Volume: 8 Issues: 26 [March, 2025] pp. 505-520]
Jurnal Penyelidikan Sains Sosial (JOSSR)
eISSN: 2637 -0956
Journal Website: https://academicinspired.com/jossr
DOI: 10.55573/JOSSR.082650

FACTORS CONTRIBUTING TO MATHEMATICS ANXIETY AMONG DIPLOMA STUDENTS IN POLYTECHNIC

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Article history
Received date : 15-2-2025
Revised date : 16-2-2025
Accepted date : 24-3-2025
Published date : 15-4-2025

To cite this document:
Raja Ahmad, R. N., & Raja Ahmad, R. N. (2025). Factors contributing to mathematics anxiety among diploma students in polytechnic. *Jurnal Penyelidikan Sains Sosial (JOSSR)*, 8 (26), 505-520.

Abstract: *Particularly among diploma students in polytechnic institutions, mathematics anxiety frequently impairs their confidence, performance, and engagement with mathematical subjects. This investigation investigates the pedagogical and contextual elements that contribute to the anxiety of diploma students, as well as their personal experiences and perspectives of mathematics. Data was acquired by open-ended questionnaires from 24 diploma students at a polytechnic institution, utilising a qualitative study approach. Thematic analysis was employed to determine the primary themes associated with mathematics anxiety. Results indicate that students' anxiety is significantly influenced by the following: exam-related stress, fear of making mistakes, difficulty in recalling mathematical concepts, and fast-paced teaching. Furthermore, their difficulties are further compounded by learning obstacles, including language limitations, online learning difficulties, and social comparisons. However, students emphasised that the assistance of their peers and lecturers played a critical role in reducing fear and bolstering their mathematical self-assurance. The findings of this study are consistent with the current research on mathematics anxiety and underscore the necessity of student-centred teaching methods, exam preparation tactics, and supportive learning environments to resolve this issue. The study's results contribute to the expanding corpus of research on mathematics anxiety by offering qualitative insights into the lived experiences of diploma students in polytechnic settings. Although the study has limitations, such as a small sample size and a dependence on self-reported data, it emphasises the significance of successful pedagogical tactics in reducing mathematics anxiety. In order to improve comprehension and assistance for students who are suffering from mathematics anxiety, future studies should investigate intervention-based methodologies and multi-perspective studies.*

Keywords: *Mathematics Anxiety, Diploma Students, Polytechnic Education, Qualitative Study, Thematic Analysis*

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Introduction

The widespread influence of mathematics anxiety on students' cognitive and emotional involvement with mathematics has long been a subject of scholarly research. Mathematics anxiety, which is defined as a sensation of trepidation, fear, or tension when confronted with mathematical assignments (Richardson & Suinn, 1972), can substantially affect the learning process, performance, and general attitudes of students toward the subject. Researchers have recognised mathematics anxiety as a complex condition that includes emotional, cognitive, physiological, and behavioural components (Mammarella et.al, 2023). The harmful impacts of mathematics anxiety must be addressed by comprehending the underlying reasons, given the growing significance of mathematical proficiency in professional and higher education.

The incidence and consequences of mathematics anxiety among primary, secondary, and university students have been thoroughly investigated in previous research (Anugrah et al., 2019). Research has demonstrated that students' performance is negatively correlated with mathematics anxiety, which results in diminished confidence in their mathematical abilities and avoidance behaviours (Mohd et al, 2024). Nevertheless, a research vacuum continues to exist in assessing mathematics anxiety among diploma-level students, particularly in polytechnic settings where applied mathematical skills are essential for technical and vocational disciplines (Saleh et al., 2024).

The learning environment is one of the most significant variables that contribute to mathematics anxiety. Teacher attitudes, instructional methods, and classroom culture significantly influence the experiences of pupils with mathematics. Research indicates that anxiety levels are elevated by conventional, inflexible education methods that prioritise rote memorization and high-stakes exams (Zanabazar et al., 2023). In contrast, mathematics anxiety has been alleviated by supportive and engaging learning environments that integrate technology-assisted instruction and collaborative learning (Ersozlu, 2024). This underscores the significance of teaching tactics in reducing students' anxieties and cultivating a more positive relationship with mathematics.

Students' self-efficacy and prior experiences with mathematics are additional significant factors contributing to mathematics anxiety. Students who have met repeated failures in mathematics or have received negative reinforcement from teachers or peers are more prone to have elevated anxiety levels (Prahmana et al., 2019). Furthermore, the development of mathematics anxiety is influenced by sociocultural variables, including parental expectations, peer influence, and societal prejudices. Research has shown that children's attitudes and performance can be influenced by the transfer of parental worry toward mathematics (Polacco et al., 2024). In mathematics anxiety study, gender disparities have also been investigated. The results indicate that female students frequently report higher levels of worry than their male counterparts, which may be attributed to cultural norms regarding gender and mathematical aptitude (Asomah et. al, 2025).

Despite the abundance of research on mathematics anxiety in general, there is a dearth of qualitative studies investigating the lived experiences of diploma students, particularly those in polytechnic schools. Numerous previous studies focus on quantitative measurements, which offer significant statistical insights but fail to capture the complex, nuanced aspects that influence students' experiences with mathematics fear. This investigation aims to close this gap by employing a qualitative methodology to investigate the personal, educational, and contextual aspects that contribute to mathematics anxiety among diploma students.

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Mathematics anxiety represents a significant and pervasive barrier to learning, withfar reaching consequences that extend across all levels of education and into professional and personal life (Mustafa, 2024). Although much research has been undertaken on mathematics anxiety in primary, secondary, and university students, there is a limited understanding of how diploma students in polytechnic schools perceive and manage this phenomenon (Saleh et al., 2024). Addressing this gap is essential to guarantee diploma students' academic and professional success, as mathematics is a vital component of technical and vocational courses. readiness.

Research suggests that mathematics anxiety is the result of a variety of factors, such as personal experiences, educational circumstances, and social influences. A study conducted by Serin (2023) discovered that students who have early bad experiences with mathematics are more likely to acquire long-term anxiety that remains throughout their higher education. Similarly, Polacco et al. (2024) emphasised the influence of teacher interactions and family attitudes on kids' assessments of their mathematical capabilities. Nevertheless, these studies mostly concentrate on general student populations, disregarding the distinctive experiences of diploma students in polytechnic settings.

Furthermore, traditional instructional practices, including high-pressure assessment situations and strict teaching methods, have been found to be substantial factors in mathematical anxiety (Zanabazar et al., 2023). Polytechnic students who frequently participate in applied mathematics as part of their technical training may encounter distinctive obstacles that heighten their anxiety. Educators are unable to establish effective interventions and gain a comprehensive grasp of the underlying causes of anxiety in this specific student population due to the absence of qualitative research.

The primary focus of existing research is on mathematics anxiety among school or undergraduate university students, with less qualitative study of diploma-level students, particularly in polytechnic settings. The varied emotional, educational, and social aspects that contribute to mathematics anxiety in diploma students are not sufficiently comprehended.

Research Aim

This study aims to explore and understand the factors contributing to mathematics anxiety among diploma students at polytechnic institutions.

Research Objectives

1. To investigate diploma students' personal experiences and perceptions related to mathematics anxiety.
2. To identify educational and contextual factors influencing mathematics anxiety among diploma students.

Literature Review

Mathematics anxiety is a common issue that hinders students' performance and attitudes toward mathematics. This literature review evaluates contemporary research (published within the past seven years) that pertains to two primary objectives: (1) the examination of diploma students' personal experiences and perceptions regarding mathematics anxiety and (2) the identification of educational and contextual factors that influence such anxiety among diploma students.

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Personal Experiences and Perceptions Related to Mathematics Anxiety

The personal experiences and perceptions of students significantly influence the development of mathematics anxiety. Research suggests that persistent anxiety regarding mathematics may result from adverse experiences during early childhood education. Baas (2020) discovered that children who experienced negative encounters with mathematics throughout their formative years developed a perception of incapacity, which resulted in increased anxiety during the latter stages of their education. This anxiety frequently emerges as fear, trepidation, or tension when confronted with mathematical activities. Mathematics anxiety is directly associated with self-efficacy, a student's conviction that they can achieve in particular circumstances. Research has demonstrated that students with inadequate mathematics self-efficacy are considerably more susceptible to worry. For example, Jameson (2014) conducted a study that demonstrated that second-grade pupils who had a low self-concept in mathematics displayed elevated levels of arithmetic anxiety. The results of this study, which concentrated on younger pupils, indicate that anxiety levels might be influenced by self-perception in mathematics across various educational stages.

Mathematical anxiety has also been associated with gender disparities. Compared to their male colleagues, research suggests that female students frequently express higher levels of mathematics anxiety. Mutodi and Ngirande (2014) investigated mathematics anxiety among university students in South Africa and discovered that female students exhibited significantly higher levels of anxiety than their male counterparts. This discrepancy may be linked to social prejudices and expectations surrounding mathematical competence and gender.

Asomah et.al (2025) reveals significant gender differences in mathematics anxiety and performance, with males generally performing better than females. This underscores the importance of understanding and addressing the unique factors that contribute to these differences in educational settings.

Educational and Contextual Factors Influencing Mathematics Anxiety

Various educational and contextual factors influence the emergence and persistence of mathematics anxiety among diploma students. These aspects encompass the classroom environment, instructional procedures, cultural influences, and teacher traits.

Teacher Characteristics and Instructional Practices

Their teachers' attitudes and behaviours substantially influence students' mathematics anxiety. Educators who experience elevated levels of mathematics anxiety may unintentionally transmit these emotions to their students. Beilock et al. (2010) conducted a study that revealed that primary school teachers who experienced high levels of mathematics anxiety had a detrimental impact on the academic performance of their students, particularly female students.

Although this investigation concentrated on kids of a younger age, it underscores the potential for teacher concern to impact student outcomes across a range of educational levels. Students' attitudes about mathematics are also significantly influenced by instructional approaches. Anxiety may be exacerbated by conventional education approaches that prioritise rote memorization and repetitive problem-solving. However, educational methods that encourage critical thinking, real-world application, and comprehension have been linked to decreased anxiety in mathematics. For instance, Richland et al. (2020) conducted a study that revealed that students' mathematics anxiety levels were reduced due to diversified teaching tactics and supportive teacher-student interactions.

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Another promising set of coping strategies for mathematics anxiety involves mindfulness and relaxation techniques. These approaches aim to help students manage their anxiety in high-stress situations, such as math tests or difficult problem-solving tasks, by fostering a state of calm awareness and reducing physiological symptoms of stress (Mustafa, 2024).

Classroom Environment and Peer Influence

Mathematics anxiety can be influenced by the general classroom environment, which includes peer interactions. Lower anxiety levels have been linked to a pleasant school environment defined by collaborative learning, mutual respect, and encouragement. In contrast, anxiety levels may be elevated by an environment that is either competitive or unsupportive. Lau et al. (2022) analyzed data from more than one million students in numerous nations. They discovered that students in educational environments with high average levels of math anxiety tended to have worse math achievement. This implies that the collective anxiety level within a classroom or institution may influence individual student outcomes.

Incorporating peer support and collaborative learning into the mathematics classroom can also help alleviate anxiety. When students work together to solve problems or discuss mathematical concepts, they often feel less isolated and more supported. Collaborative learning allows students to share their ideas and approaches, which can build their confidence and foster a sense of community. In a peer-supported learning environment, students can also help each other build confidence by explaining concepts in ways that are more relatable to their peers. This process reinforces their own understanding while fostering a collaborative and less competitive atmosphere. Group work can create a more relaxed, non-threatening environment, which is particularly beneficial for students who experience anxiety when working independently (Mustafa, 2024).

Parental and Societal Influences

Mathematics anxiety can also be influenced by parental attitudes toward mathematics and their involvement in their children's education. Parents who are too interested in their children's math homework or who exhibit unfavourable sentiments about mathematics may exacerbate anxiety. Lau et al. (2022) discovered that parental homework involvement was positively correlated with student math anxiety, suggesting that well-intentioned parental help may occasionally have harmful impacts.

Accordingly, constructive strategies mainly revolve around creating a positive environment and making math learning an enjoyable and productive experience. To be precise, parents need to inspect and ideally overcome their own possible negative attitudes towards math by seeking support and psycho-educating themselves, and not “pass” their own discomfort and tension to their children; especially in the secondary and higher education era, wherein the complexity of mathematics typically surpasses parental knowledge to the subject (Tsirimokos et al, 2024).

Mathematics anxiety can be influenced by societal prejudices, particularly those that are gender-related. The notion that males are inherently more adept at mathematics might erode the confidence of female pupils and increase their anxiety levels. Gunderson et al. (2012) discovered that the attitudes and performance of children in mathematics were potentially influenced by the endorsement of gender stereotypes regarding mathematics ability by parents and instructors. This could contribute to the development of math anxiety.

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Cultural and Educational System Factors

The structure of educational systems and cultural attitudes about mathematics can also influence mathematics anxiety. Students' anxiety may be accidentally elevated in countries that prioritise high-stakes testing and performance. In contrast, educational systems that emphasise comprehension and mastery may mitigate anxiety. Lau et al. (2022) discovered that the contextual effect of math anxiety on accomplishment was found to be significantly variable between countries. This suggests that cultural and systemic factors influence the relationship between anxiety and performance.

The topic of mathematics anxiety among diploma students in polytechnic settings is complicated and is influenced by various educational and environmental factors, as well as personal experiences and self-perceptions. Societal preconceptions, low self-efficacy, and negative early experiences influence anxiety. Furthermore, the mathematics experiences of pupils are substantially influenced by the classroom environment, instructional procedures, teacher qualities, parental attitudes, and cultural influences. A holistic strategy encompassing supportive teaching approaches, positive classroom environments, and an understanding of societal and cultural impacts is necessary to address mathematics fear. By comprehending and mitigating

Methodology

Research Design

In order to investigate the elements that contribute to mathematics anxiety among diploma students at a polytechnic, this study implements a qualitative research approach. A qualitative method is appropriate because it enables a comprehensive examination of students' environmental effects, perspectives, and experiences associated with mathematics anxiety (Creswell & Poth, 2018). This method allows for collecting detailed, rich data, which is essential for thoroughly comprehending the phenomenon being investigated. Qualitative research is particularly advantageous for examining subjective experiences that are difficult to quantify (Merriam & Tisdell, 2016).

Participants and Sampling

24 diploma students from a polytechnic college are included in the investigation. In order to guarantee that the sample is composed of students with pertinent experiences and perspectives on the phenomena, purposive sampling selects individuals who have encountered mathematics anxiety. This sampling strategy is suitable for qualitative research because it enables the selection of information-rich examples that provide valuable data (Patton, 2015). A sample size of 24 is deemed sufficient for qualitative studies, as it enables data saturation while preserving a manageable dataset for in-depth analysis (Guest et al., 2006).

Research Instrument

An open-ended questionnaire is implemented to ascertain students' perceptions and experiences about mathematics anxiety. The questionnaire is composed in English and Malay to guarantee inclusivity and clarity for participants who may feel more at ease articulating their opinions in their favourite language. In qualitative research, using open-ended questions enables participants to express their experiences without constraints, resulting in more comprehensive data than closed-ended formats (Kallio et al., 2016).

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Data Collection Procedure

The open-ended questionnaire is distributed to participants, who must complete it independently within a predetermined duration. Informed consent is obtained from all participants prior to data collection to maintain ethical considerations, including anonymity, voluntary participation, and confidentiality (Wiles, 2013).

Data Analysis

Thematic analysis is used extensively in qualitative research to uncover, analyse, and interpret patterns (themes) within the data. The qualitative data that has been acquired is analysed using this method (Braun & Clarke, 2006). Thematic analysis is particularly well-suited for examining subjective experiences, as it offers a systematic and adaptable method for discovering the most significant themes in textual material (Nowell et al., 2017). The study utilises approaches such as peer debriefing and member checking to guarantee the reliability and trustworthiness of the theme analysis (Lincoln & Guba, 1985). These procedures bolster the credibility of the findings by checking the accuracy and consistency of the discovered themes.

Findings

1. Students' personal experiences and perceptions related to mathematics anxiety

i. Feelings of Anxiety and Nervousness

Numerous students experience anxiety and anxiousness when confronted with mathematics problems, exams, or novel subjects. Self-doubt and the dread of failure are frequently the sources of this worry.

- *"Saya akan berasa takut dan mula overthinking 'boleh ke saya buat' dan kurang berasa confident dengan jawapan atau jalan kira."*
- ("I feel scared and start overthinking, 'Can I do this?' and I lack confidence in my answers or calculations.") — P 16
- *"Saya berasa gelisah apabila melihat soalan yang tak pernah dilihat."*
- ("I feel anxious when seeing unfamiliar questions.") – P 11
- *"Saya merasa nervous dan susah nak berpikir."*
- ("I feel nervous and find it difficult to think.") – P 14

Mathematics anxiety is frequently linked to feelings of uncertainty, worry, and anxiousness, particularly when pupils meet new or unfamiliar difficulties. The replies suggest that a significant number of students experience feelings of anxiety and unease when confronted with mathematics assignments, particularly in high-pressure settings such as exams. Self-doubt is the source of this worry, as students mistrust their capacity to answer problems accurately. These emotions can harm cognitive performance by disrupting the ability to concentrate and solve problems.

ii. Fear of Making Mistakes and Lack of Confidence

Students' fear of making mistakes results in a lack of confidence in their mathematical capabilities. This apprehension influences their willingness to tackle challenging issues.

- *"Separuh teruja sebab semangat nak dapatkan jawapan yang betul tapi kalau tak dapat dan asyik salah, lama-lama semangat tu hilang. Jadi keliru dan hilang fokus bila nak buat soalan lain. Mungkin sebab tak kuasai cara nak tackle soalan tu."*

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- ("I feel half-excited because I want to get the right answer, but if I keep getting it wrong, I lose motivation. I get confused and lose focus when working on other questions. Maybe because I don't know how to tackle the question properly.") – P 15
- *"Saya banyak careless semasa membuat latihan atau semasa peperiksaan. Saya mula gelisah apabila soalan berlainan daripada latihan yang diberikan."*
- ("I make a lot of careless mistakes in practice or exams. I start feeling anxious when the questions are different from the ones given in practice.") – P 16
- *"Sebab soalan bahasa English."*
- ("Because the question is in English.") – P 9

Many pupils perceive mathematics errors as a failure rather than a learning opportunity. This apprehension results from bad prior experiences, low self-efficacy in math-related tasks, and social comparisons. Insecure students may hesitate to tackle challenging tasks, which can result in math avoidance and limited practice, further exacerbating their anxiety.

iii. Stress and Pressure from Time Constraints and Expectations

A significant number of students experience stress as a result of the pressure to do well around exam time. Additionally, they feel overpowered when others complete tasks ahead of them or encounter difficulty recalling formulas.

- *"Saya akan berasa takut jika saya tidak dapat menyiapkan semua soalan dan saya tidak mempunyai masa yang mencukupi dalam menyiapkan soalan."*
- ("I feel scared if I can't complete all the questions and lack enough time to finish them.") – P 7
- *"Apabila kawan yang duduk sebelah dah siap dahulu ataupun ada kawan tanya masa kita tengah buat satu soalan dan belum lagi dapatkan jawapan. Tertekan bila salah langkah walaupun soalan nampak mudah."*
- ("When my friend sitting next to me finishes first, or when a friend asks me a question while I am still working on one, I feel pressured. I also feel stressed when I make a mistake, even if the question looks easy.") – P 5
- *"Melihat kawan yang dapat menjawab soalan matematik dengan mudah tanpa keresahan."*
- ("Seeing my friends answer math problems easily without stress makes me anxious.")
- - P 10

Math anxiety is considerably exacerbated by the dread of not completing exams on time, retaining formulas, and observing colleagues flourish while they struggle. The fast-paced nature of mathematics education sometimes causes many students to feel overwhelmed, especially when they believe they are slipping behind. Low self-esteem and added pressure might result from social comparisons.

iv. Struggles with Understanding and Retaining Mathematical Concepts

Students experience irritation and worry due to their difficulty in comprehending and recollecting mathematical principles that they have previously acquired.

- *"Saya rase masih boleh hadap lagi.. Tapi kadang saya 50/50 maksud nye saya perlu ambik masa sikit untuk faham kan, Dan saya Ade masalah untuk ingat topic yang lepas maksud nye macam kalau dah masuk topic baru topic yang lepas sayang lupa sikit... Tapi kalau di ingat kan balik saya bole tangkap balik."*

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- ("I think I can still manage... but sometimes I'm 50/50, meaning I need extra time to understand. I also have trouble remembering previous topics. Once we move on to a new topic, I forget a bit... but if I'm reminded, I can recall it again.") – P 9
- *"Saya akan berasa gelisah apabila saya tidak tahu bagaimana untuk menjawab soalan yang diberikan, dengan atas alasan saya tidak mengigati formula mahupun jalan kerja."*
- ("I feel anxious when I don't know how to answer a given question, mainly because I can't remember the formula or the solving steps.") – P 6
- *"Semasa menghadapi soalan trigonometri, dimana topik tersebut merupakan topik yang saya lemah dan kurang faham semenjak sekolah menengah. Perasaan yang sama hadir semasa menjawab soalan matematik yang berbentuk ayat."*
- ("When facing trigonometry questions, I feel anxious because it's a topic I have struggled with since secondary school. The same feeling happens when answering word problems in math.") – P 21

Many students experience difficulty in retaining and recalling mathematical concepts, particularly when switching between different disciplines. The challenge of comprehending fundamental concepts exacerbates self-doubt, uncertainty, and irritation. Students experience feelings of discouragement and the conviction that they cannot achieve success in mathematics when they forget the material they have previously acquired.

v. Coping Strategies and Attempts to Stay Positive

Some students seek to manage their math anxiety by maintaining a sense of calm, using newly acquired concepts, or experimenting with other methods.

- *"Saya akan cuba untuk selesaikan dengan tenang."*
- ("I will try to solve it calmly.") – P 12
- *"Saya sangat suka dengan matapelajaran matematik. Jika saya mempunyai masalah berkenaan matematik, saya akan tenang dan cari jalan untuk menyelesaikan masalah tersebut. Saya tidak akan cemas kerana ia boleh menyebabkan saya membuat kesilapan."*
- ("I really like mathematics. If I have a problem, I stay calm and find a way to solve it. I don't panic because it can lead to mistakes.") – P 20
- *"Pada suatu hari, saya tidak dapat menjawab soalan terakhir ketika menduduki peperiksaan matematik, saya berasa gelisah tapi tetap meneruskan perjuangan."*
- ("One day, I couldn't answer the last question in my mathematics exam, I felt anxious but kept trying.") – P 8

Some students learn personal skills to cope with stress, such as maintaining cool, practising patience, or discovering other ways to solve problems, despite suffering mathematics anxiety. This implies that, despite the prevalence of mathematics anxiety, students can actively strive to overcome it by fostering self-regulation and resilience.

2. Educational and contextual factors influencing mathematics anxiety among diploma students.

i. Fast-Paced Teaching and Lack of Comprehension

Numerous students report experiencing anxiety when lessons progress at an excessive pace, which complicates their comprehension of mathematical ideas. Their anxiousness is exacerbated by the rapid pace of instruction and the absence of adequate practise or revision.

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- *"Belajar subtopic dengan laju."* (Learning subtopics too fast) — P 1
- *"When the lecturer teach too fast."* — P 4
- *"Mempelajari sesuatu bab atau tajuk dengan cepat dan latihan yang kurang."* (Learning a topic too quickly with minimal practice) — P 10
- *"Pada pendapat saya, pembelajaran matematik yang menyumbang kepada perasaan tersebut apabila diajar dengan laju."* (In my opinion, math learning contributes to anxiety when taught too fast) — P 16

Students experience feelings of anxiety and distress when they are unable to fully comprehend things prior to transitioning to new subjects. This implies that anxiety may be mitigated through structured lesson plans, periodic changes, and timed learning methodologies.

ii. Complex and Lengthy Problem-Solving Processes

Students experience anxiety as a result of the intricacy of formulae, the difficulty of completing lengthy computations, and the dread of making mistakes. The challenge of accurately administering formulations further exacerbates their tension.

- *"Rumus yang merumitkan."* (Complicated formulas) — P 3
- *"Pada pendapat saya, dari aspek jalan kira yang panjang membuatkan saya menjadi resah/gelisah kerana jika terdapat satu kesalahan maka, jawapan akhir akan salah."* (I feel anxious because a small mistake in long calculations will lead to the wrong final answer) — P 17
- *"Bila banyak sangat nombor dan huruf dan kuasa."* (When there are too many numbers, letters, and exponents) — P 13
- *"Tidak memahami apa yang dipelajari."* (Not understanding what is being taught) — P 19

Students experience a rise in mathematics anxiety when encountering intricate formulas and lengthy calculations. They can develop confidence by dividing difficulties into smaller parts, offering formula sheets, and allowing students to practise with simpler problems before progressing to more complex ones.

iii. Examination and Assessment-Related Anxiety

Students experience anxiety when confronted with difficult quizzes, tests, or examinations, particularly when the topic of the exams is much more difficult than that of classroom exercises or when formulae are not offered.

- *"Bila soalan quiz/test terlalu advance dari latihan dalam kelas."* (When quiz/test questions are more advanced than classroom exercises) — P 9
- *"Tiada rumus di dalam kertas peperiksaan."* (No formulas provided in the exam paper) — P 8
- *"Dimana saya perlu menjawab soalan di hadapan kelas dan buntu untuk menyelesaikan masalah matematik tersebut."* (When I have to solve a math problem in front of the class and feel stuck) — P 21

Students' anxiety is exacerbated by the unpredictability of exam topics and the pressure to perform well on tests. Offering formula reference sheets, exam techniques, and peer discussions prior to exams may alleviate this tension.

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iv. Learning Barriers in Online and Classroom Environments

Students experience difficulty comprehending mathematical topics due to linguistic difficulties, lack of engagement, and online learning.

- *"Kaedah pembelajaran online kerana sukar untuk memahami, masalah line dan sukar untuk bertanyakan soalan dengan lebih mudah."* (Online learning is difficult due to connection issues and difficulty in asking questions) — P 7
- *"Apabila penggunaan bahasa English di dalam kelas."* (When English is used in class) — P 24
- *"Malu bertanya."* (Shy to ask questions) — P 2

Students encounter challenges when communication is impeded by language limitations, online learning obstacles, or personal reluctance to inquire. The engagement and comprehension of students could be enhanced by promoting multilingual and interactive teaching methods.

v. Negative Teaching Methods and Classroom Environment

Students worry when they believe the teaching methods are ineffective, rigid, or threatening.

- *"Pada pendapat saya, saya berasa gelisah apabila kaedah pengajaran tidak betul."* (I feel anxious when the teaching method is ineffective) — P 11
- *"Menekan-nekan murid untuk selesaikan masalah matematik apabila murid itu tidak faham."* (Pressuring students to solve problems when they don't understand) — P 12
- *"Apabila seorang guru mengajar dengan gelak tawa."* (When a teacher teaches with humor) — P 6

A helpful and engaging teaching approach (e.g., employing humour, patience, and encouragement) can help alleviate students' worries, but strict or ineffective teaching approaches can increase students' anxiety.

vi. Role of Peer and Lecturer Support in Reducing Anxiety

Students find that lecturers and peers provide valuable assistance in overcoming their mathematical phobia. Participatory discussions, clear explanations, and encouraging remarks bolster their confidence.

- *"Pensyarah memberi sedikit sebanyak tips untuk menyelesaikan masalah matematik."* (Lecturer gives some tips to solve math problems) — P 1
- *"Pensyarah saya ajar dengan penuh sabar. Penerangan jelas walaupun kadang-kadang ada tersilap tulis atau cakap, tapi tak mengapa, nanti ada budak kelas yang betulkan jadi saya tak adalah keliru sangat. Kalau dengan rakan pula, diorang akan bantu saya kalau saya tak faham."* (My lecturer teaches patiently. If they make a mistake, my classmates correct it, so I don't feel confused. My friends also help when I don't understand.) — P 5
- *"Interaksi dengan kawan dan pensyarah tu penting."* (Interaction with friends and lecturers is important) — P 13
- *"Saya sering bertanya soalan pada pensyarah dan kawan kelas jika tidak faham apa yg dipelajari."* (I often ask my lecturer and classmates questions if I don't understand what is being taught.) — P 17

The provision of positive peer and professor support is crucial in the reduction of fear and the development of students' self-assurance. Students' engagement with mathematics can be improved by promoting interactive learning, peer debates, and friendly instruction.

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Journal Website: https://academicinspired.com/jossr
DOI: 10.55573/JOSSR.082650

Discussion

The topic of mathematics anxiety among diploma students in polytechnic schools is diverse and is influenced by personal experiences, educational circumstances, and social factors. The results of this study are consistent with the existing literature on mathematics anxiety, indicating that students' anxiety levels are significantly influenced by factors such as fast-paced teaching, fear of making mistakes, examination pressure, and difficulty in understanding mathematical concepts. Furthermore, this investigation underscores the significance of peer and lecturer assistance in alleviating anxiety, emphasising the necessity of inclusive and engaging teaching strategies. In order to provide a deeper understanding of the nature of mathematics anxiety among diploma students, this discussion contrasts the important findings of this study with past research and analyses them.

Participants identified the rapid pace of instruction as a significant worry, as it hindered their ability to comprehend mathematical ideas. According to the participants, the speakers' rapid progression through subtopics resulted in inadequate time for comprehension and practice. This discovery is consistent with the research conducted by Zanabazar et al. (2023), which discovered that rigorous, rapid educational methods elevate students' anxiety levels. When mathematical concepts are not adequately reinforced through practice, students experience feelings of overload, which can result in avoidance behaviours. Similarly, Mammarella et.al (2023) hypothesised that students subjected to quick instruction without sufficient scaffolding are more susceptible to mathematics anxiety. Conversely, research suggests that planned lesson planning, periodic changes, and timed learning tactics enhance student comprehension and alleviate anxiety (Ersozlu, 2024). These results underscore the need for polytechnic teachers to slow the teaching pace, implement active learning approaches, and conduct recap sessions to enhance comprehension.

The participants' apprehension of making errors frequently led to a loss of motivation and reluctance. Numerous students experienced discouragement due to their repeated encounters with incorrect answers, which resulted in a lack of trust in their mathematical ability and self-doubt. Students who lack confidence are inclined to refrain from tackling mathematical issues, which exacerbates their nervousness and impedes their progress. Additionally, Prahmana et al. (2019) discovered that long-term anxiety is increased by prior unpleasant experiences with mathematics, which is consistent with the results of this study. Many participants expressed that their early failures had influenced them to assume that they were intrinsically unqualified to tackle challenging difficulties, diminishing their motivation to attempt such tasks. In order to, resolve this issue, it is imperative to foster a development attitude in pupils, emphasising that errors are a component of the learning process rather than evidence of failure.

Students expressed worry regarding uncertain test content, stringent time limits, and perceived difficulty compared to classroom exercises, which appeared as another major cause. Examination-related anxiety was also identified. This is in accordance with the research conducted by Lau et al. (2022), who found that high-stakes tests frequently enhance students' anxiety, particularly when unprepared or when they meet novel questions. The absence of formula sheets in examinations was also identified as a stressor. This discovery is consistent with the research conducted by Beilock et al. (2010), who observed that cognitive overload in high-pressure settings impedes the ability to solve problems. Open-book or formula-supported evaluations may benefit polytechnic students who depend on practical mathematical principles, as evidenced by numerous professional certification tests. Exam preparation seminars, practice tests that simulate actual exam conditions, and tactics for time management during assessments

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can all be implemented by instructors to mitigate examination-related anxiety. In addition, students may be motivated to engage more thoroughly with mathematical topics by offering partial marks for problem-solving attempts rather than solely final answers.

Students reported experiencing trouble retaining previously learned material, resulting in frustration and uncertainty when they attempted to solve new mathematics problems. This discovery is corroborated by Mustafa (2024), who discovered that pupils with inadequate mathematical foundations report more anxiety when studying complex subjects. Also, Anugrah et al. (2019) emphasised that cumulative learning gaps contribute to the long-term avoidance of mathematics. Those successful scaffolding approaches, such as connecting new topics to previously taught material, can enhance recall and confidence, as reiterated by the results of this study. Furthermore, hands-on problem-solving sessions and strategically spaced repetition may improve students' capacity to recall mathematical knowledge. Encouraging students to create personalised study strategies, including concept maps, peer discussions, and summary notes, can enhance their comprehension.

Participants identified language hurdles, reluctance to ask questions, and challenges associated with online learning as obstacles to their effective engagement with mathematics. These findings are consistent with Polacco et al. (2024), who discovered that language disparities can increase stress for students, particularly when mathematics education is offered in a non-native language. Furthermore, students who experience anxiety from feeling uneasy asking questions in class owing to shyness or fear of criticism are less inclined to seek explanations, which exacerbates their worry. In online learning environments, connectivity challenges and restricted direct engagement further compromise students' capacity to comprehend mathematical concepts. This implies that teachers should cultivate an open, non-judgmental classroom environment where students feel at ease asking questions, use interactive learning technologies, and implement multilingual teaching approaches.

The favourable impact of supportive lecturers and peers on reducing mathematics anxiety was a critical discovery in this study. Numerous participants identified patient instructors and supportive classmates as critical factors in developing confidence and resolving their challenges. This is in accordance with the results of Richland et al. (2020), who discovered that supportive teacher-student interactions are associated with reduced levels of mathematics anxiety. Additionally, collaborative learning environments, in which students participate in group problem-solving activities and peer conversations, promote a sense of motivation and security in the context of mathematics education. Promoting active peer tutoring, open communication between students and professors, and group learning activities can ease anxiety and enhance participation.

Limitations of the study

Although this research offers useful insights into the elements contributing to mathematics anxiety among diploma students in polytechnic institutions, it is imperative to recognise numerous limitations. Initially, the study is predicated on qualitative data, which, despite its extensiveness, restricts its applicability to a broader student body. The results are unique to the 24 individuals from a particular polytechnic institution, and their experiences may not fully represent students from other educational settings or backgrounds. Future research incorporating quantitative methodologies or a more diverse sample could offer a more comprehensive perspective.

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Secondly, self-reported data from open-ended questionnaires may be influenced by bias since individuals may not precisely recollect their experiences or may produce replies that are socially desirable. In-depth interviews or focus group discussions could have facilitated a more profound examination of their emotions and perceptions.
Furthermore, this investigation fails to consider the potential influence of extrinsic factors, such as socioeconomic position, cultural factors, and prior academic performance, on mathematics fear. Future research should employ a mixed-methods approach to investigate the interaction between these characteristics and students' anxiety levels.
Lastly, the study predominantly concentrates on the viewpoints of students, without the direct involvement of academic staff or lecturers, whose teaching styles and experiences could have further contextualised the findings. In order to gain a more comprehensive understanding of mathematics anxiety in polytechnic settings, future research should employ a multi-perspective approach.

Future Research

Although this study offered significant insights, future research should investigate intervention-based techniques to alleviate mathematics anxiety among diploma students. Additional research might investigate the long-term effects of educational innovations, student coping mechanisms, and the effectiveness of technology in lowering anxiety in mathematical learning.

Conclusion

This study's results substantiate the current research on mathematics anxiety by emphasising the critical personal, educational, and contextual elements that contribute to students' difficulties in polytechnic environments. External learning hurdles, exam-related stress, fast-paced teaching, fear of failure, and comprehension issues were all identified as factors that exacerbated anxiety levels. Nevertheless, the problems were significantly mitigated by the tremendous support of peers and lecturers.

Polytechnic institutions could foster supportive classroom settings, incorporate exam preparation tools, and use more student-centred teaching approaches to solve these difficulties. Educators can enhance diploma students' academic achievement and mathematical confidence by recognising and actively addressing the issues that contribute to mathematics anxiety, thus creating a more positive and successful learning experience.

Acknowledgement

We would like to take this opportunity to sincerely thank all the respondents who participated in this study. Your willingness to share your experiences and insights played a crucial role in the success of our research. Without your input, this study would not have been possible. Heartfelt thanks to fellow team members, whose dedication, hard work, and strong sense of collaboration ensured that every stage of this project was completed smoothly. Your collective efforts have truly made this research a rewarding and enriching experience. We are truly grateful to everyone who contributed to this journey in one way or another.

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References

Anugrah, T., Kusmayadi, T. A., & Fitriana, L. (2019). Mathematics anxiety in dealing math exams. *Journal of Physics: Conference Series, 1157(3), 032101.* https://doi.org/10.1088/1742-6596/1157/3/032101

Asomah, R. K., Kwabena, M. J., Assamah, G., Narh-Kert, M., & Manu, H. N. (2025). The influence of gender differences in mathematics anxiety on mathematics performance. *International Journal of Educational Innovation and Research, 4*(1), 16–33. https://doi.org/10.31949/ijeir.v5i1.10565

Baas, B. (2020). The perceptions and experiences of math anxiety (Master's thesis, Dominican University of California). Master of Science in Education | Master's Theses, 17. https://doi.org/10.33015/dominican.edu/2020.EDU.06

Babchuk, W. A. (2016). [Review of the book *Qualitative research: A guide to design and implementation* (4th ed.), by S. B. Merriam & E. J. Tisdell]. *Adult Education Quarterly, 67*(1), 70–72. https://doi.org/10.1177/0741713616671930

Beilock, S. L., Gunderson, E. A., Ramirez, G., & Levine, S. C. (2010). Female teachers' math anxiety affects girls' math achievement. *Proceedings of the National Academy of Sciences of the United States of America, 107*(5), 1860–1863. https://doi.org/10.1073/pnas.0910967107

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology, 3*(2), 77–101. https://doi.org/10.1191/1478088706qp063oa

Cohen, L., Manion, L., & Morrison, K. (2018). Research methods in education (8th ed.). *Routledge*. https://doi.org/10.4324/9781315456539

Creswell, J. W., & Poth, C. N. (2018). Qualitative inquiry and research design: Choosing among five approaches (4th ed.). *SAGE Publications*.

Ersozlu, Z., Blake, D., Usak, M., & Hawken, S. (2022). Addressing preservice teacher's reasons for mathematics and test anxiety. *European Journal of Educational Research, 11*(3), 1715-1728. https://doi.org/10.12973/eu-jer.11.3.1715

Guest, G., Bunce, A., & Johnson, L. (2006). How Many Interviews Are Enough? An Experiment with Data Saturation and Variability. *Field Methods*, *18*(1), 59-82. https://doi.org/10.1177/1525822X05279903

Gunderson, E. A., Ramirez, G., Levine, S. C., & Beilock, S. L. (2012). The Role of Parents and Teachers in the Development of Gender-Related Math Attitudes. *Sex Roles: a Journal of Research*, 66, 153-166. https://doi.org/10.1007/s11199-011-9996-2

Jameson, M. M., & Fusco, B. R. (2014). Math anxiety, math self-concept, and math self-efficacy in adult learners compared to traditional undergraduate students. *Adult Education Quarterly*, 64(4), 306–322. https://doi.org/10.1177/0741713614541461

Kallio, H., Pietilä, A.-M., Johnson, M., & Kangasniemi, M. (2016). Systematic methodological review: Developing a framework for a qualitative semi-structured interview guide. *Journal of Advanced Nursing, 72*(12), 2954–2965. https://doi.org/10.1111/jan.13031

Lau, N. T., Hawes, Z., Tremblay, P. F., & Ansari, D. (2022). Disentangling the individual and contextual effects of math anxiety: A global perspective. *Proceedings of the National Academy of Sciences of the United States of America*, *119*(7). https://doi.org/10.1073/pnas.2115855119

Lincoln, Y.S. and Guba, E.G. (1985) *Naturalistic Inquiry*. SAGE, Thousand Oaks, 289-331. http://dx.doi.org/10.1016/0147-1767(85)90062-8

Mammarella, I. C., Caviola, S., Rossi, S., Patron, E., & Palomba, D. (2023). Multidimensional components of (state) mathematics anxiety: Behavioral, cognitive, emotional, and psychophysiological consequences. *Annals of the New York Academy of Sciences, 1523*(1), 91–103. https://doi.org/10.1111/nyas.14982

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eISSN: 2637 -0956
Journal Website: https://academicinspired.com/jossr
DOI: 10.55573/JOSSR.082650

Md Saleh, Z. ., Subramaniam, G. ., & Mohd Shariff, N. M. . (2024). Mathematics Anxiety among Architecture Students at Polytechnic Sultan Idris Shah: A Preliminary Study as An Attempt to Strengthen Mathematics Education in TVET Institution. *Semarak International Journal of STEM Education*, *1*(1), 39–48. https://doi.org/10.37934/sijste.1.1.3948

Merriam, S. B., & Tisdell, E. J. (2016). Qualitative research: A guide to design and implementation (4th ed.). Jossey-Bass.

Mohd, N., Salim, W. I. W., & Ismail, S. (2024). Exploring Mathematics Anxiety and Mathematics Achievement among Technical Students. 51–56. https://doi.org/10.1109/ivit62102.2024.10692548

Mustafa, A. N. (2024). Mathematics anxiety causes, consequences, and coping strategies. *International Journal of Advanced Research*, *12*(11), 1268–1276. https://doi.org/10.21474/ijar01/19941

Mutodi, P., & Ngirande, H. (2014). Exploring mathematics anxiety: Mathematics students' experiences. Mediterranean Journal of Social Sciences, 5(1), 283–294. https://doi.org/10.5901/mjss.2014.v5n1p283.

Nowell, L. S., Norris, J. M., White, D. E., & Moules, N. J. (2017). Thematic analysis: Striving to meet the trustworthiness criteria. *International Journal of Qualitative Methods*, *16*, 1–13. https://doi.org/10.1177/1609406917733847

Patton, M. Q. (2015). *Qualitative research and evaluation methods* (4th ed.). SAGE Publications.

Polacco, D., Zsoldos-Marchis, I., & Dekel, R. (2024). Perspectives of teachers on the signs and causes of mathematics anxiety. *Acta Didactica Napocensia*. https://doi.org/10.24193/adn.16.2.10

Prahmana, R. C. I., Sutanti, T., Wibawa, A. P., & Diponegoro, A. M. (2019). Mathematical anxiety among engineering students. Infinity Journal, 8(2), 179–188. https://doi.org/10.22460/INFINITY.V8I2.P179-188

Richardson, F. C., & Suinn, R. M. (1972). The Mathematics Anxiety Rating Scale: Psychometric data. *Journal of Counseling Psychology*, *19*(6), 551–554. https://doi.org/10.1037/h0033456

Richland, L. E., Naslund-Hadley, E., Alonzo, H., Lyons, E., & Vollman, E. (2020). Teacher and students' mathematics anxiety and achievement in a low-income national context. *Mind, Brain, and Education*, *14*(3), 293–309. https://doi.org/10.1111/mbe.12253

Serin, H. (2023). Mathematics anxiety: Overcoming challenges and achieving success. *International Journal of Social Sciences & Educational Studies*, *10*(2), 383–390. https://doi.org/10.23918/ijsses.v10i2p383

Tsirimokos, G., Lekka, E., & Pilafas, G. (2024). 'Math is not for me'. Investigating Mathematics Anxiety in Secondary and Higher Education: A Critical Discussion of Current Practices and Future Recommendations. *International Journal of Science and Healthcare Research*, *9*(2), 237–249. https://doi.org/10.52403/ijshr.20240234

Wiles, R. (2013). *What are qualitative research ethics?* Bloomsbury. https://hdl.loc.gov/loc.gdc/gdcebookspublic.2020715357

Zanabazar, A., Deleg, A., & Ravdan, M. (2023). A study of factors causing math anxiety among undergraduate students. *International Journal of Innovative Research and Scientific Studies*, *6*(3), 578–585. https://doi.org/10.53894/ijirss.v6i3.1609