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A Strategic Remedy for Math Anxiety

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Abstract

Math anxiety can be characterized as feelings of apprehension or distress that individuals experience when faced with tasks or activities associated with mathematics. Due to its prevalence, math anxiety is a growing issue for teachers who seek to uplift and prioritize the comfort, well-being and success of their students. Failure to address math anxiety can significantly hinder a student's learning, lower their academic performance, and negatively cloud their overall attitude towards mathematics. In gathering and sorting resources associated with prevailing positions regarding math apprehension, this paper aims to explore math anxiety's impact on students' learning, and the benefit of collaborative efforts between parents and teachers to curtail math anxiety. In doing so, this paper details a purposeful approach to teaching mathematics that is conducive for those students who experience math anxiety. It discusses the importance of a supportive classroom environment and implementing unique instructional strategies while identifying various measures that can be used to assess the progress of students who are trying to overcome math anxiety. As an elementary school, third-grade teacher, this paper—and the approach it depicts—is also a reflection of the lessons I learned while teaching two students with math anxiety this past year. It should be noted, moreover, that any general statements that are made about beneficial, strategic instruction are rooted in my own experiences.

I. Introduction

While the term “math anxiety” may be interpreted as an emotional response to a poor performance on a mathematics assessment, or an indicator of an student who is unpropitious in his or her academic endeavors, these are facile generalizations; rather, a student may perform poorly on a mathematics assignments because they feel anxious before they even began the exercise. Author Zarina Geatry's “Math Anxiety is Real; How Teachers Can Help Calm the

Nerves” notes that even accomplished mathematicians, such as Laurent Schwartz and Maryam Mirzakhani, have reported experiencing math anxiety. In studying math anxiety and its consequences for students, researchers have aligned their estimations of the portion of the general population that suffers from the disorder—approximately one-fifth or 20%—with one another, and thus have not only corroborated the prevalence of the academic apprehension, but highlighted the importance of finding an effective remedy (Geatry). By amalgamating the essential takeaways from both the abundance of research centered around math anxiety with my recent observations of two students who suffered from such academic distress, this paper aims to carefully curate an innovative approach—one strictly based on the existing, prevailing positions on the topic— designed to alleviate anxiety among math students.

II. Understanding Math Anxiety

Devising an efficacious solution to curtail the ubiquitous experience of math anxiety requires first delving into the intricacies of such apprehension. As a third grade teacher, I taught and observed two students who suffered from math anxiety in the same classroom last year. Though they both suffer from the same kind of disorder, their behavior starkly differed when confronted with an activity or exercise associated with mathematics. One of the two students would showcase his vehement apathy towards mathematical instruction by yelling, crying, attempting to move around the classroom and disrupting the learning experience for his peers. The other student, on the other hand, would tend to suppress her emotions, stop talking, and avoid eye contact; it was apparent that though this student may not have been as verbally or physically disturbed by the introduction of mathematical instruction, she was equally detached from the lesson. This experience depicts the range of expression regarding math anxiety; it is

imperative for educators to recognize that individuals react to unpleasant stimuli in different manners.

Given math anxiety's seemingly paradoxical nature, individualistic complexities, and relevance to improving the learning experience for all students, much research has been dedicated to defining and identifying the indicators and effects of the disorder. General academic anxiety refers to a broader kind of anxiety experienced by students in regards to their overall academic performance. Math anxiety, in contrast, specifically pertains to the apprehension that students experience when faced with math-related, mental tasks. According to the *Journal of Experimental Psychology*, math anxiety can be described by the experience of “panic, tension, and helplessness aroused by doing math or even just thinking about it.” Because the brain devotes more energy to coping with the stress than to processing information, students are more likely to lose focus and as a result, struggle to retain and process information (Ashcraft & Kirk, 2001). The added challenges associated with devoting energy to math-related mental tasks—according to “General academic anxiety and math anxiety in primary school. The impact of math anxiety on calculation skills”—tends to also induce students to have low perceptions of their capabilities and as a result, perform poorly in reasoning, processing and evaluating information (Commodari & La Rosa, 2021).

III. Creating a Supportive Classroom Environment

Carrying out a teaching approach that is conducive to the goal of curbing stress and anxiety among students begins with the classroom environment, which, if meticulously maintained, can play a crucial role in relieving anxiety among students and enhancing their academic performance. By carrying out lesson plans in strategic ways designed to make students feel engaged, accepted and valued in the classroom, teachers can foster a positive atmosphere

that encourages risk-taking, engagement, and open communication. For example, research has shown that dedicating the first five minutes of a lesson to short, anxiety-reducing exercises, such as meditation or do-now activities with no “incorrect” answers helps students loosen up, improve focus and concentration. For instance, questions such as “What did we enjoy doing in class yesterday?” or “What is on our agenda today?” allow for multiple correct answers and serve to boost esteem, confidence and camaraderie among the students (Gearty).

Additionally, it is the relationships within a classroom, whether between a teacher and a student or among students themselves, that are vital for creating a positive and empowering learning environment. Though building these relationships ultimately serves to enhance a class of students' overall academic and social growth, however, few classroom teachers have much training or knowledge regarding such social support. Author Jessica Minahan of “Building positive relationships with students struggling with mental health” noted that “few classroom teachers have much training in mental health counseling and support... despite the proven value of interaction strategies, they are almost never written out and shared among colleagues.” Some of these mechanisms or interaction strategies include tact regarding tone of voice, proximity, use of humor, de-escalating responses to defiant behavior, and gentle ways of giving constructive feedback (Minahan, 2022).

IV. Implementing Instructional Strategies

For the educational system to truly encapsulate a collective commitment towards ameliorating the content-learning experience and reducing math anxiety among students, then teachers must utilize an engaging and relevant math curriculum with the goal of capturing interest and motivating students to learn. In overseeing and delivering meaningful and relatable

math lessons, teachers can help students visualize the role of mathematics in their daily lives, which can promote a deeper understanding of the pertinent concepts.

Teaching a course in an equitable manner that aims to appeal to each student in the classroom requires an educator to differentiate instruction to accommodate diverse learners; this includes, if possible, teaching students multiple ways to help solve a math problem. For example, a valuable mechanism that is versatile enough to be tailored to each student's personal creativity and comfort, according to "How to Help Kids With Math Anxiety" by Rachel Ehmke, is the mnemonic device. As it pertains to aiding students in retaining information, moreover, clear and effective communication of mathematical concepts is necessary. As opposed to dull, verbal teaching instruction, the use of captivating visual aids and manipulatives are among the best tools for teachers to employ in order to achieve this goal. As conveyed by "Impact of Visual Aids in Enhancing the Learning Process Case," it is due to the meteoric, innovative nature of technological design, visual aids are only growing in their appeal: "practical improvements in the creation of visual aids for classroom use have been remarkable...using visuals aids as a teaching method stimulates thinking and improves learning." Manipulatives, additionally, hold significant value for educators since they provide concrete, hands-on experiences for students to explore mathematical concepts. In having my students tackle hands-on math activities that required them to use—and become comfortable with the concepts illustrated by—tangible examples, such as place value blocks, I can attest to their value in lessening math anxiety; they help students visualize abstract ideas, develop critical thinking skills, and increase their comprehension of mathematical principles.

V. Addressing Math Anxiety

As stated, persistent commitment from teachers towards actively considering ways to mitigate a student's math anxiety during class time is paramount, but as is the potential collaborative relationships these teachers can share with the parents of the students. By establishing open communication and coordinated, collaborative efforts, both parties can work together to provide the necessary support and resources to propel the student past their apprehension and towards success in mathematics. Building and refining my relationship with the parents of my students was indispensable in my pursuit to attenuate the effects of math anxiety in my classroom.

In working together, parents and educators can efficiently cater to the needs of kids to help them become more resilient learners. One strategy that both parties can cooperatively employ, Dr. Pagirsky of the Child Mind Institute notes, is to alter how they praise children and adjust what they think of as a successful learning experience. In other words, praising students for the work that they put in, not necessarily for the grade that they get, can be beneficial. Moreover, though trying to help children with their math homework may be anxiety-provoking for some parents, it is important for them to recognize that they use math reasoning in their daily lives more than they realize. Thus, parents of math students can expand on the momentum that teachers—with their use of in-class instructional strategies, such as manipulatives—have generated in class by using real-world examples to explore math concepts with their children (Ehmke, 2023).

VI. Evaluating the Effectiveness of Strategies

The effectiveness of a holistic teaching approach that is aimed at reducing apprehension can be evaluated through various lenses, considering factors such as student engagement, anxiety indicators, academic performance along with measuring progress based on class-oriented goals

made at the beginning of the school year. When measuring the success of such strategic instruction, teachers must be cognizant of the cues that their students make when faced with math related tasks; students with math anxiety display it in different manners, so identifying a disgruntled student's tendencies and measuring his or her departure from, or gravitation towards, that behavior over the course of the year. Examples of indicators of math anxiety include, but are not limited to: a student "shutting down" avoiding eye contact, having closed body language, or making self-critical comments such as "I'm bad at math" (Gearty).

In addition to identifying and monitoring indicators among their students, teachers have access to tangible results such as math quizzes, exams, homework, and student performance during math lessons. However, it is important to remember that these have limitations, given that some students with math anxiety nevertheless perform strongly in the subject and vice versa.

Finally, teachers can evaluate the success of their students relative to if they are on track to meet the math learning goals and or expectations that were set forth at the beginning of the school year. If a select student doesn't appear to be gravitating towards such desired results, then the primary educator can try to identify the basis for such academic shortcomings, and whether math anxiety had a role in producing them.

VII. Conclusion

The most effective remedy for mitigating and assuaging the effects of math anxiety is a multilayered approach that aims to empower students to overcome their distress and develop a positive relationship with mathematics. Such a calculated practice requires patience, empathy, and consistent support on behalf of the student's learning environment. Moreover, a thoroughgoing commitment towards alleviating a student's math anxiety entails active,

cooperative action by teachers and parents who seek to deepen their understanding of the disorder and as a result, can accommodate the student on a daily basis. Since tangible results associated with academic performance have their limitations, educators can assess and monitor their progress in reducing math anxiety among students by focusing on indicators such as increased participation in class, improved self-confidence, and enhanced academic performance in math-related assessments and assignments. This methodical process for teachers, aimed at limiting the effects of apprehension among students, is based on the prevailing positions and research that has been assembled regarding math anxiety. By implementing these approaches, teachers can create a nurturing learning environment that empowers students to overcome their math anxiety and develop a positive relationship with mathematics.

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