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Math Teachers' Perceptions of Student Math Anxiety in Underserved Schools: Systemic Barriers and Transformative Practices

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ABSTRACT This qualitative phenomenological study utilized critical pedagogy as a framework to explore K-12 students' math anxiety from teachers' perspectives, the systemic barriers contributing to this anxiety, and the transformative practices that educators implement to promote students' math learning. Semi-structured interviews were conducted with nine math teachers with an average of 17 years of teaching experience in diverse, urban, or Title I schools. A reflexive thematic analysis was applied, revealing that teachers clearly understood their students' math anxiety and the systemic challenges contributing to it. This study found that students' math avoidance behavior, their lack of cumulative math learning, shortage of qualified math teachers, families with low-socioeconomic status, high-stakes testing, and lack of transformative practices were perceived as the reasons for math anxiety by the teachers. This finding suggests targeted professional development for math teachers to enhance their skills in developing students' agency and sense of belonging to challenge systemic barriers.

KEYWORDS: *Math anxiety, STEM education, systemic challenges, transformative practices*

Introduction

In today's technology-driven world, STEM (Science, Technology, Mathematics, and Engineering) disciplines are critical, and experts are needed in those fields to cope with global progress and development. Since mathematics is the core subject of STEM, understanding the barriers to learning, such as math anxiety, is critical to developing future STEM experts (Cuder et al., 2024). Research also shows that math anxiety is a persistent barrier to mathematics learning (Lau et al., 2024; Szczygiet et al., 2024). Improving instructional strategies might not be the solution to math anxiety, as systemic challenges in the school systems, such as deficit thinking based on student backgrounds and a lack of effective mathematics teachers, persist. So, when we talk about math anxiety, we need to consider the systemic challenges related to it. Also, incorporating transformative teaching practices alongside mathematics instruction is essential to empowering and motivating students in learning mathematics.

Math Anxiety

Dreger and Aiken's (1957) "number anxiety" is considered the beginning of math anxiety studies; the authors explained "number anxiety" as an emotional tension that creates anxiety or stress when solving any numerical, mathematical, or arithmetical problems. Khasawneh et al. (2021) extended the concept of math anxiety to a broader context arguing for a more comprehensive approach, saying that math anxiety is a psychological response to tension that arises when students face mathematical tasks and cannot solve them. This reduces their confidence and increases their fear of mathematics.

Math is a complex subject for many students because it requires more attention and thoughtful approaches to solve mathematical problems. (Finell et al., 2022; Langoban, 2020; Radiamoda, 2024). Students need more

attention in mathematics than in other subjects because math demands high-level cognitive functions, like logical reasoning and abstract thinking (Finell et al., 2022). Motivation is also an important factor for students to be engaged in learning mathematics. So, to get motivated, they need equitable learning environments, effective mathematics instruction, and resources (e.g., manipulatives, technology) in learning mathematics (Furner & Duffy, 2022; O'Hara et al., 2022; Pizzie & Kraemer, 2023). Szucs and Toffalini (2023) found that students' perceived control and low expectations of mathematics learning are the reasons behind their math anxiety. When students feel a lack of control over their mathematics learning and believe that no matter how hard they work, they fail in mathematics, it negatively influences their mathematics learning.

Many studies on students' math anxiety solely focus on students' cognitive, emotional, and psychological factors (Luttenberger et al., 2018; Ramirez et al., 2023) that causes their math anxiety. However, there are some institutional and policy factors that might have an impact on students' math anxiety, over which students have no control. These factors, including teachers' deficit thinking, curriculum design, and the lack of certified mathematics teachers in the school, shape the learning environment where math anxiety may develop.

Systemic Challenges

Systemic challenges are deep-rooted, invisible obstacles in school systems for students, particularly those from low socioeconomic backgrounds. Bertrand and Marsh (2021) found that teachers' deficit thinking about their bilingual, disabled, and struggling students negatively impacted their academic success. The authors concluded that teachers in those schools promoted inequality and deprived students of opportunities to learn. Similarly, Battey et al. (2021) found that teachers hold biases against students based on race; the authors also noted that those teachers showed less care and support to students from low-income families regardless of their color. Funding disparities exacerbate the inequalities. Powell (2018) found that while schools in affluent communities and schools in low-income communities received similar amounts of federal and state funding, the former received more money through property taxes and private donations compared to the latter. This funding gap creates challenges for the low-income community schools to hire effective mathematics teachers, even licensed teachers, and cannot provide the necessary resources (e.g., licensed teachers and manipulatives) to students.

Carroll et al. (2023) described how schools implement below-standard mathematics curricula for low-income students, as they cannot offer many mathematics classes due to teacher shortages, where funding is essential to hire teachers. Moldavan et al. (2022) found that in this technology-driven era, schools in urban areas often lack technology, such as a smartboard for the classroom and individual laptops for students. This lack of technology in the classroom limits teachers' ability to visualize mathematical concepts, and students do not have access to some online mathematics resources (e.g., Khan Academy). As a result, the students in those schools were behind in mathematics learning and felt math anxiety. The authors concluded that neither parents nor schools can provide students with updated technological devices to support them in learning mathematics due to a lack of funding. London et al. (2021) used the "glass ceiling" metaphor to describe the invisible but real obstacles faced by students in low-socioeconomic communities due to systemic challenges. Despite the students' inherent potential, these systemic barriers hinder their mathematics progress in school and, subsequently, negatively impact their ability to study STEM in college.

Teachers are in a unique position as they work with students regularly. Their position allows them to observe how the systemic factors and students' backgrounds are interconnected in mathematics learning and overall reduce their math anxiety. However, very few studies examined students' math anxiety through the lens of teachers' perspectives and how they try to reduce it (Horne, 2022).

Transformative Practices in Math Teaching

Transformative practices in mathematics teaching refer to instructional methods that prioritize student-centered teaching and learning over traditional, lecture-based approaches. Darder et al. (2023) defined critical pedagogy as a transformative practice that empowers students to develop personal interests and a sense of control in education. Such an approach is crucial for students from marginalized and underserved communities to gain empowerment and develop agency in their education, especially in mathematics, to enter the STEM fields in the future. Practically, students from low socioeconomic status are systemically marginalized as the system suppresses their voices and limits their agency, and constrains their potential. The established systems constantly oppress and exclude them from learning mathematics in an attempt to divert them away from STEM disciplines, regardless of color. For example, Carr and Kefalas (2011) conducted an ethnography in a 100% White community

school in rural Iowa. They found that school officials showed biases and helped students with special coaching and scholarship applications based on their social status. Such differences in support systems show how schools uphold the inequality, providing access only to the privileged students and depriving students from low-income families who deserve more support.

As a transformative practice in mathematics classrooms, the dialogical approach engages students in meaningful mathematical dialogue to foster critical thinking and shared understanding. Song et al. (2023) found that dialogical interaction enables students to articulate and refine their mathematical reasoning. This practice leads students to a deeper understanding and increases confidence in learning mathematics. Uddin (2019) also recognized the dialogical approach as a transformative practice that promotes collaborative inquiry and peer-to-peer communication. This approach positions students as active participants in knowledge constructions rather than passive recipients of information. By encouraging students to justify their reasoning, analyze their own learning, and learn from mistakes, the dialogical approach reframes errors as an essential part of the learning process. Thus, the dialogical approach is exemplified as a transformative practice in teaching mathematics, as it establishes a classroom culture grounded in two-way communication, mutual respect, and empowerment.

All the above studies discussed transformative teaching practices as a theoretical framework, but none discussed the practical implications of these practices for reducing students' math anxiety. But reducing students' math anxiety is nationally essential, as mathematics is the core of STEM subjects. Thus, understanding teachers' perspectives is critical as they are primarily responsible for students' mathematics learning. They are in a unique position because they teach mathematics regularly and see systemic challenges students face.

Purpose of this Study

Understanding student math anxiety is crucial for providing the necessary support to the students to succeed in mathematics. This study aimed to understand K-12 students' math anxiety from their teachers' perspectives. It focused on how mathematics teachers perceived math anxiety in their students and explored their understanding of the reasons behind this anxiety. Additionally, the study examined how teachers viewed systemic barriers contributing to their students' math anxiety and the transformative practices they employ to alleviate it.

Theoretical Framework

This study employed critical pedagogy as its theoretical framework. Critical pedagogy is grounded in Freire's (1968, 1970) seminal work, *Pedagogy of the Oppressed*. Freire identified unequal education systems and systemic oppression within classrooms and school environments based on students' backgrounds. According to Freire, students from low-income families lack a voice in the classroom, and school systems oppress them systematically. While Freire did not originate the term "critical pedagogy," later pioneers such as Henry Giroux referred to this empowering educational approach as critical pedagogy. Darder et al. (2023) described critical pedagogy as a transformative education system that promotes democratic schooling and fosters students' motivation and interest in meaningful learning activities. Thus, the students take control of their own learning. Similarly, Kincheloe (2008) explained that critical pedagogy promotes reflective practices for teachers to examine the effectiveness of their teaching methods and their own biases in order to promote equitable practices for all students.

This study used critical pedagogy as a lens to explore teachers' understanding of systemic challenges that negatively impact marginalized student populations when learning mathematics and help create their math anxiety. This study's critical pedagogy lens helped determine whether teachers were aware of the inequalities in school systems and educational policies. This lens helped to examine whether teachers were engaged in reflective practices and considered students' sociocultural backgrounds in order to provide equitable support. By addressing this issue, the critical pedagogy lens guided this study to explore the intersection of math anxiety, systemic inequality, and transformative teaching practices.

Research Questions

1. What do mathematics teachers recognize as signs of their students' math anxiety?
2. What do teachers see as systemic challenges that contribute to students' math anxiety?
3. What transformative practices do they employ to promote their students' mathematics learning and remove anxiety?

Methods

Methodology

This study employed a phenomenological approach to investigate student math anxiety based on their teachers' experiences in teaching mathematics. According to Creswell and Poth (2018), the phenomenological approach examines the lived experiences of individuals with a specific phenomenon they encounter directly. The authors note that this approach centers on how individuals perceive and interpret their experiences. Similarly, Ayton et al. (2023) state that phenomenology emphasizes individual experiences and how individuals articulate and make sense of those experiences. The current study explored mathematics teachers' analysis of their students' math anxiety, their understanding of the systemic barriers students faced in the classroom, and the actions they took to reduce this anxiety. All these activities were part of teachers' daily experiences of working with students with math anxiety, making a phenomenological approach suitable for this study.

Participants

The nine participants in this study were K-12 mathematics teachers from a Midwest state in the United States. The recruitment criteria required that participants have at least three years of experience teaching mathematics and work in diverse, urban, or Title 1 schools. Diverse schools are those that have students from different races or ethnicities, such as Asian, Black, Hispanic, and White. Urban schools are located in cities with low-income neighborhoods, and the student population may be homogeneous. Title 1 schools located in low-income communities, either in cities or counties, and receive extra federal funding due to their high percentages of students from low-income families. The following participants were recruited and interviewed. Their identities were hidden using self-naming pseudonyms. They are listed in Table 1 in order of the interview schedule.

Table 1

List of Participants

Name	Years of Experience	School-Level	Type of School
Eric	15	High	Diverse
Neolle	15	Elementary	Title 1
Ani	30	Middle	Urban and Title 1
Kimberly	20	High	Diverse
Lisa	30	High	Diverse
Ashley	3	Middle	Urban and Title 1
Derek	25	Elementary	Title 1
Lacey	7	Middle	Urban and Title 1
TC	7	High	Urban

Data Collection

Data was collected through individual interviews using Zoom, which were recorded with the participants' permission. Each interview lasted about 30 minutes. The interview questions were developed through the literature review for the introductory part of this study. The questions were:

1. How would you describe your students' math anxiety?
2. How do you recognize it in your students?
3. What do you think are your students' primary causes of math anxiety?
4. Do you notice math anxiety affecting certain groups of students more than others (e.g., based on gender, race, or socioeconomic background)?
   a) If so, why do you think this happens?
5. How do you think systemic factors, such as school policies or resource availability, contribute to math anxiety in your students?
6. How do you see your role as a teacher in addressing inequities that might promote student math anxiety?
7. In your opinion, how does cultural or socioeconomic background influence a student's experience with math anxiety?
8. What strategies or practices do you use to help students manage or overcome math anxiety?
9. Have you received training or professional development on addressing student math anxiety?
   a) If so, what did you find helpful, and what do you feel was missing?
10. What additional resources or support would help you address math anxiety more effectively, especially for marginalized students?

Data Analysis

This study used reflexive thematic analysis to analyze qualitative data. Braun et al. (2022) defined reflexive thematic analysis as the identification, analysis, and reporting of the themes from qualitative data. The authors also explained a six-step process in which the researcher's subjectivity and positionality are utilized to identify themes within a data set. This six-step process of data analysis is:

1. Familiarization with the data
2. Coding,
3. Generating initial themes
4. Developing and reviewing themes
5. Refining, defining, and naming themes
6. Write-up.

Based on the reflexive thematic analysis, the final themes of this study are:

- Math Avoidance Tendency
- Lack of Basic Math Skills
- Shortage of Qualified Math Teachers
- Blaming Parents with Low -Socioeconomic Status
- Influence of High-Stakes Testing
- Impact of School Policies
- Limited Transformative Practices

Results

Math Avoidance Tendency

Participant mathematics teachers were acutely aware of their students' struggles with math anxiety, and they recognized it through students' avoidance behaviors. For example, TC said, "I show a problem and ask them to do another, and they ask to go to the bathroom, raising a million hands. There's also class skipping. I see them all day, but they don't attend math class." Similarly, Lacey noted, "I recognize math anxiety in my students when they seem disengaged, avoid eye contact, or become easily distracted. They appear busy with something else instead of attempting to solve the problem." TC and Lacey's experiences clearly illustrated how students avoided mathematics classes and participation in mathematics learning. Another participant, Lisa, described a similar experience. She said, "They don't give me any responses to show what they know, and they don't want me to understand what they don't know."

Other participants also demonstrated a clear understanding of their students' avoidance of math-related tasks and practices. For instance, Eric remarked, "You give them a question, and they don't want to answer or get involved, like not staying on task." Similarly, Ani mentioned, "I see avoidance behavior when they encounter mathematics problems. There are many signs, such as not participating." One participant, Kimberly, elaborated on why students exhibit this avoidance behavior. She noted, "[Math anxiety] comes naturally. Many students come to me openly and share their anxiety even before they give themselves a chance. They do not participate." The participants described their students disengaging from mathematics learning due to their fear of failing to solve mathematics problems. As Ashley stated, "Sometimes they express emotions like worry. They feel overwhelmed by certain problems. They said, 'I am overwhelmed.' They fear they won't solve the mathematics problem correctly. It's like an unknown worry." So, the students have a fear of mathematics, and it influences them to avoid mathematics tasks in class.

Lack of Basic Math Skills

When the participants were asked why their students showed mathematics avoidance and what might be the possible reason behind it, all participants said that students lacked basic mathematics skills that are essential to solving mathematics problems. As Ashley said, "When they are in high school, I expect them to know certain things, right?" Similarly, Lisa said, "If they lack knowledge in multiplication and division, it makes them very hesitant to try math since it's a subject that builds each year." Kimberly said, "I show my students and help them solve logarithmic equations, and they don't know what log is. So, I stay on basics." Ani's experience was similar: "The first thing I will say is that their lack of foundational skills leads them to frustration when tackling a math problem." Eric also echoed the same. He said, "It could be a lack of fundamental skills. They don't have basic math skills that they need to build on."

Shortage of Qualified Math Teachers

In addition to a lack of basic mathematics skills, participants reported that a shortage of skilled and effective mathematics teachers contributes to their students' math anxiety and bad experiences. Neolle said, "When I think about student math anxiety, I think about teacher math anxiety. The way they teach it causes the kids to have some anxiety." TC said, "Low staffing is a challenge. If you barely have enough qualified teachers to teach the content classes, you don't have anybody to do math intervention." Derek added, "Are our teachers prepared to teach math content? Do they have the pedagogy?" Eric shared the same concern, saying, "We have math teachers who are not certified. They might have a degree in Computer Science with many math credits, but it does not mean they have math pedagogy skills."

Blaming Parents with Low-Socioeconomic Status

Participants often blamed parents for their students' math anxiety. Despite having understanding parents with little education and low-income, the participants still placed responsibility on the parents. Ani said,

"Socioeconomic status plays a role in math anxiety. Like, students who come from low-income families lack resources at home, which impacts their math ability." Similarly, Neolle said, "[Parents] need to reinforce the math skills because [teachers] cannot just teach them in one period. If [students] don't have anyone at home to help [them], that's going to cause more anxiety." Eric mentioned how parents' educational backgrounds negatively impact his students' mathematics learning when he said, "I notice that parents of students from low socioeconomic backgrounds may not have matriculated to high school or may be dropouts. They may not have the math content they need to help their child." TC noted, "I think parents have math anxiety. So, it gets passed down through the generations." Kimberly also said, "I think [math anxiety] starts at home. It is generational."

Influence of High-Stakes Testing

Along with blaming parents, the participants also shared how standardized testing increased their students' math anxiety. Ashley said, "Students get lots of pressure to get a good score but not to learn. Those types of tests are stressing [students] out." Ani said the same: "The pressure to perform well in high-stakes testing is another challenge for [students]." Similarly, Eric said, "I think standardized testing is one of the contributing factors for students' math anxiety because they have fear about it." Derek added, "I focus now on the test because we are accountable for testing data." The participants also discussed how the testing process put pressure on the students. Neolle said, "We teach kids solving math problems with all strategies, but then we have to assess them with a specific approach. So, they do not feel comfortable." Kimberly also said, "English language learners are allowed to learn math in their own language, and they face testing in English when many of the English terms are challenging for them."

Impact of School Policies

Like the impact of testing, participants also shared that some school policies negatively impacted students' learning of mathematics. For example, Derek said, "Schools are hiring brand-new math teachers who have not gone through the teacher preparation program. These teachers are unaware of what is going on in the developmental stages." Additionally, Lisa talked about how the curriculum is unfavorable for some students. She said, "Many students do not want to work in a group. They are uncomfortable working with others and letting others know what they don't know." TC shared a practical challenge she encountered due to her school policy when she said, "School allows students to retake the test as many times as they want to. By the 10th chance, they still don't do well. By this time, I will be one or more units ahead, and they will still miss some new math concepts."

Limited Transformative Practices

Although there was no direct interview question about transformative practice, participants shared their regular teaching strategies in the class in response to question number 8. When participants were asked how they generally mitigate their students' math anxiety and help them overcome systemic challenges, their answers varied. Eric said, "I use a growth mindset approach. I try to help them get out of their fixed mindset. I told them that I expect them to change their attitude towards mathematics. So, I give them lots of hands-on experience." Ani said, "I use manipulatives all the time, like visual aids." Lacey said, "I create a judgment-free environment where students feel safe to ask questions." Ashley also gave a similar response. Lacey said, "I like to create an open space and just make sure everyone is treated equally and also working together." Kimberly talked about empowering parents' mathematics skills. She said, "I invite all of my parents to my classroom. I ask them, 'Do you need a special session on manipulating your son's or daughter's math curriculum?'" TC takes a different approach. She said, "I have students come to the board. I definitely have them shout out. "Do you agree? Do you disagree? Why, why not? Just having some dialogue around math."

Intersection of Systemic Barriers and Teacher Pedagogical Confidence

Among these seven themes, mathematics avoidance tendency, lack of basic mathematics skills, shortage of licensed teachers, and blaming parents were the most frequently discussed by all participants. The participants consistently associated those factors with students' math anxiety. They also blame the school systems as systemic challenges that shaped their classroom realities. In addition to those central themes, one salient yet less frequently articulated observation disclosed a deeper dimension of teacher experience. Several participants expressed their feelings of inadequacy in teaching mathematics. They shared their hopelessness and uncertainty about how to engage students in learning mathematics, encourage reluctant students, or connect mathematical concepts with real-life scenarios. Their reflections suggest that teachers' pedagogical confidence plays a crucial role in the mathematics classroom. When teachers are unsure

and unskilled in engaging students in learning mathematics, they rely on traditional lecture methods, and students are not interested in learning.

Discussion and Conclusion

The results section indicates that the participating mathematics teachers possess a strong understanding of their students' math anxiety and their mathematics avoidance tendencies. The research agrees that math anxiety is common among students, leading to avoidance behavior (Jenifer et al., 2022; Schmitz et al., 2023). Participants also found the same behavior in their students. They recognized their students' disengagement from mathematics classes and their tendencies to avoid mathematics altogether. One participant, TC, stated that students look for possible excuses to skip mathematics tasks in class. TC also mentioned that she sometimes saw some of her students in the building, but they did not attend mathematics classes.

The findings of this study have provided a foundation for exploring the perceived reasons for math anxiety from math teachers' perspectives and the urgency to address math anxiety, especially for students from low-income families. This study's exploration of how teachers perceive students' math avoidance behavior and their lack of cumulative math learning suggests potential implications for addressing math anxiety. An important finding of this study is the gaps between math teachers' accountability and pedagogical preparedness. Teachers' blaming of students' family backgrounds for their math anxiety is significant because it echoes the status quo instead of providing support. This finding suggests implications for targeted professional development for math teachers. Teachers need training in implementing transformative practices, like an approach to engage students in meaningful dialogue in math class to enhance their agency and sense of belonging, so they can challenge systemic barriers.

Students' mathematics avoidance behavior is a primary reason for their math anxiety. When they avoid mathematics practices, they miss learning content, and this gradually prevents them from developing enough basic or foundational knowledge in mathematics. Kyttälä and Björn (2022) said that when students avoid mathematics lessons, they build the trajectory of future mathematics avoidance because they lack past mathematics knowledge required for future mathematics learning. Participants of the current study found the same to be true. For example, Lisa said, "If they lack knowledge in multiplication and division, it makes them very hesitant to try math since it's a subject that builds each year." Students' gradual mathematics avoidance develops a cumulative learning gap in mathematics, causing them to ultimately build math anxiety that keeps them from mathematics learning.

Students with math anxiety commonly develop a fear of mathematics. The gradual development of fear of mathematics becomes an insurmountable hurdle, as Markovits and Forgasz (2017) said: "Mathematics is like a lion" (p. 49). When students see mathematics as a big challenge and think they cannot solve mathematical tasks, it can develop their deficit mentality towards mathematics. As Kimberly said, "I can tell you [researcher] they have a fear of embarrassment. They come in with more of a defeatist mentality. So, they prepare themselves to fail." This cycle of avoidance and fear in mathematics develops a solid mathematics anxiety and a negative mindset about mathematics. Students, therefore, lose belief in themselves and their ability to learn mathematics.

There may be several reasons why students develop math anxiety and avoid mathematics. Uddin (2022) stated that teachers' math anxiety or insufficient knowledge of mathematics content and pedagogy contribute to students lacking a strong mathematics foundation. The participants of this study corroborated this. Neolle noted, "A lot of our teachers are not prepared enough with the content." Eric also echoed the same as he said, "In my school, we have math teachers who are not certified and teachers who are not certified, they don't have the pedagogical skills." When teachers are not prepared enough to teach mathematics, they have trouble effectively engaging their students in learning mathematics. This type of mathematics teaching-learning creates math anxiety among students. Thus, it can be argued that teachers' math anxiety is one possible reason for students' math anxiety, leading to their mathematics avoidance behavior.

In addition, the participating mathematics teachers discussed other systemic factors, such as high-stakes testing, that contribute to students' math anxiety. Göloğlu-Demir and Kaplan-Keleş (2021) found that standardized tests are not motivational for both teachers and students. The participants of this study said they focus on testing rather than helping their students conceptualize mathematics content. Derek said, "I must prepare my students for the test and teach steps to solve problems, not conceptually understand the math we discuss." The participants also discussed school policies as a barrier that contributes to students' math anxiety. Ingersoll and Tran (2023) note that schools in

low-income communities face significant challenges in hiring qualified teachers due to a lack of funding and place individuals in front of students without adequate content knowledge and pedagogical skills. One participant, Derek, stated, "Schools are hiring brand-new math teachers who have not completed the teacher preparation program." As a result, students who experience math anxiety do not receive the qualified teachers and equitable instruction needed to learn mathematics.

Blaming parents for students' poor performance is not a new trend. Some teachers and schools consistently evade responsibility and shift the blame to parents. Coleman et al. (1966) first reported that students from low socioeconomic backgrounds struggle regardless of the initiative schools implement. Likewise, the participants of this study assigned some blame to the parents. For example, Kimberly said, "It is generational. It is cultural because underrepresented communities lack emphasis on math." Similarly, TC stated, "I think their parents have math anxiety. So, I believe it's passed down through generations."

The participating mathematics teachers recognized several systemic challenges: a shortage of mathematics teachers, high-stakes testing, and students' low socioeconomic backgrounds, contributing to this anxiety. Schools in low-income communities struggle with funding because of insufficient property taxes, and end up recruiting underqualified, and sometimes unqualified, mathematics teachers to fill the vacancies with lower salaries. State and federal funding must be based on schools' needs. Low-income community schools must get the necessary financial support to provide quality education to their students. When schools hire skilled and licensed mathematics teachers, they can offer effective mathematics instruction to their students.

Luzano (2024) noted that transformative practices like the problem-solving approach in the mathematics classroom can activate students' prior knowledge and develop conceptual understanding. However, no participants in this current study showed problem-solving strategies. While Dresel et al. (2025) found that students learned better from their errors when they received constructive feedback, only one participant, Ashley, discussed trial and error. She said, "It's about guiding their emotion and thinking and making them feel comfortable about making mistakes because we all make mistakes." The dialogical approach in mathematics learning is a practical method that allows students to have a voice by engaging in meaningful learning activities (Uddin, 2019). Only one participant, Derek, discussed this approach, stating, "Having students talk about the answers and strategies is critical. It's not just about finding the correct answer; it's [about] the pathway you choose to get there." Derek's strategy of a dialogical approach is a transformative practice, but it lacks deeper critical engagements with students' lived experiences and systemic challenges.

The limited transformative practices observed in this study suggest the need for targeted professional development for mathematics teachers on how to apply transformative practices in the mathematics classroom. Transformative practices, such as a dialogical approach, are essential because they promote student-centered learning, reflection, and empowerment, all of which are crucial to enhancing students' motivation and agency in learning, and to reducing their math anxiety. These professional developments might target inquiry-based, socially relevant lesson planning practices to implement dialogical practices and problem-solving strategies. Schools can also organize trauma-informed pedagogy to provide students with psychological support to minimize their math anxiety. The teacher education program should introduce a course for preservice mathematics teachers to enhance their skills and knowledge on the psychological and systemic roots of students' math anxiety. The federal or state government can provide funding for Title 1 schools for some transformative projects, such as student-led math circles or peer mentoring to establish a mathematics community in schools.

This study has several limitations. First, its findings cannot be generalized due to the small sample size. While participants' insights provided robust data, they may not represent the diverse perspectives of mathematics teachers from various backgrounds. Second, this study relied on participants' self-reported data without observational validation. Finally, this study offered only a snapshot of students' math anxiety, lacking long-term data.

This study has created opportunities for future research. A qualitative case study approach might be helpful in exploring some systemic challenges, such as curriculum barriers, teachers' efficacy, and resource availability. A quasi-experimental study might be practical in justifying the effectiveness of some transformative practices, such as dialogical approaches and problem-solving strategies. A qualitative case study might help examine how engagement in transformative teaching practices impacts teachers' confidence and pedagogical beliefs about mathematics learning. Another case study could help to investigate how teachers' self-perceived inadequacy in mathematics instruction influences classroom practices, student engagement, and math anxiety.

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