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Gender Differences in Mathematics Teaching Anxiety Among Pre-Service Mathematics Education Department Students

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ABSTRACT

This study aims to determine the differences in anxiety and mathematics commonly experienced by prospective mathematics teachers. This study involved 25 respondents from the Mathematics Education Study Program. This study used a quantitative descriptive analysis approach and collected data in March 2025 using a digital questionnaire with a Likert scale. Descriptive statistics, including percentages, were used to analyze the data. Based on the study findings, female teachers were more anxious than their male counterparts, especially in terms of emotional pressure, teaching readiness, and understanding of gender roles in the classroom. These results indicate that both groups exhibit high levels of self-confidence, despite differences in anxiety levels based on gender. Therefore, to optimally prepare prospective mathematics teachers, teacher education programs should include techniques for managing anxiety in teaching. The small sample size and limited number of respondents are the main limitations of this study.

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INTRODUCTION

Math teaching anxiety is a feeling of fear, anxiety, and worry experienced by a teacher when teaching mathematics. This habit of experiencing feelings of fear and anxiety is often felt by new teachers who lack experience experiencing anxiety because they have not mastered the subject matter being taught a lack of confidence arises, which can cause them to feel incapable and worried about their ability to convey material clearly and effectively to students (Syuhada & Retnawati, 2020). Usually, these feelings of discomfort or worry arise when having to give math lessons (Prasetyo et al., 2023). Teachers often experience anxiety, worry, and apprehension in teaching, and many studies have discussed that this anxiety negatively impacts their confidence and effectiveness in the classroom (Delgado-Monge et al., 2024).

In Indonesia, current research shows that mathematics education students, both female and male, often feel anxious about teaching mathematics due to their lack of experience in the teaching process. Lack of

experience in teaching mathematics tends to exacerbate anxiety, and inexperienced teachers often face difficulties in preparing teaching materials and delivering lessons effectively, resulting in increased anxiety, usually felt by prospective teachers, especially in the face of new demands and sudden changes in learning methods (Argaswari & Hapsari, 2022). The level of anxiety in teaching mathematics in Indonesia is increasing, and it is found in prospective mathematics teachers who feel unprepared to teach due to a lack of experience and effective engagement with mathematics content (Achsan Bakrin, 2023). Research shows that both male and female teachers face math anxiety, which is influenced by many factors, including teaching methods and performance demands, and is therefore complex, rooted in personal beliefs as well as external pressures, and affects both sexes similarly in the performance of teaching tasks (Lafuente, 2024). Lack of teaching experience leads to low individual confidence, which, according to the theory of self-efficacy proposed by Albert Bandura, confirms that individual beliefs in self-ability significantly affect performance and emotional responses, including anxiety, so teachers who have high self-efficacy tend to feel more confident and experience lower anxiety in teaching, In contrast, those with low self-efficacy feel anxious more easily, so fostering self-efficacy through training and guidance is important to reduce teacher anxiety and increase teaching effectiveness (Asomah et al., 2025).

Research into the effect of gender on math teaching anxiety has shown inconsistent results, with some studies finding significant differences and others not. The study showed that although female teachers had higher levels of personal math anxiety than male teachers, there was no significant difference in math teaching anxiety between the two, the findings also showed that females were more anxious at high levels, and while males tended to be more anxious at moderate levels, indicating that anxiety can vary not only by gender, but also by intensity (Hossain, 2020). Research on the effect of gender on math teaching anxiety shows mixed results. Female teachers tend to experience higher anxiety due to stereotypes and social pressure, which impacts their confidence and teaching effectiveness (Delage et al., 2022). Although a number of studies have been conducted, there is still inconsistency in the results of research on whether gender actually affects the level of math teaching anxiety, especially in prospective teachers. In addition, there are still few studies that specifically address this issue in the context of mathematics education students in Indonesia. This gap suggests the need for further research to clarify the relationship between gender and math teaching anxiety in different cultural and educational contexts.

The study of gender-based teaching anxiety is important for understanding the differences in mathematics teaching anxiety experienced by female and male prospective mathematics education teachers and the social and psychological factors that influence it. Understanding the differences in teaching anxiety between women and men is important because it can reveal various social and psychological factors that can affect teacher anxiety so that researchers can design appropriate strategies to help teachers overcome anxiety, thereby increasing teaching effectiveness and improving learning outcomes (Dao et al., 2024). The cognitive-emotional model of dual harm offers an integrated framework for understanding the co-occurrence of self-harm and aggression through the interaction of distal, proximal, and feedback processes, emphasizing emotional regulation and interpersonal motives as core functions of dual harm behavior (Shafti et al., 2021). Research reveals that female teacher candidates tend to experience higher levels of anxiety in teaching mathematics and chemistry than male teachers, so special interventions are needed in teacher education programs to assist both genders in overcoming emotional challenges that may hinder their teaching persuasiveness, and also it can be seen that gender differences affect anxiety levels in teaching mathematics (Boateng et al., 2025). The novelty of this study is that it examines differences in mathematics teaching anxiety based on gender in the context of mathematics education students in Indonesia, which has rarely been the focus of previous research. In addition, this study also focuses on combining self-efficacy and awareness of gender roles as factors that influence teaching anxiety, an approach that has not been addressed in an integrated manner in previous studies.

This research describes methods, findings of gender-based differences in math teaching anxiety, and strategies to improve math teaching effectiveness. This study aims to examine how gender affects teaching anxiety among prospective mathematics teachers, and to explore how gender awareness contributes to this phenomenon. This research offers a new perspective by integrating factors that have rarely been studied. Effective teaching and learning can help address and understand the causes of mathematics anxiety so that prospective teachers and mathematics education students can actively address their anxiety, build confidence, and create a more positive and supportive learning environment so students will feel attracted to create a learning environment that makes teachers feel comfortable (Furner & Duffy, 2022). Prospective teachers can reduce anxiety in teaching mathematics by implementing inclusive teaching strategies and creating a supportive classroom environment so that a positive atmosphere is created for teachers and students to feel

comfortable in discussing mathematical concepts, which can ultimately reduce the anxiety of both parties (Atoyebi & Atoyebi, 2022).

METHOD

This study describes the differences in math teaching anxiety between males and females to support the development of effective learning by using a quantitative descriptive approach. According to (Hossain, 2020), this study's descriptive quantitative research approach will efficiently identify differences in math anxiety between genders and provide essential insights that can augment the educational process and help design more effective learning strategies. The study involved a total of 25 participants, consisting of male and female students enrolled in the mathematics education program, who were identified as prospective mathematics teachers. This study also aims to develop practical teaching skills to reduce math teaching anxiety, considering the existing gender differences.

This study required data from mathematics education students to identify differences in math teaching anxiety levels based on gender, and results are expected to provide a clearer picture of the influence of gender factors on teaching mathematics at the prospective teacher level. Both male and female mathematics education students were selected because they are preparing to become prospective mathematics teachers. They are at an essential stage in developing their teaching skills and are beginning to form perceptions and attitudes related to mathematics teaching, including potential teaching anxiety.

The research sample was selected from the population of mathematics education students using Google Forms questionnaire techniques. Mathematics education students were used as samples to be relevant to the research objectives. The sample consisted of men and women so that the data obtained could reflect the characteristics and variations in the level of anxiety in teaching mathematics among prospective mathematics teachers. Prior to distributing the questionnaire, the instrument was reviewed and refined based on its relevance to the research objectives and its alignment with the characteristics of mathematics education students. The questions in the questionnaire were carefully constructed to reflect common aspects of anxiety in teaching mathematics. Content validity was ensured by cross-checking the statements with theoretical concepts from the relevant literature and by ensuring their clarity and suitability to prospective mathematics teachers as target respondents.

Data was collected in March 2025 by distributing digital questionnaires to the Mathematics Education study program students through the Google Forms platform. The purpose of distributing this questionnaire was to collect information about the level of anxiety in learning mathematics, both in male and female students, as well as the factors that influence anxiety. Online questionnaires were chosen because they are considered more efficient, practical, and able to reach more respondents without being constrained by distance and time. The research instrument consisted of 50 statement items designed to measure various dimensions of anxiety in learning mathematics, such as cognitive and emotional anxiety, as well as the factors that influence it. Respondents were asked to respond to each statement using a five-point Likert scale: Strongly Disagree, Disagree, Neutral, Agree, and Strongly Agree. This scale is used to measure the intensity of respondents' attitudes or feelings towards each statement given.

Data collected through digital questionnaires distributed to Mathematics Education students were analyzed descriptively and quantitatively to see the differences in the level of anxiety about teaching mathematics between male and female students. Differences will be examined by considering factors that may influence anxiety, such as teaching experience, gender stereotypes, and perceptions of mathematical ability. This study was conducted to highlight gender differences in mathematics anxiety and provide a fundamental understanding that can help in analyzing teaching anxiety and the various factors that may play a role in the emergence of such anxiety (Antonio, 2023). The data obtained will be compared to see the difference in anxiety levels between female and male students, and then the results in the form of percentages to show which group has a higher level of anxiety to provide a clearer picture of the differences in math teaching anxiety based on gender.

RESULT AND DISCUSSION

FINDING

This section presents the findings on the differences in mathematics teaching anxiety between male and female students, along with the contributing factors, including self-confidence, teaching skills, perceptions of gender roles, social support, student participation, and teaching preparation.

Table 1. Gender Comparison

No.	Category	Male (Mean)	Female (Mean)
1	Teaching Anxiety	3.32	3.37
2	Self-confidence	3.32	3.39
3	Teaching Skills	3.83	3.81
4	Gender Differences	3.00	3.00
5	Social Support	3.63	3.69
6	Student Participation	3.71	3.81
7	Teaching Preparation	4.18	4.22

Table 2. Percent of Gender Comparison

No.	Category	Male (%)	Female (%)
1	Teaching Anxiety	47.9	52.1
2	Self-confidence	34.5	65.5
3	Teaching Skills	42	58
4	Gender Differences	33	67
5	Social Support	35	65
6	Student Participation	35	65
7	Teaching Preparation	36.2	63.8

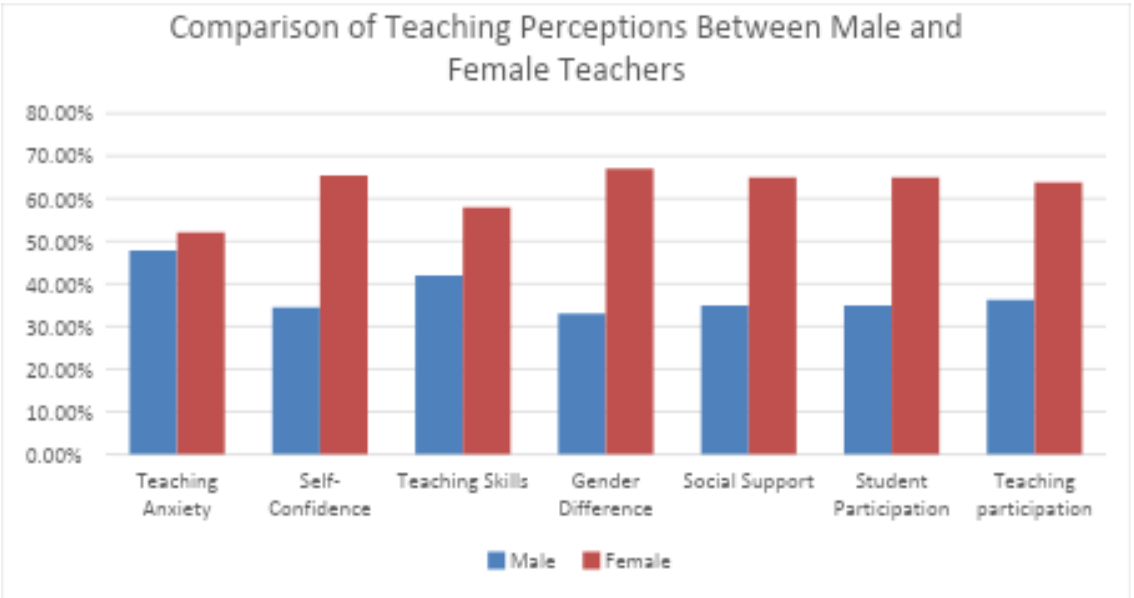

Figure 1. Gender Comparison

The findings show that female students tend to report slightly higher levels of teaching anxiety (52.1%) than male students (47.9%). Interestingly, despite this increased anxiety, female students also showed greater self-confidence (65.5% vs. 34.5%) and stronger awareness of gender-related influences in teaching (67% vs. 33%). The results suggest that female students tend to value and engage more with aspects such as teaching preparation, classroom participation, and social support than their male peers.

We also ran an independent t-test to check if the anxiety differences between male and female students were meaningful. The result ($t = 0.879$, $p > 0.05$) showed that the difference wasn't statistically significant. In other words, while descriptive data show notable trends by gender, these differences may not be generalizable due to potential sampling variability. Therefore, although female students appeared to experience slightly higher anxiety, the lack of statistical significance ($p > 0.05$) suggests that the observed differences may be influenced by sample limitations or other contextual variables not captured in this study.

DISCUSSION

The data in this study show that gender influences how future math teachers deal with teaching anxiety. Female students often feel more nervous, especially when they must plan lessons or face emotional challenges during class. However, interestingly, they also feel more confident and are more aware of the need for support and student involvement. This finding comparable to what other studies have reported—female teachers may carry more emotional weight, but they often manage it by being more prepared and committed.

According to (Zee & Koomen, 2016) teachers with strong self-efficacy are better equipped to manage stress and maintain confidence, even under pressure. This dual condition—high anxiety alongside high confidence—can be explained by the dual-process theory, which states that emotional and cognitive responses operate simultaneously yet (Evans, 2008);(Pessoa, 2009). Female students may cognitively feel ready but still experience emotional stress, particularly due to societal expectations or stereotypes related to teaching mathematics.

There's a clear difference in how male and female pre-service teachers experience anxiety when teaching math. Female students tend to feel more worried about their skills, preparation, and the kind of support they might need (52.1%), while male students report slightly less anxiety (47.9%). This suggests that gender does play a role in how teaching anxiety is experienced. Interestingly, despite this, they also showed higher confidence in their teaching abilities (65.5% vs. 34.5%). They were more aware of the influence of gender in learning (67% vs. 33%) and more likely to recognize the need for additional training (58% vs. 42%). In contrast, male students tended to be less anxious but also less engaged with the emotional and social aspects of teaching. It seems that female students may feel more pressure, but they try to handle it by preparing well and staying aware of what's expected. On the other hand, male students might need support that helps them pay more attention to inclusive teaching practices. That's why teacher education should consider what each group needs emotionally, socially, and in terms of their learning style.

Mathematics teaching anxiety can interfere with lesson effectiveness and make the subject feel intimidating for both teachers and students (Prasetyo et al., 2023). This was reflected in the present study, where 52.1% of female and 47.9% of male pre-service teachers admitted feeling anxious, especially when responding to difficult questions or teaching in front of a class (Prasetyo et al., 2023). Although female teachers felt more anxious, a higher proportion of them reported being confident when teaching, 65.5% compared to 34.5% of male teachers. This supports what (Pratiwi et al., 2022) found, that confidence can help teachers explain material better and improve how students respond to learning. Teaching skills were also considered essential for success, as many pre-service teachers acknowledged the need to improve them through additional training—58% of female participants and 42% of males agreed with this (Aguilar & Ortiz, 2024). This suggests that many future teachers are aware of their professional gaps and see growth as achievable with proper support. Furthermore, research has shown that gender stereotypes and personality traits influence how male and female teachers approach mathematics instruction (Mashuri & Yawan, 2023). Supporting this, 67% of female and 33% of male teachers in the current study reported that gender factors influenced how they taught and interacted with students. The role of social support also emerged as a key factor. While (Abirin, 2023) found that such support has a substantial impact on student anxiety, even if it is not statistically significant, it remains critical in the teaching context. Some of the participants in this study—particularly 65% of the female students and 35% of the males—mentioned that having support from classmates and students helped reduce their nervousness when teaching. As also noted by (Asfari et al., 2024), feeling connected to others can help ease stress and improve teachers' emotional well-being management. Active student participation also contributed to teachers' sense of ease, with 65% of female and 35% of male teachers saying it made them more comfortable during instruction (Wulandari et al., 2024).

Finally, teacher preparedness was another consistent theme. Although some teachers may possess confidence and technological knowledge, they still felt underprepared for integrating tools into their teaching (Agyei et al., 2022). In this study, 63.8% of female teachers and 36.2% of male teachers said that preparing materials in advance helped them reduce anxiety and feel more secure.

The results suggest a few ways to help reduce anxiety and make math teaching more effective. For example, (Atoyebi & Atoyebi, 2022) suggest using real-life problems and student-centered learning in inclusive classrooms. This approach can help students feel more involved and teachers feel more confident, while also supporting creativity. (Pasaribu & Lestari, 2023) identified several sources of teaching anxiety during the practicum, such as fear of mistakes, lack of preparation, and poor time management, which can be managed through humor, positive thinking, effective lesson planning, and active classroom engagement.

Teaching math well is important if we want students to succeed in today's data-driven world. However, to make that happen, we need teachers who feel confident and are well prepared (Law-Davis, 2023). Those who excel at modeling, explaining concepts clearly, utilizing technology, and facilitating students' understanding of abstract ideas tend to create more effective learning environments (Aguilar & Ortiz, 2024). At the same time, gender expectations can subtly influence how students perceive themselves in STEM. (Zhou et al., 2023) suggest that female teachers can help by showing students strong role models, encouraging growth, and making classrooms more inclusive. Emotional well-being also plays a role. (Asfari et al., 2024) found that family and social support significantly reduce teacher stress and improve work-life balance. Meanwhile, hybrid learning environments—as noted by (Balayan et al., 2024)—can enhance participation and problem-solving, though face-to-face settings may better support communication. In this study, female teachers reported feeling more anxious; however, many of them also felt confident about their teaching abilities (Fitriati et al., 2023). At first, this might sound conflicting. However, when viewed through the lens of the dual-process theory, it makes sense—our emotions and thoughts do not always align (Evans, 2008);(Pessoa, 2009). A teacher can believe she is capable, yet still feel anxious due to external pressure, such as expectations or multiple responsibilities. Even if someone has experience, it does not always alleviate stress. This mix of emotion and thought illustrates the complexity of the teaching experience, particularly for women. These findings underscore the importance of teacher education programs to address not only content mastery but also emotional resilience by incorporating gender-sensitive support systems, peer collaboration, and strategies that foster confidence through practice and feedback.

One of the unexpected findings in this study was that female teachers showed high levels of self-confidence, even though they also reported higher levels of anxiety than male teachers. While anxiety is typically linked to low self-confidence, that pattern did not appear here. This may be attributed to the greater adaptability among female teachers, who are often more proactive in seeking social support and preparing lesson materials. Many of them also value teaching preparation and workplace support as key to their teaching readiness. Their confidence may also stem from reflective professional experiences that help them maintain a strong sense of capability, even in high-pressure situations. In line with the dual-process theory (Evans, 2008);(Pessoa, 2009), cognitive evaluations, such as self-confidence, and emotional responses, like anxiety, can operate independently. Therefore, the anxiety that female teachers feel may not stem from a lack of teaching skills. It may be more about external pressure and expectations tied to gender, especially in math, a subject often perceived as male-dominated territory. Even with that anxiety, many do not back down—instead, they push themselves to do better and believe even more in what they can handle.

Even when teachers possess sufficient knowledge and preparation, they may still experience anxiety due to emotional responses or external pressures. That anxiety might not come from a lack of ability, but from how they respond emotionally. (Zee & Koomen, 2016) explain that when teachers believe they are capable, they usually feel less overwhelmed. This concept relates to self-efficacy, initially introduced by Bandura, which continues to help explain how people cope with pressure, especially in the teaching context.

This study offers a comprehensive examination of how gender influences teaching anxiety in math; however, it does not cover a few key aspects. Since the participants came from only one region, the results may not accurately reflect what is happening in other places. We also did not examine other factors that could play a role, such as age, teaching experience, or educational level. We did not explore other factors, such as age, teaching experience, or educational level. These things could affect how teachers deal with anxiety. In future studies, it is crucial to involve individuals from diverse backgrounds. Examining more of these details could provide a more comprehensive view. Even with its limits, this study still offers something valuable. It can help improve the training and support of teachers.

This study still has limitations, so it would be beneficial to continue exploring this topic. Future research should involve teachers from diverse regions and school levels, allowing the results to reflect a

broader context. It would also help to look at things like school culture, leadership, and how teachers and students interact, since all of these can affect anxiety, too. Researchers might also test out specific ways to reduce anxiety and build confidence, especially for teachers who struggle with high levels of stress. That way, the findings could be used to develop more effective training programs that truly meet the needs of teachers in real classrooms.

CONCLUSION

From this research, it seems clear that gender does have some influence on teaching anxiety, especially among students preparing to become math teachers. Many female students reported feeling more anxious, especially when explaining lessons, but they also appeared more confident in their abilities. Male students seemed less anxious overall but were also less focused on support and preparation. Due to these differences, it would be beneficial for teacher education programs to give more attention to the specific needs of each group. Female students often benefit from encouragement and emotional support. In contrast, male students may respond better to training that helps them become more aware of the classroom environment and the needs of their peers. This study involved a limited group of students, so future studies could include participants from diverse backgrounds or varying levels of experience to gain a more comprehensive understanding.

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