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Unravelling the link between math anxiety and math performance of grade 6 pupils

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A B S T R A C T

This study investigated the relationship between math anxiety and academic performance among 56 Grade 6 pupils at DMMMSU-MLUC LES, with the goal of designing a targeted intervention to address key factors contributing to poor performance and heightened anxiety in mathematics. A mixed-methods design was used to explore this relationship. Quantitative data were collected through math anxiety surveys and academic records, which showed a slight improvement in grades from 87.96 to 88.88. The mean anxiety score was 3.30, indicating a moderate level of anxiety. A correlation analysis revealed a moderate negative relationship ($r = -0.58$, $p = 0.049$), confirming that higher math anxiety is associated with lower academic performance. Qualitative interviews with 20 selected students provided deeper insights into contributing factors. For academic performance, key themes included personal struggles and challenges, teaching methods, and study and practice habits. For math anxiety, major influences involved personal identity in learning, peer-driven motivation, and family aspirations. These themes helped contextualize the quantitative findings and emphasized the importance of emotional, instructional, and social dimensions in math learning. In response to these findings, the researchers developed "Math3matics: Empower, Excel, Exceed", a structured intervention program specifically designed to address the emotional, instructional, and social challenges identified. The program incorporates confidence-building activities, guided problem-solving, peer collaboration, and interactive math tasks. It emphasizes teacher support, positive peer interaction, and student-centered strategies that aim to reduce anxiety, foster a growth mindset, and improve overall mathematical competence.

RESUMO

Este estudo investigou a relação entre a ansiedade em matemática e o desempenho acadêmico de 56 alunos do 6º ano da DMMMSU-MLUC LES, com o objetivo de desenvolver uma intervenção direcionada para lidar com os principais fatores que contribuem para o baixo desempenho e o aumento da ansiedade na disciplina de matemática. Foi utilizado um desenho de pesquisa de métodos mistos para explorar essa relação. Os dados quantitativos foram coletados por meio de questionários sobre ansiedade matemática e registros acadêmicos, os quais mostraram uma leve melhora nas notas, de 87,96 para 88,88. A pontuação média de ansiedade foi de 3,30, indicando um nível moderado de ansiedade. Uma análise de correlação revelou uma relação negativa moderada ($r = -0,58$, $p = 0,049$), confirmando que níveis mais altos de ansiedade em matemática estão associados a um desempenho acadêmico mais baixo.Entrevistas qualitativas com 20 alunos selecionados forneceram uma compreensão mais profunda dos fatores que contribuem para esses resultados. Em relação ao desempenho acadêmico, os principais temas identificados incluíram dificuldades e desafios pessoais, métodos de ensino e hábitos de estudo e prática. Quanto à ansiedade em matemática, os principais fatores envolviam a identidade pessoal na aprendizagem, a motivação influenciada pelos colegas e as aspirações familiares. Esses temas ajudaram a contextualizar os achados quantitativos e destacaram a importância das dimensões emocionais, instrucionais e sociais na aprendizagem da matemática. Em resposta a esses resultados, os pesquisadores desenvolveram o programa "Math3matics: Empower, Excel, Exceed", uma intervenção estruturada criada especificamente para enfrentar os desafios emocionais, instrucionais e sociais identificados. O programa incorpora atividades para o fortalecimento da autoconfiança, resolução de problemas guiada, colaboração entre colegas e tarefas matemáticas interativas. Ele enfatiza o apoio do professor, a interação positiva entre os alunos e estratégias centradas no estudante, com o objetivo de reduzir a ansiedade, promover uma mentalidade de crescimento e melhorar a competência matemática geral.

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Introduction

Mathematics anxiety refers to a psychological reaction marked by unease, worry, and fear, which can disrupt an individual's ability to perform well in math (Ashcraft & Moore, 2009). This condition affects not only students but also teachers, parents, and others involved in mathematical tasks. When anxiety arises, it can interfere with cognitive processes essential to problem-solving, ultimately lowering performance and reinforcing avoidance of math-related activities (Maloney, Schaeffer, & Beilock, 2013).

The 2022 Program for International Student Assessment (PISA) reinforces the significant impact of math anxiety on academic performance. Students with high anxiety scored about 60 points lower than their low-anxiety peers. However, those who possessed a growth mindset—believing that ability improves through effort—demonstrated lower anxiety and scored 18 points higher on average than students with a fixed mindset (PISA, 2022). These global trends highlight the critical role of psychological and motivational factors in shaping mathematics achievement.

In the Philippines, the COVID-19 pandemic led to an abrupt shift to distance learning as mandated by DepEd Order No. 012, s. 2020. This transition intensified academic challenges and math anxiety due to decreased teacher interaction, heightened expectations, and reduced peer collaboration (Department of Education, 2020). These effects were particularly pronounced among younger learners, who require more guidance and social engagement during the learning process.

Despite the increasing interest in math anxiety, existing research has predominantly focused on older students and international contexts (Yu et al., 2023; Mahato & Sen, 2021; Siti Hawa Omar et al., 2022). There is a notable gap in localized studies that explore how math anxiety manifests in Filipino elementary students, especially within culturally and socially distinct environments. Pre-interviews with Grade 6 teachers and pupils at Don Mariano Marcos Memorial State University–Mid La Union Campus Laboratory Elementary School (DMMMSU-MLUC LES) revealed anxiety triggers such as perceived difficulty, parental expectations, and struggles with problem-solving—underscoring the urgency of a contextually grounded investigation.

Thus, this study aims to examine the relationship between math anxiety and academic performance among Grade 6 pupils at DMMMSU-MLUC LES. It seeks to identify the specific factors contributing to math anxiety in this setting and assess how these factors influence achievement. Ultimately, the study aspires to inform the development of culturally relevant, school-based interventions that build student confidence, reduce anxiety, and foster positive engagement with mathematics.

The Research Questions are**:** What is the Level of Math Performance of Grade 6 Pupils? What is the Level of Math Anxiety of Grade 6 Pupils? Is there a significant relationship between the Level of Math Performance and the Level of Math Anxiety of Grade 6 Pupils? What factors

do Grade 6 pupils identify as affecting their Math Performance? What factors do Grade 6 pupils identify as contributing to their Math Anxiety? What structured intervention program can be developed to mitigate Math Anxiety and improved Math Performance among Grade 6 pupils, informed by the identified levels, relationship and factors?

Methodology

Research Design

This study adopted an explanatory sequential mixed-methods design, which involved collecting and analyzing quantitative data in the initial phase, followed by a qualitative phase to further explain and contextualize the statistical results. The quantitative strand aimed to assess the levels of math anxiety and math performance among Grade 6 learners. The findings from this phase were then explored in greater depth through qualitative interviews, which sought to uncover the underlying personal, academic, and environmental factors influencing these outcomes. This sequential approach provided both numerical trends and nuanced insights, enabling the researchers to design informed and context-specific strategies for addressing the issues identified (Thornberg et al., 2022).

Sources of Data

The research was conducted at Don Mariano Marcos Memorial State University – Mid La Union Campus Laboratory Elementary School (DMMMSU-MLUC LES) and involved Grade 6 students. For Research Questions 1, 2, and 3, which aimed to measure math performance, assess math anxiety, and analyze the relationship between them, the researchers employed total enumeration, including all 56 Grade 6 pupils (35 from Section 6-Brilliant and 21 from Section 6-Abled). This method ensured full coverage of the target population and reduced the risk of sampling bias.

For Research Questions 4 and 5, which explored the factors affecting both math performance and anxiety, the researchers used criterion sampling to purposively select 20 participants. Ten students were selected based on academic performance, with five identified as high-performing and five as low-performing. Another ten students were selected based on math anxiety levels identified from survey results—five with high anxiety and five with low anxiety. This approach allowed for a more focused and comparative exploration of student experiences.

Although classroom observations were initially planned as part of the data collection process, they were not implemented due to logistical constraints. All qualitative findings were therefore derived from interviews and supported by relevant literature.

Instrumentation and Data Collection

For Research Question 1, which aimed to evaluate math performance, the researchers collected academic grades in mathematics from students' report cards for the first and second grading periods. These grades served as the basis for analyzing trends in student performance.

To address Research Question 2, the researchers designed a researcher-made questionnaire to assess math anxiety levels. The survey employed a 5-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree) and underwent expert validation by five professionals, including one school principal and four mathematics teachers. The instrument received an average content validity rating of 4.95. A pilot test was conducted among Grade 6 students at Ayaoan Elementary School in Luna, La Union, and the results showed a Cronbach's Alpha of 0.80, indicating high internal consistency and reliability (Adeniran, 2018).

For Research Question 3, the relationship between math anxiety and performance was assessed using the data collected from Research Questions 1 and 2. These variables were statistically analyzed to identify significant patterns and associations.

Research Questions 4 and 5 were explored through semi-structured interviews with the 20 selected participants. Instead of spoken interviews, students were given guided written prompts and encouraged to respond in writing. This method enabled the students to reflect more deeply and answer more comfortably, especially when discussing personal struggles, motivations, and perceptions. Interviews were conducted over two weeks, with daily one-hour sessions in a quiet and supervised setting. The interview guide was reviewed by five teachers for clarity and relevance and then pilot-tested with five students from Ayaoan Elementary School. Based on the feedback, the questions were translated into Filipino to improve comprehension and ensure the accuracy of responses.

To address Research Question 6, the researchers synthesized the quantitative and qualitative findings to determine appropriate and evidence-based interventions. The integration of both data strands allowed for the identification of priority areas and informed the design of strategies to reduce math anxiety and enhance student performance.

Data Analysis

To analyze the data for Research Question 1, descriptive statistics were employed. The researchers computed the mean math grades for the 1st and 2nd grading periods using Microsoft Excel, providing an overview of student performance.

For Research Question 2, descriptive statistics were also used to analyze the Likert scale responses. The average scores for each item were calculated using Excel's AVERAGE function, offering a clear picture of students' anxiety levels.

For Research Question 3, a Pearson Correlation Analysis was conducted to determine the strength and direction of the relationship between math anxiety and performance. Microsoft Excel was used to compute the correlation coefficient, and a scatter plot was generated to visually support the findings.

For Research Questions 4 and 5, the written interview responses were analyzed using thematic analysis following the six-phase approach of Braun and Clarke (2019): (1) familiarization with the data, (2) generation of initial codes, (3) identification of potential themes, (4) review and refinement of themes, (5) definition and naming of themes, and (6) writing the analytical narrative. The coding process was reviewed by a second researcher to ensure consistency and credibility.

For Research Question 6, the researchers performed a comprehensive triangulation of findings from both the quantitative and qualitative phases. The integration of results helped pinpoint the factors contributing to anxiety and performance gaps and informed the development of targeted interventions grounded in the data.

Ethical Considerations

The researchers from Don Mariano Marcos Memorial State University-Mid La Union Campus conducted this research with careful attention to ethical standards. Before the study, researchers asked qualified validators to review and approve the questionnaire and interview guide to ensure they were clear and relevant. Then, a pilot test was conducted with a small group of Grade 6 pupils who were not part of the main study to check for reliability, and adjustments were made based on their feedback. After this, researchers sought approval from the Principal and Advisers of the Grade 6 sections to conduct the survey.

During the study, once all approvals were received, researchers distributed authorization letters and consent forms to Grade 6 students and their parents. These documents explained the study's purpose, stating that participation was voluntary and that students could withdraw at any time without consequences. Parents were also asked to consent to the collection of their child's Math grade as part of the study. The questionnaire was administered to Grade 6 students, with researchers guiding them through the process while conducting interviews with selected participants to gather deeper insights. Data on both Math anxiety levels and Math performance for Grade 6 students were collected. All responses were kept anonymous, and all data, including math grades, were securely stored to protect students' identities.

After the study, researchers followed important standards to ensure honesty and accountability. They analyzed the collected data using reliable methods to ensure the results were valid and trustworthy. Participants' identifying information was kept confidential throughout the analysis process. The data was only used for research purposes, and no unauthorized access was allowed. Researchers clearly reported their findings in relation to the research questions and existing studies. Ethical considerations were a top priority, protecting participants' rights and respecting their contributions. Regular reviews were conducted to ensure that ethical standards and best practices were followed, creating a responsible research environment.

Results and Discussion

level of math performance of grade 6 pupils

Table 3 shows the level of Math performance of 56 Grade 6 pupils based on their collected grades from the 1st and 2nd quarters at DMMMSU-MLUC LES.

Table 3.

Level of Math Performance of Grade 6 Pupils

RESPONDENTS	1ST QUARTER GRADES	2ND QUARTER GRADES	AVERAGE
R1	90	90	90
R2	92	94	93
R3	90	91	90.5
R4	87	88	87.5
R5	90	91	90.5
R6	89	90	89.5
R7	90	91	90.5
R8	87	88	87.5
R9	80	81	80.5
R10	83	84	83.5
R11	90	90	90
R12	89	90	89.5
R13	89	93	91
R14	93	94	93.5
R15	88	89	88.5
R16	96	97	96.5
R17	93	94	93.5
R18	83	85	84
R19	91	91	91
R20	89	90	89.5
R21	86	88	87
R22	84	84	84
R23	91	92	91.5
R24	88	88	88
R25	92	93	92.5
R26	83	83	83
R27	87	87	87
R28	89	90	89.5
R29	88	89	88.5
R30	93	94	93.5
R31	80	81	80.5
R32	80	81	80.5

R33	85	86	85.5
R34	96	97	96.5
R35	88	88	88
R36	85	86	85.5
R37	84	84	84
R38	80	81	80.5
R39	91	91	91
R40	89	90	89.5
R41	91	91	91
R42	95	95	95
R43	94	94	94
R44	80	81	80.5
R45	90	93	91.5
R46	84	86	85
R47	85	86	85.5
R48	92	93	92.5
R49	83	84	83.5
R50	85	86	85.5
R51	89	89	89
R52	88	89	88.5
R53	87	88	87.5
R54	86	87	86.5
R55	87	89	88
R56	92	92	92
TOTAL AVERAGE	**87.96**	**88.88**	**88.42**

The overall average grade of **88.42** signifies that the class generally performed at a *"Satisfactory"* level. Notably, a positive trend was observed: the average increased from **87.96** in the first quarter to **88.88** in the second. This steady improvement suggests that students are gradually enhancing their mastery of mathematical concepts.

While the general performance is commendable, the results also reveal intra-group variability. The highest individual average of **96.5** (attained by R16 and R34) demonstrates strong academic performance and suggests effective use of problem-solving strategies and conceptual understanding. In contrast, five pupils—R9, R31, R32, R38, and R44—recorded the lowest average of **80.5**, indicating areas where conceptual gaps may exist. This 16-point disparity between the highest and lowest averages underscores the need for targeted pedagogical support.

The improvement in student performance is supported by Candelaria (2022), who demonstrated that peer tutoring significantly enhances students' mathematical skills, particularly in problem-solving and critical thinking. The author's findings align with the

results of the current study, reinforcing the notion that collaborative strategies contribute positively to academic progress. Similarly, Aguhayon et al. (2023) established that differentiated instruction not only improved performance but also increased student confidence. These approaches may explain the improvement observed between quarters and should be sustained or expanded to further close performance gaps.

Furthermore, the data aligns with research conducted by Siti Hawa Omar et al. (2022), who emphasized the role of structured interventions and diversified teaching strategies in improving student engagement and reducing math anxiety. This perspective is reinforced by Serpil Akkus and Lynch (2022), who found a strong correlation between self-efficacy and academic performance. Students with higher confidence in their abilities tend to perform better, a dynamic that likely influenced the upward trend in grades observed here.

However, the performance of lower-achieving pupils signals the necessity for personalized interventions. Students scoring in the lower range may be experiencing challenges such as math anxiety, lack of foundational skills, or low self-confidence. Yu et al. (2023) emphasized the importance of targeted strategies to reduce math anxiety—particularly among vulnerable subgroups like girls—further supporting the case for remedial instruction, one-on-one support, or formative assessments to guide teaching.

In summary, while the overall performance trend is positive, the variation in scores indicates that not all students benefit equally from general instructional approaches. The integration of peer tutoring, differentiated instruction, and anxiety-reducing strategies is essential to support both high and low performers. A dual approach—enrichment for advanced learners and interventions for struggling ones—can promote a more equitable and effective math learning environment.

level of math anxiety of the grade 6 pupils

Table 4 shows the level of Math anxiety among Grade 6 pupils based on the results of a survey questionnaire completed by 56 Grade 6 pupils at DMMMSU-MLUC, LES.

Table 4.

Level of Math Anxiety of the Grade 6 pupils

INDICATOR	*Mean*	*Descriptive Equivalent*
1. I feel nervous when I have to solve math problems	3.45	High Anxiety
2. I worry about making mistakes in math class.	3.82	High Anxiety
3. Math tests make me feel anxious	3.43	High Anxiety
4. I often feel overwhelmed by math assignments	3.36	High Anxiety
5. I get anxious when I don't understand a math concept.	3.43	High Anxiety
6. I feel nervous when my teacher asks me to solve a math problem in front of the class.	3.84	High Anxiety

7. I feel embarrassed when I don't know the answer to a math question.	4.01	High Anxiety
8. Math homework stresses me out more than homework from other subjects.	3.30	Moderate Anxiety
9. I often feel frustrated when trying to solve math problems.	3.61	High Anxiety
10. I avoid participating in math-related activities because they make me anxious.	3.40	High Anxiety
11. I believe I am not good at math compared to my classmates.	3.67	High Anxiety
12. I think that math is more difficult for me than for most students.	3.42	High Anxiety
13. I often feel anxious about upcoming math tests.	3.42	High Anxiety
14. I find it hard to concentrate during math lessons due to anxiety.	3.07	Moderate Anxiety
15. I think that I will never get better at math.	2.80	Moderate Anxiety
16. I avoid asking for help with math because I feel embarrassed.	3.18	Moderate Anxiety
17. I often feel that I am not capable of solving math problems.	3.23	Moderate Anxiety
18. I believe that math is too difficult for me to master.	3.20	Moderate Anxiety
19. I feel anxious when I see math problems on tests or quizzes.	2.96	Moderate Anxiety
20. I feel more anxious about math than about any other subject.	3.16	Moderate Anxiety
21. I procrastinate on math homework because it makes me anxious.	3.36	High Anxiety
22. I feel physically uncomfortable (e.g., sweaty palms, racing heart) when doing math.	3.14	Moderate Anxiety
23. I often avoid math-related activities or assignments to prevent feeling anxious.	2.82	Moderate Anxiety
24. I feel a sense of relief when math class is over.	3.55	High Anxiety
25. I am often worried about how well I perform in math compared to my peers.	3.63	High Anxiety
26. I feel anxious even when I am just thinking about math problems.	3.19	Moderate Anxiety
27. I find it hard to relax before or during math tests.	3.12	Moderate Anxiety
28. I feel that math class is a major source of stress for me.	3	Moderate Anxiety
29. I often feel that I will never be able to understand math.	2.75	Moderate Anxiety
Overall Mean	**3.30**	**Moderate Anxiety**

The overall mean Math anxiety score of **3.30** indicates a **moderate level of math anxiety** among Grade 6 pupils.

The overall mean score of **3.30** indicates a **moderate level of math anxiety**, though several items revealed **high anxiety**, especially those linked to public performance and fear of failure. Notably, the highest anxiety score (M = 4.01) was associated with feelings of embarrassment when unable to answer a math question, followed by nervousness when solving problems in front of the class (M = 3.84) and worry over making mistakes (M = 3.82). These findings suggest that social evaluation and classroom pressure are significant anxiety triggers.

Several indicators of moderate anxiety also emerged, including difficulty concentrating (M = 3.07), physical discomfort (M = 3.14), and avoidance of help-seeking (M = 3.18), indicating internalized beliefs about low ability. Despite not being extreme, these consistent stressors may still negatively impact engagement and achievement.

These results are supported by Murch (2023), who emphasized the effectiveness of mindfulness and growth mindset practices in reducing math anxiety and improving performance. Ng et al. (2022) further highlighted that reductions in anxiety may not always translate directly to performance gains, underscoring the complexity of the relationship. Additionally, Harahap et al. (2024) found that low self-regulated learning correlates with higher anxiety, reinforcing the need to build autonomy in learners.

Overall, findings highlight the emotional barriers that persist even at the elementary level. Interventions such as SRL strategies, supportive classroom climates, and emotionally sensitive instruction are essential to reduce anxiety and support learners' mathematical development.

Significant relationship between the math performance and the level of math anxiety of the grade 6 pupils.

Table 5 presents the relationship between Math Performance and Math Anxiety of Grade 6 pupils, as analyzed using Pearson correlation, revealing a moderately negative correlation.

Table 5.

Significant relationship between the Math Performance and the Math Anxiety of the Grade 6 Pupils.

Variables	Pearson Correlation (r)	p-value	Interpretation
Math Anxiety & Math Performance	-0.58	0.049	Moderately negative correlation (statistically significant)

The results reveal a **moderate negative correlation** (r = -0.58, p = 0.049), indicating that **higher levels of Math anxiety are significantly associated with lower Math performance**.

These findings suggest that anxiety may be a key factor hindering students' ability to engage effectively with mathematical content. This supports Mahato and Sen (2021), who found that academic stress and anxiety negatively affect mathematical competency. Similarly, Dodongan (2022) reported that students with elevated anxiety levels tend to show lower math achievement.

The statistically significant correlation emphasizes the need for interventions that address emotional factors, such as stress-reduction strategies and classroom practices that promote confidence and reduce fear of failure, in order to improve both well-being and academic outcomes.

Factors affecting math performance of grade 6 students

Based on the interviews conducted with the Garde 6 pupils the following are the Factors Affecting Math Performance of Grade 6 Pupils are the following: *Personal Struggles and Challenges, Teaching Methods, Support System, Study and Practice Habits, and Math Specific Strategies*

Personal Struggles and Challenges.

This theme captures the cognitive and emotional hurdles faced by Grade 6 pupils in learning mathematics. Several participants expressed difficulty in grasping mathematical concepts and managing emotions like frustration and distraction during study. As ***P10*** shared, *"I sometimes find math hard, especially when solving fractions,"* while **P7** recalled, *"When we learned about angles, I found it difficult, but I watched a video and it helped me understand the topic."* These insights reflect how students actively seek ways to cope with their struggles, such as using multimedia resources.

However, the emotional toll of independent learning was also evident. **P9** mentioned, *"I sometimes find it difficult to study math by myself,"* highlighting the need for external support. **P10** added, *"I like using a math app on my tablet, but sometimes I get distracted,"* indicating that while digital tools offer potential benefits, they also introduce new challenges related to focus and self-regulation.

The difficulties in understanding core topics like fractions and angles, along with emotional struggles such as anxiety, frustration, and distraction, mirror the findings in Research Question 1, which assessed pupils' Math performance levels. The steady improvement in performance from Q1 to Q2 shows progress but also suggests that many learners still require targeted academic and emotional interventions.

Literature supports these observations. According to Siti Hawa Omar et al. (2022), there is a strong negative correlation between mathematics anxiety and achievement,

especially among students with lower performance, where anxiety often stems from negative self-perceptions. This is aligned with the emotional responses shared by participants in this study. Similarly, Mrlaiche (2025) explored widespread difficulties with fractions, decimals, and geometry, pointing to poor study habits and lack of confidence as contributing factors—both of which were evident in the students' narratives.

Moreover, the conceptual struggles mentioned align with the findings of Mangarin and Caballes (2024), who emphasized that cognitive barriers, particularly in abstract topics like fractions and angles, significantly hinder students' problem-solving abilities. Uegatani et al. (2023) further confirmed that the inherent complexity of mathematical concepts often leads to perceived difficulty, which was reflected in the lived experiences of the Grade 6 pupils in this study.

These findings underscore the importance of structured academic support—such as remedial instruction—as well as emotional and motivational counseling, to address both the cognitive and affective dimensions of learning mathematics.

Teaching Methods.

This theme highlights the critical role of peer collaboration and parental involvement in supporting students' academic success. Students rely on these external supports to clarify concepts, reinforce learning, and stay motivated.

Participant narratives illustrate this well. **P9** shared, *"I need my friends to explain things when I don't get it,"* emphasizing the value of peer support in collaborative learning. **P2** noted, *"I ask my parents to help me when I get stuck on hard problems,"* pointing to the significance of parental guidance at home.

These support systems enhance comprehension and confidence by providing alternative explanations and emotional encouragement. The steady improvement in math performance (as shown in RQ1) aligns with the presence of such supports, suggesting their positive impact on learning outcomes.

This finding is supported by Xu et al. (2023), who demonstrated that collaborative problem-solving fosters critical thinking and deeper understanding. Liu (2023) also found that strong peer relationships correlate with improved academic performance, especially when friendships are academically oriented. Similarly, Worley et al. (2023) reported that peer support contributes to academic competence, though its effects on anxiety were limited.

Together, these results emphasize that cultivating strong support systems—both in and outside the classroom—can significantly enhance student learning and academic performance.

Study and Practice Habits.

This theme highlights how students employ strategies such as interactive tools, self-review, and consistent practice to improve their mathematical understanding. **P1** shared, *"Watching videos online helps me understand the lessons better,"* while **P10** noted, *"Reviewing previous lessons before a test helps me remember the steps,"* emphasizing the

importance of engagement and repetition. P5's use of textbook problems illustrates the value of regular practice in building mastery.

These findings align with Riaddin (2022), who found that instructional videos enhance problem-solving skills and comprehension in math. Similarly, Utami (2022) reported that game-based learning and flashcards effectively improve fluency, while Gyeltshen and Dorji (2023) confirmed that YouTube videos significantly enhance understanding compared to traditional methods. The observed improvement in student performance from Q1 to Q2 supports the effectiveness of these study habits in reinforcing conceptual learning and boosting confidence.

Math-Specific Strategies.

Students also adopted targeted approaches to navigate mathematical challenges, such as breaking down complex problems, engaging in hands-on activities, and using tools like rulers and flashcards. **P8** shared, *"I find it helpful to break big problems into smaller steps,"* and **P9** remarked, *"I like when we do hands-on activities because they make learning math fun."* These practices enabled students to simplify problems and visualize abstract concepts. Kaminski (2024) and Moore & Merlo (2024) emphasized the value of breaking problems into subtasks, which helps reduce cognitive overload and build problem-solving skills. Koehler (2023) further noted that developing conceptual understanding enhances students' ability to approach word problems with logic and confidence.

The incremental improvement in math performance reflects the positive impact of these strategies on students' engagement, understanding, and critical thinking.

factors contributing to math anxiety of grade 6 pupils

Several themes emerged regarding to the factors affecting to Math Anxiety of Grade 6 pupils: ***Personal Identity in Learning, Teaching Assistance, Peer-Driven Motivation, Family Aspirations, and Cognitive Approaches to Learning***

Personal Identity in LearninG.

Students' self-perceptions significantly influence their confidence and learning in mathematics. Statements such as *"I feel nervous because I'm not sure if I'll understand it"* **(P1)** and *"I always struggle with math topics"* **(P7)** reveal how negative beliefs contribute to anxiety and reduced engagement. This aligns with the moderate math anxiety level (M = 3.30) identified in RQ2, suggesting that low self-efficacy and fear of failure hinder performance.

Zafar et al. (2024) and Szucs & Toffalini (2023) affirm that students with lower confidence experience higher anxiety and reduced control, leading to poorer outcomes. These findings support the need for confidence-building strategies that foster self-belief and reduce internalized academic pressure.

Teaching Assistance.

Clear instruction, patience, and structured practice from teachers enhance student confidence and comprehension. As **P3** stated, *"I feel excited because my teacher usually explains things clearly,"* underscoring the value of accessible teaching. The moderate anxiety levels in RQ2 reflect how teacher support mitigates stress and builds self-efficacy.

Gilreath (2023) emphasizes that educators' confidence in math directly influences student outcomes, while C. Wang et al. (2024) show that positive teacher-student relationships reduce anxiety and increase engagement. These findings highlight the crucial role of teachers in creating supportive learning environments.

Peer-Driven Motivation.

Peers influence student motivation and anxiety, both positively and negatively. Some students feel motivated to improve, while others express anxiety about being outperformed or judged by classmates (e.g., **P1:** *"I feel nervous because my classmates are better at math than I am"*).

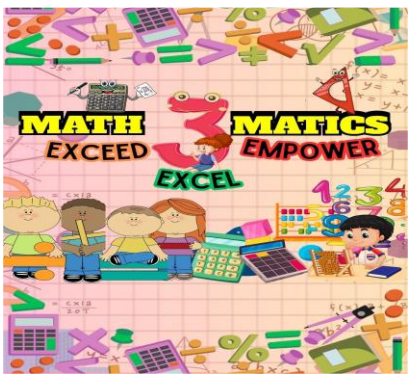
These dynamics contribute to the moderate anxiety levels found in RQ2 and align with Hossein-Mohand (2023) and Lance et al. (2024), who found that peer relationships shape students' engagement and attitudes toward math. A supportive peer culture is thus essential to reduce anxiety and encourage help-seeking behaviors.

Family Aspirations

Parental expectations impact students' confidence, motivation, and stress. Encouragement (**P1:** *"I feel proud because my family believes I can excel in math"*) can be empowering, while pressure (e.g., **P2:** *"I feel stressed because my parents expect me to get a good grade"*) may lead to avoidance and anxiety.

This theme reflects the tension seen in RQ2's anxiety findings. Research by Tang & Tran (2023), Asare et al. (2024), and Xu et al. (2022) shows that while high expectations can improve performance, excessive pressure can be counterproductive. A balanced, supportive family approach is key to sustaining motivation without harming student well-being.

Figure 1.
Math3matics: Exceed, Excel, Empower



Proposed Intervention Program to Mitigate Math Anxiety and Improve Math Performance of Grade 6 Pupils

Program Title:
MATH3MATICS: Exceed, Excel, Empower

Rationale

The study titled "Unraveling the Link Between Math Anxiety and Math Performance of Grade 6 Pupils" revealed a moderate negative correlation between Math anxiety and academic achievement. Many Grade 6 pupils experience anxiety due to fear of failure, peer comparison, low confidence, ineffective teaching strategies, and external pressure from parents and teachers. This emotional distress often results in avoidance, reduced engagement, and low performance in mathematics.

To break this cycle, the researchers developed "MATH3MATICS: Exceed, Excel, Empower," a two-month intervention program scheduled for May to June 2024–2025, targeting Math anxiety and performance deficits. This program aims to foster a supportive, student-centered learning environment that builds confidence, strengthens conceptual understanding, and promotes collaboration among learners, teachers, and families.

Beyond academic improvement, the program also promotes inclusive and community-based learning. Through active collaboration and shared accountability, MATH3MATICS seeks to empower learners with the skills and mindset needed to thrive in mathematics and reduce the long-term impact of anxiety on academic growth.

Program Objectives

By the end of the intervention, the students will be able to:

1. Reduce Math anxiety by fostering a supportive and positive classroom climate.
2. Enhance self-confidence and motivation through reflective goal setting.
3. Strengthen core skills in fractions and geometry through targeted remediation.
4. Improve comprehension through hands-on and collaborative activities.
5. Balance technology use with guided instruction to deepen understanding.
6. Promote help-seeking behaviors and peer support systems.
7. Reduce anxiety and increase focus through relaxation techniques.
8. Strengthen family engagement while reducing performance-related stress.
9. Develop structured, step-by-step problem-solving strategies.
10.

Intervention Framework

FINDINGS	OBJECTIVES	INTERVENTION ACTIVITY	PROCEDURE
Moderate Math anxiety due to fear of mistakes, embarrassment, and peer pressure.	Foster a supportive learning environment.	Confidence-Building Workshops	Weekly group sessions using role-playing, sharing, and positive reinforcement to build Math self-efficacy.
Higher self-efficacy linked to better Math performance.	Boost motivation and confidence.	Self-Efficacy Journaling	Students maintain guided journals to set goals, track progress, and reflect after Math lessons.
Low performance in fractions and geometry.	Strengthen foundational understanding.	Remedial Math Clinics	Conduct after-school sessions with visual aids and manipulatives (e.g., blocks, rulers, fraction tiles).

Group work and visuals improve comprehension.	Promote collaborative and visual learning.	Interactive Group Math Activities	Use Math games, puzzles, and role-rotating tasks (explainer, checker, solver) in small groups.
Technology aids learning but may distract.	Manage digital tools constructively.	Guided Tech-Based Learning	Integrate videos/apps with time limits and reflective discussion breaks led by the teacher.
Students avoid seeking help due to fear of judgment.	Encourage peer support.	Math Peer Buddy System	Pair students and train buddies in giving/receiving help using supportive communication techniques.
Anxiety lowers performance.	Reduce stress and improve focus.	Mindfulness & Relaxation Sessions	Begin Math class with short breathing/visualization activities to reduce anxiety.
Family expectations create both motivation and stress.	Increase positive family support.	Family Involvement Program	Host quarterly Math nights to build awareness and promote encouragement-focused parenting.
Students benefit from breaking problems into smaller steps.	Develop critical thinking and strategies.	Step-by-Step Problem-Solving Guides	Use scaffolded worksheets, teacher modeling, and self-talk prompts to teach strategic problem breakdown.

Program Strengths and Innovations

Multidimensional Approach: Targets cognitive, emotional, and social factors of Math anxiety.

Community-Centered: Actively involves families and peers to build a holistic support system.

Evidence-Based Methods: Applies growth mindset, cognitive-behavioral techniques, and UDL principles.

Monitoring Mechanism: Tracks Math performance, anxiety levels, and engagement through pre/post assessments, feedback, and observation.

Conclusions

In light of the findings, the following conclusions are drawn:

Grade 6 pupils demonstrated satisfactory Math performance, with an average score of 88.88 in the second quarter. This suggests that while students are performing at a generally acceptable level, further gains can be achieved through targeted interventions focusing on conceptual understanding—particularly in challenging areas like fractions and geometry.

The students exhibited a moderate level of Math anxiety, with a mean score of 3.30. This reflects a persistent emotional barrier that affects focus, participation, and confidence during Math activities. While students are coping, this level of anxiety still hinders optimal engagement and achievement.

A statistically significant, moderately negative correlation ($r = -0.58$, $p = 0.049$) was found between Math anxiety and Math performance. This indicates that higher levels of anxiety

are reliably associated with lower achievement, underscoring the critical importance of reducing anxiety to improve learning outcomes in mathematics.

Math performance is influenced by multiple interrelated factors, including self-efficacy, parental pressure, peer comparison, teaching quality, and study habits. Addressing these areas holistically—through student-centered teaching methods, stronger peer and parental support, and structured practice—can result in substantial improvements in performance.

Math anxiety stems from specific factors, such as fear of failure, lack of confidence, ineffective instructional practices, and high external expectations. Creating a supportive and low-pressure classroom environment, coupled with engaging, interactive teaching strategies, can significantly reduce these sources of anxiety and positively impact academic performance.

The proposed intervention, "MATH3MATICS: Exceed, Excel, Empower," directly responds to the study's findings by integrating confidence-building, skill-focused remediation, collaborative learning, mindfulness practices, and family engagement. This comprehensive program offers promising potential to mitigate Math anxiety and enhance Math performance, especially when combined with professional development for teachers in anxiety-sensitive pedagogies.

Recommendations

The rationale of the proposed intervention should be explicitly linked to the study's findings, particularly highlighting how the observed moderate Math anxiety and its negative correlation with performance justify the need for targeted support. This strengthens the program's alignment with the research outcomes.

The objectives of the intervention should be enhanced by making them measurable, such as aiming to reduce Math anxiety scores by a certain percentage or increase Math performance by a specific number of points. Measurable goals provide a clearer basis for evaluating the program's effectiveness.

Teacher training initiatives should be included as a specific activity within the intervention. This may involve workshops on anxiety-reducing strategies, differentiated instruction, and confidence-building techniques in Math education.

Intervention activities should be refined with more operational details to ensure consistent implementation. For instance, clearly define the frequency, duration, tools, and expected outcomes of each session.

Cognitive approaches to learning, such as chunking, metacognition, and retrieval practice, should be incorporated into the intervention. These strategies can enhance conceptual understanding and help students manage anxiety more effectively.

A program evaluation and sustainability plan should be added, including pre- and post-assessments, feedback mechanisms, and monitoring tools. Establishing a long-term support team can help sustain program impact beyond its initial implementation.

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