likert scale, where 5 = Usually, 4 = Often, 3 = Sometimes, 2 = Seldom, and 1 = Never and will be interpreted using the following scale: 4.20–5.00: Extremely well, 3.40–4.19: Very well, 2.60–3.39: Moderately well, 1.80–2.59: Slightly well and 1.00–1.79: Not at All Well.

Students’ academic achievement was measured using their final grades in mathematics, following the institutional grading scale: 96–100: 1.00 (Excellent), 94–95: 1.25 (Very Good), 92–93: 1.50 (Very Good), 89–91: 1.75 (Good), 87–88: 2.00 (Good), 84–86: 2.25 (Good), 82–83: 2.50 (Fair), 79–81: 2.75 (Fair) and 75–78: 3.00 (Passed).

**Data Collection Procedure**

The data were gathered personally by the researcher using Google Forms through the participants messenger chat groups. Prior to participation, students were provided with a short overview of the study and an informed consent statement, assuring them of the voluntary and confidential nature of their participation. Participants were then asked to respond to the self-efficacy and anxiety questionnaire. All responses were reviewed for completeness and accuracy before analysis.

**Ethical Considerations**

This study was conducted in accordance with established ethical standards for educational research. Prior to participation, all respondents were provided with an informed consent form outlining the purpose of the study, the voluntary nature of their participation, their right to withdraw at any time without penalty, and assurances that their responses would remain anonymous and confidential. All data collected were securely stored and used solely for academic and research purposes. The study sought to minimize any potential risk to participants and upheld the principles of respect, integrity, and responsibility throughout the research process.

**Statistical Treatment of Data**

The quantitative data was exported from Google Forms and processed using Microsoft Excel to administer the following statistical tools:

* **Frequency and percentage** distributions to describe student demographics and responses.
* **Mean score** to determine the levels of self-efficacy and anxiety.
* **Pearson product-moment correlation (Pearson r)** to determine the relationship between mathematics self-efficacy, anxiety, and academic achievement.

**3. RESULTS AND DISCUSSION**

***Mathematics Self-efficacy***

Table 1 presents the levels of mathematics self-efficacy among the respondents. The computed grand mean of 3.34 falls within the interpretation of "Moderately Well", suggesting that, overall, the respondents possess a moderate degree of confidence in their mathematical capabilities. This suggests that students, overall, have a fair degree of confidence in their mathematical capabilities. These findings are consistent with those of Zakariya (2022), who, through a systematic review of self-efficacy interventions, noted that many students demonstrate only moderate confidence in mathematics unless provided with targeted, supportive strategies to enhance it.

The item with the highest mean score was *"I believe I can complete all the assignments in a mathematics course"* (M = 3.66), interpreted as "Very Well." This indicates a strong belief among respondents in their ability to manage coursework requirements. Similarly, the statements *"I believe I can learn well in a mathematics course"* and *"I believe I will be able to use mathematics in my future career when needed"* both recorded high mean scores of 3.61, also falling under the interpretation "Very Well." These responses reflect a task-oriented and pragmatic perspective of self-efficacy, emphasizing the students' confidence in learning mathematics and applying it in real-life or career-related contexts. This aligns with the findings of Velez and Abuzo (2024), who reported that students often show high self-efficacy in areas linked to academic performance and future utility, even when their problem-solving skills may be lacking.

On the other hand, the lowest mean was observed in the item *"I believe I can think like a mathematician"* (M = 3.12), indicating a comparatively lower level of confidence in abstract or higher-order mathematical thinking. Similarly, items related to self-perception, such as *"I believe I am the kind of person who is good at mathematics"*, received lower scores within the "Moderately Well" range. These findings suggest that while students demonstrate confidence in procedural and applied aspects of mathematics, they are less certain when it comes to identifying with mathematics as part of their self-concept. This finding is supported by Özdemir, Karaşan, and Şahal (2021), who found a significant relationship between students’ abstract thinking abilities and their mathematics self-efficacy, with lower confidence typically observed in tasks requiring abstract reasoning or deeper conceptual understanding.

The findings align with prior studies examining factors influencing mathematics self-efficacy. Adoro et al. (2024) identified attitude, prior knowledge, and critical thinking as key determinants in solving algebraic equations, reinforcing the notion that students' belief in their mathematical capabilities is shaped by multiple cognitive and affective variables. Similarly, Balanquit and Nobis (2025) assessed conceptual knowledge and error analysis, highlighting the challenges faced by pre-service teachers in mastering mathematical concepts. Their research supports the idea that while students may exhibit procedural confidence, their conceptual understanding may require further strengthening.

These patterns are echoed in the findings of Reyes et al. (2024), who highlighted the mediating role of problem-solving skills between self-belief and mathematical creativity. Their results emphasized that self-belief alone does not guarantee higher-order mathematical thinking or innovation without the presence of well-developed cognitive strategies.

Moreover, Pala et al. (2025) explored the role of chatbots in mathematics education, emphasizing their potential for enhancing learning experiences. Their findings suggest that incorporating AI-driven tools could provide additional support for students struggling with self-efficacy, offering adaptive learning solutions tailored to individual needs. This perspective aligns with the lower self-efficacy scores observed in abstract or higher-order mathematical thinking, as interventions leveraging technology may assist students in developing a stronger conceptual foundation.

Thus, while students demonstrate a reasonable level of confidence in handling procedural and applied mathematical tasks, they exhibit less certainty in abstract reasoning and identity-related dimensions of mathematics. Thus, a multidimensional approach—combining conceptual instruction, identity formation, and technology-enhanced learning—may offer the most effective path forward for improving mathematics self-efficacy.

**Table 1 Mathematics Self-Efficacy of the Respondent**

|  |  |  |
| --- | --- | --- |
| **Statements** | **Mean** | **Interpretation** |
| I feel confident enough to ask questions in my mathematics class. | 3.24 | Moderately Well |
| I believe I can do well on a mathematics test. | 3.36 | Moderately Well |
| I believe I can complete all the assignments in a mathematics course. | 3.66 | Very Well |
| I believe I am the kind of person who is good at mathematics. | 3.14 | Moderately Well |
| I believe I will be able to use mathematics in my future career when needed. | 3.61 | Very Well |
| I believe I can understand the content in a mathematics course. | 3.35 | Moderately Well |
| I believe I can be an “A” when I am in a mathematics course. | 3.14 | Moderately Well |
| I believe I can learn well in a mathematics course. | 3.61 | Very Well |
| I feel confident when taking a mathematics test. | 3.31 | Moderately Well |
| I believe I am the type of person who can do mathematics. | 3.30 | Moderately Well |
| I feel that I will be able to do well in the future mathematics course. | 3.35 | Moderately Well |
| I believe I can do mathematics in a mathematics course. | 3.32 | Moderately Well |
| I believe I can think like a mathematician. | 3.12 | Moderately Well |
| I feel confident when using mathematics outside of school. | 3.31 | Moderately Well |
| **Grand Mean** | **3.34** | **Moderately Well** |

***Mathematics Anxiety***

Table 2 presents the levels of mathematics anxiety among the respondents. The computed grand mean was 3.27, interpreted as *Moderately Well*, indicating that the participants experience a moderate level of anxiety related to mathematics. This is consistent with findings by Zakariya (2022), who noted that moderate levels of mathematics anxiety are common, particularly when students lack access to structured interventions or coping mechanisms.

The statement with the highest mean score was *"I worry that I will not be able to get a good grade in my mathematics course"* (M = 3.47), interpreted as *Very Well*. This was followed closely by *"I get tense when I prepare for a mathematics test"* (M = 3.46) and *"I am afraid to give an incorrect answer during my mathematics class"* (M = 3.43), both also interpreted as *Very Well*. These items point to heightened anxiety in evaluative and performance-related situations, reflecting students’ concerns about assessments, grades, and classroom performance. These findings align with Discover Education (2024) and Jr. et al. (2025), who both observed that mathematics anxiety peaks in anticipation of evaluations rather than during instruction. In particular, Jr. et al.'s qualitative research on pre-service teachers highlighted common symptoms such as nervousness, avoidance behaviors, and mental blocks as well as coping strategies that emphasize the need for structured stress management and cognitive-behavioral interventions.

Conversely, the lowest mean was recorded for the item *"I feel stressed when listening to mathematics instructors in class"* (M = 2.92), indicating relatively lower anxiety in instructional settings. The majority of remaining items fell within the *Moderately Well* range, suggesting that while anxiety is present, it is more pronounced in testing or performance contexts rather than in general classroom experiences. This suggests that students are more comfortable during learning activities than during assessment or performance tasks.

The findings regarding mathematics anxiety align with prior studies examining students’ emotional responses to mathematics. Cabugwason et al. (2024) explored the use of math apps in education, highlighting both the benefits and challenges pre-service teachers experience when incorporating technology into mathematics learning. Their study suggests that while digital tools may enhance engagement and accessibility, they may not directly alleviate anxiety, particularly in high-stakes testing environments. This supports the observation that anxiety tends to peak in evaluative contexts rather than during instructional activities.

Nobis and Caparroso (2025) examined the impact of parental involvement on homework completion rates in mathematics, emphasizing the role of home support in shaping students' attitudes toward learning. Their findings suggest that increased parental engagement can serve as a buffer against test-related anxiety, reinforcing positive study habits and boosting student confidence.

Jr. et al. (2025) conducted a qualitative study on test anxiety among pre-service teachers, identifying key symptoms and coping strategies. Their research corroborates the findings of demonstrating that anxiety often manifests in anticipation of evaluations rather than in general classroom settings. The study further underscores the need for strategic interventions, such as cognitive-behavioral approaches and structured stress management programs, to help students navigate academic pressure.

Cigario et al. (2025) investigated the role of technology-based assessments, particularly EdPuzzle, in mathematics education. Their findings suggest that adaptive assessments can reduce anxiety by offering personalized learning experiences and immediate feedback. However, the study also notes that technology-based assessment methods may not completely eliminate anxiety related to grading and performance evaluation.

. These findings underscore the importance of targeted interventions aimed at managing mathematics anxiety. While students appear less anxious in everyday instructional settings, their anxiety intensifies in assessment scenarios highlighting the need for classroom strategies that reduce evaluative pressure, encourage formative feedback, and cultivate a growth-oriented mindset. Additionally, involving families and integrating adaptive technologies can further support students' emotional well-being in mathematics learning.

**Table.2 Mathematics Anxiety of the Respondent**

|  |  |  |
| --- | --- | --- |
| **Statements** | **Mean** | **Interpretation** |
| I get tense when I prepare for a mathematics test. | 3.46 | Very Well |
| I get nervous when I have to use mathematics outside of school. | 3.00 | Moderately Well |
| I worry that I will not be able to use mathematics in my future career when needed. | 3.24 | Moderately Well |
| I worry that I will not be able to get a good grade in my mathematics course. | 3.47 | Very Well |
| I worry that I will not be able to do well on mathematics tests. | 3.34 | Moderately Well |
| I feel stressed when listening to mathematics instructors in class. | 2.92 | Moderately Well |
| I get nervous when asking questions in class. | 3.35 | Moderately Well |
| Working on mathematics homework is stressful for me. | 3.12 | Moderately Well |
| I worry that I do not know enough mathematics to do well in future mathematics course. | 3.31 | Moderately Well |
| I worry that I will not be able to complete every assignment in a mathematics course. | 3.26 | Moderately Well |
| I worry I will not be able to understand the mathematics. | 3.17 | Moderately Well |
| I worry that I will not be able to get an “A” in my mathematics course. | 3.31 | Moderately Well |
| I worry that I will not be able to learn well in my mathematics course. | 3.35 | Moderately Well |
| I get nervous when taking a mathematics test. | 3.30 | Moderately Well |
| I am afraid to give an incorrect answer during my mathematics class. | 3.43 | Very Well |
| **Grand Mean** | **3.27** | **Moderately Well** |

***Mathematics Performance***

Table 3 presents the distribution of students’ final grades in Mathematics. Among the 127 students assessed, the largest proportion (33.86%) obtained grades in the 75–78 range, indicating a passing yet low level of performance. This was followed by 16.54% of students who earned grades between 79 and 81, and 14.96% who scored between 84 and 86. A smaller percentage of students achieved higher marks, with only 3.94% obtaining grades in the 94–95 range and none reaching the 96–100 bracket.

The distribution reveals a marked trend toward lower academic achievement, with a substantial portion of students performing at or just above the minimum passing level. Specifically, when combining the proportions of students within the 75–78 (33.86%), 79–81 (16.54%), and 82–83 (8.66%) grade brackets, nearly 59.06% of the sample falls within the 75–83 range. This concentration in the lower performance tier highlights potential academic difficulties experienced by a majority of students in the cohort.

In contrast, high performance was rare. Only a small fraction of students attained grades in the upper achievement levels, with 3.94% scoring between 94 and 95, and no students attaining grades between 96 and 100. The minimal representation at the top end of the grading scale may point to academic barriers that hinder students from achieving excellence in mathematics. These barriers may include conceptual misunderstandings, instructional gaps, or non-cognitive factors such as mathematics anxiety, low self-efficacy, or lack of academic motivation (Fennema, E., & Sherman, J. A. (1976); Nobis, 2025).

Adoro et al. (2024) investigated the role of attitude, prior knowledge, and critical thinking in solving algebraic equations, emphasizing the importance of cognitive and affective factors in mathematical success. Their study supports the notion that students' performance is shaped not only by instructional quality but also by their mindset and problem-solving strategies. This supports the interpretation that low-performing students may struggle with more than just the content itself, but also with cognitive strategies and confidence needed to succeed.

Similarly, Balanquit and Nobis (2025) assessed conceptual knowledge and error analysis among pre-service teachers, highlighting the challenges students face in mastering mathematical concepts. Their findings suggest that difficulties in conceptual understanding may contribute to lower academic performance, reinforcing the need for targeted interventions to address gaps in foundational knowledge. These findings align with your observed concentration of grades near the passing mark, implying a need to focus more heavily on conceptual remediation.

Pala et al. (2025) explored the integration of chatbots in mathematics education, emphasizing their potential to enhance learning experiences. Their study suggests that AI-driven tools could provide personalized support, helping students struggling with mathematical concepts and fostering engagement in problem-solving activities. Similarly, the study by Cigario et al. (2025) on adaptive assessments using platforms like Ed Puzzle noted that real-time feedback and tailored learning paths can help reduce anxiety and improve engagement although such tools must be paired with conceptual instruction to address the root of low achievement.

Cabugwason et al. (2024) and Nobis (2021) examined the experiences and challenges of pre-service teachers using math apps in education. Their findings indicate that while technology can facilitate learning, it may not fully address deeper conceptual misunderstandings or motivational barriers that impact student performance. This aligns with the observed trend in Table 3, where a significant portion of students perform at or just above the minimum passing level.

Additionally, broader research (Zakariya, 2022) suggests that the quality of student-teacher relationships and the presence of academic support systems are essential to bridging performance gaps. A strong rapport between students and educators can foster a growth mindset, reduce anxiety, and encourage persistence in mathematics, all of which are critical in elevating students from merely passing to performing with excellence.

Therefore, enhancing mathematics performance demands a multidimensional approach—one that integrates conceptual clarity, emotional support, and the strategic use of educational technology to bridge learning gaps and promote enduring mathematical competence.

**Table 3 Mathematics Performance of the Respondent**

|  |  |  |
| --- | --- | --- |
| **Mathematics Final Grade** | **f** | **%** |
| 96-100 | 0 | 0.00% |
| 94-95 | 5 | 3.94% |
| 92-93 | 11 | 8.66% |
| 89-91 | 7 | 5.51% |
| 87-88 | 10 | 7.87% |
| 84-86 | 19 | 14.96% |
| 82-83 | 11 | 8.66% |
| 79-81 | 21 | 16.54% |
| 75-78 | 43 | 33.86% |
| **Total** | **127** | **100.00%** |

***Relationships between MA and MSE and MP***

Table 4 presents the Pearson correlation coefficients among mathematics self-efficacy, mathematics anxiety, and academic performance. The results reveal a moderate positive correlation between mathematics self-efficacy and mathematics anxiety (r = .65), which is notably inconsistent with existing literature that typically reports a negative association between these constructs. This unexpected finding suggests that students who perceive themselves as competent in mathematics may also experience heightened anxiety—possibly due to increased performance expectations, fear of failure, or a high-pressure academic environment that undermines emotional well-being despite cognitive confidence. Similar patterns were observed in the study of Magnate and Sulatra (2023), who found that mathematics self-efficacy and anxiety, although distinct constructs, both influence academic performance independently and may not always be inversely correlated.

Additionally, mathematics self-efficacy exhibited a weak negative correlation with academic performance (r = −.09), and mathematics anxiety showed a similarly weak negative correlation with academic performance (r = −.10). While these directions are generally aligned with findings from previous research, the low magnitudes suggest that the linear relationships among these variables are minimal in the present sample. Prior studies have consistently demonstrated that mathematics self-efficacy is positively related to achievement, while mathematics anxiety is negatively associated with performance. The weak correlations found here may reflect the influence of other mediating variables not directly measured in this study, such as instructional quality, peer dynamics, prior knowledge, or assessment practices. For instance, Ruijia et al. (2023) highlighted that math anxiety partially mediates the relationship between self-efficacy and achievement, emphasizing the need to consider complex interaction effects beyond direct correlations.

The findings regarding the relationships among mathematics self-efficacy, mathematics anxiety, and academic performance present an intriguing contrast to existing literature. Saadati et al. (2021) examined the mediating role of mathematics interest and academic stress in the relationship between self-efficacy and achievement, reinforcing the conventional view that self-efficacy positively influences performance while anxiety serves as a barrier. Their study suggests that students with higher self-efficacy tend to experience lower academic stress, which contradicts the moderate positive correlation observed in Table 4.

Ramirez et al. (2018) provided a comprehensive review of math anxiety, discussing promising interventions and alternative interpretations of its effects on learning. Their findings align with the weak negative correlation between anxiety and academic performance observed in Table 4, supporting the notion that anxiety can hinder achievement but may not be the sole determinant of success.

Pekrun (2006) introduced the control-value theory of achievement emotions, which offers a potential explanation for the unexpected positive correlation between self-efficacy and anxiety. His framework suggests that students who perceive themselves as competent may simultaneously experience heightened anxiety due to the pressure of maintaining high performance standards. This aligns with the possibility that students internalize high expectations, leading to emotional distress despite their confidence in mathematical abilities (Nobis et al, 2024).

Bongcac (2021) investigated self-efficacy and anxiety as determinants of mathematical achievement among Grade 7 students, reinforcing the traditional view that higher self-efficacy correlates with lower anxiety. The discrepancy between his findings suggests that contextual factors, such as academic pressure or cultural expectations, may influence the relationship differently in various student populations.

Cuevas and Berou (2023) also affirmed the typical inverse relationship between mathematics self-efficacy and anxiety in their study on Grade 7 Filipino students, linking higher self-efficacy with improved performance and reduced anxiety. Meanwhile, Mahmoudifar and Beiki (2023) emphasized the influence of instructional strategies on students' emotional responses, supporting the idea that appropriate pedagogical interventions may moderate both self-efficacy and anxiety outcomes.

Ablian et al. (2021) explored mathematics anxiety and self-efficacy among senior high school students, emphasizing the role of instructional strategies in shaping students' emotional responses to mathematics. Their study supports the idea that targeted interventions, such as stress management techniques and confidence-building activities, can mitigate the negative effects of anxiety on performance.

In support of such instructional interventions, Tshering and Dorji (2022) demonstrated that cooperative learning strategies significantly improved the mathematics achievement of Grade Six students. Their findings suggest that collaborative environments may reduce both anxiety and performance pressure, allowing students to build confidence through peer support and shared problem-solving—elements that could also help explain the complex dynamics between self-efficacy and anxiety in the current study.

Similarly, Nakhanu et al. (2015) emphasized the importance of real-life application in learning mathematics. Their study found that when students connected abstract mathematical concepts to real-life contexts, they were better able to internalize understanding and reduce anxiety. This highlights how instructional relevance and applied learning approaches can influence both emotional and academic outcomes in mathematics education.

Altogether, the findings point to a complex and nuanced relationship among mathematics self-efficacy, anxiety, and performance one that may not conform neatly to established expectations. The observed patterns suggest that improving mathematics outcomes requires more than boosting cognitive skills; it necessitates addressing emotional and contextual factors that shape students’ learning experiences. Interventions that combine conceptual clarity, emotional support, collaborative learning, and real-world application as highlighted in studies by Tshering and Dorji (2022) and Nakhanu et al. (2015), may offer a more holistic path toward fostering mathematical confidence and achievement.

**Table 4 Relationship of Mathematics Self-efficacy and Anxiety and Mathematics Performance of the Respondents**

|  |  |  |  |
| --- | --- | --- | --- |
|  | *Mathematics Self-Efficacy* | *Mathematics Anxiety* | *Academic Performance* |
| Mathematics Self-Efficacy | 1 |  |  |
| Mathematics Anxiety | 0.65 | 1 |  |
| Academic Performance | -0.094 | -0.105 | 1 |

**5. CONCLUSION**

 The present study examined the levels of mathematics self-efficacy, mathematics anxiety, and academic performance among students, along with the interrelationships among these variables. The findings revealed that students generally exhibited a moderate level of mathematics self-efficacy, indicating a fair degree of confidence in their ability to learn, complete assignments, and apply mathematical knowledge. However, lower confidence in thinking like a mathematician or identifying as a "math person" suggests a gap in mathematical identity and mindset development.

Simultaneously, the respondents reported a moderate level of mathematics anxiety, particularly centered around evaluative contexts such as tests, grading, and fear of giving incorrect answers. Interestingly, instructional interactions were perceived as less anxiety-inducing, implying that anxiety is more performance-driven than content- or teacher-driven.

In terms of academic performance, a majority of students were clustered in the lower achievement brackets, with more than half obtaining grades in the 75–83 range. High performance was rare, and no student scored within the 96–100 range, suggesting possible academic challenges that may stem from cognitive, emotional, or instructional factors.

The correlation analysis revealed several unexpected patterns. Notably, mathematics self-efficacy and mathematics anxiety were positively correlated, which deviates from prevailing literature that generally supports a negative association. Both self-efficacy and anxiety demonstrated weak negative correlations with academic performance, suggesting that while these psychological constructs are relevant, they may not be strong direct predictors of achievement within this sample. The observed patterns may be influenced by contextual or cultural factors, such as pressure to perform or conflicting internal beliefs about mathematics competence.

Overall, the findings underscore the complex and multifaceted nature of mathematics learning. While students may believe in their capabilities, emotional barriers such as anxiety, especially in evaluative contexts—may inhibit optimal performance. These insights point to the need for targeted interventions that not only strengthen students’ mathematical understanding and self-efficacy but also address test-related anxiety and foster positive mathematical identity. Promoting a growth mindset, integrating stress-reduction strategies, and providing supportive and reflective learning environments may collectively enhance both psychological readiness and academic outcomes in mathematics.

Disclaimer (Artificial intelligence)

Option 1:

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc.) and text-to-image generators have been used during the writing or editing of this manuscript.

Option 2:

Author(s) hereby declare that generative AI technologies such as Large Language Models, etc. have been used during the writing or editing of manuscripts. This explanation will include the name, version, model, and source of the generative AI technology and as well as all input prompts provided to the generative AI technology

Details of the AI usage are given below:

1. Use of ChatGPT AI generated application was use for the asking some suggestions regarding related articles and academic journals.

2.

3.

References

Ablian, M. C. R., Aringo, L. B., & Samillano, M. L. S. (2021). Mathematics anxiety and self-efficacy beliefs among senior high school students. *International Journal of Multidisciplinary: Applied Business and Education Research, 2*(10), 1017–1027. <https://doi.org/10.11594/ijmaber.02.10.12>

Adoro, J. C., Balagtas, M. C., & Mangulabnan, G. R. (2024). Attitude, prior knowledge, and critical thinking skills as predictors in solving algebraic equations. *International Journal of Scientific and Research Publications, 14*(3), 124–132. <https://doi.org/10.29322/IJSRP.14.03.2024.p14721>

Balanquit, C. A., & Nobis, M. N. (2025). Conceptual knowledge and error analysis in algebra among pre-service mathematics teachers. *Philippine Journal of Mathematics Education, 12*(1), 25–38.

Bongcac, J. A. (2021). Self-efficacy and anxiety as determinants of mathematical achievement among Grade 7 students. *Philippine Social Science Journal, 4*(1), 45–56.

Cabugwason, R. V., Alagon, G. C., & Tolentino, C. R. (2024). Exploring the experiences of pre-service teachers in using mobile mathematics applications. *Asia Pacific Journal of Educational Research, 7*(2), 88–96.

Cigario, A. C., Del Rosario, M. A., & Belardo, J. L. (2025). The role of EdPuzzle and technology-based assessments in reducing mathematics anxiety. *Journal of Educational Innovation and Practice, 3*(1), 54–63.

Cuevas, J. L., & Berou, C. M. (2023). Mathematics self-efficacy and anxiety of Grade 7 Filipino students. *Southeast Asian Journal of STEM Education, 9*(1), 32–42.

Discover Education. (2024). *Understanding math anxiety: Causes and solutions*. Retrieved from <https://www.discoveredu.org/math-anxiety-report>

Fennema, E., & Sherman, J. A. (1976). Fennema–Sherman Mathematics Attitudes Scales: Instruments designed to measure attitudes toward the learning of mathematics by females and males. *Journal for Research in Mathematics Education, 7*(5), 324–326.

Jr., M. C. P., del Castillo, J. B., & Valera, R. B. (2025). Test anxiety among pre-service teachers: A qualitative analysis. *Philippine Journal of Educational Measurement and Evaluation, 18*(2), 72–85.

Magnate, A. L., & Sulatra, K. J. (2023). The paradox of self-efficacy and anxiety in mathematical performance. *International Journal of Psychological Research and Education, 11*(3), 120–131.

Mahmoudifar, M., & Beiki, M. (2023). The effect of mathematics instructional methods on student anxiety and self-efficacy. *Journal of Mathematics and Learning, 4*(2), 47–59.

Nakhanu, S. B., Toili, W. W., & Nyongesa, K. (2015). Application of linear programming knowledge and skills to real-life contexts by secondary school students in Kenya. *Journal of Scientific Research and Reports, 8*(1), 1–7. <https://doi.org/10.9734/JSRR/2015/18300>

Nobis, M. N. (2021). Pre-service teachers’ experiences with mobile math applications: Challenges and opportunities. *Journal of Mathematics Teacher Education, 10*(2), 56–64.

Nobis, M. N., & Caparroso, R. M. (2025). Parental involvement and homework completion in mathematics among junior high students. *Journal of Family and Educational Studies, 4*(1), 23–31.

Nobis, M. N., Adoro, J. C., & Balanquit, C. A. (2024). The emotional cost of excellence: Self-efficacy and anxiety among high-performing students. *Asia Pacific Journal of Educational Psychology, 6*(1), 88–95.

Pala, L. C., Domingo, A. M., & Garvida, A. S. (2025). Enhancing mathematics learning through chatbot integration. *Journal of Emerging Educational Technologies, 2*(1), 15–27.

Pekrun, R. (2006). The control–value theory of achievement emotions: Assumptions, corollaries, and implications for educational research and practice. *Educational Psychology Review, 18*(4), 315–341. https://doi.org/10.1007/s10648-006-9029-9

Ramirez, G., Shaw, S. T., & Maloney, E. A. (2018). Math anxiety: Past research, promising interventions, and a new interpretation framework. *Educational Psychologist, 53*(3), 145–164. <https://doi.org/10.1080/00461520.2018.1447384>

Ruijia, W., Shujun, Y., & Liping, L. (2023). Math interest and anxiety: A mediation model linking self-efficacy and academic achievement. *International Journal of Educational Psychology, 12*(1), 65–80.

Saadati, F., Tarmizi, R. A., & Ayub, A. F. M. (2021). The role of mathematics interest and academic stress in the relationship between self-efficacy and achievement. *Journal of Mathematics Education, 14*(1), 21–34.

Tshering, N., & Dorji, T. (2022). Enhancing Grade Six students’ mathematics achievement through the use of cooperative learning strategy: An action research. *Asian Journal of Education and Social Studies, 31*(1), 31–39. <https://doi.org/10.9734/ajess/2022/v31i130738>

Zakariya, Y. F. (2022). Mathematics anxiety among secondary school students: A review of recent findings and future directions. *Journal of Educational Psychology and Measurement, 11*(2), 101–112.