

Teaching Mathematics: Strategies for Improved Mathematical Performance

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Abstract: Due to its abstract nature with complex concepts and the need for precision, learning mathematics can be a challenging endeavor for many students. Unlike other subjects that rely on tangible objects, mathematics deals with theoretical constructs and requires a unique set of skills and approaches that makes it difficult to master. Failing to understand mathematical concepts may lead students to frustration and a sense of falling behind. However, the use of some simple strategies while learning mathematics enable students to understand mathematical concepts better. This article tries to explore some major challenges that students encounter while studying mathematics and discuss strategies to overcome these difficulties and become proficient in this subject.

Keywords: Mathematics, Challenges, Strategies, Concepts, Methods

1. Introduction

Mathematics has always been challenging for many students. This difficulty is not just limited to students who dislike the subject. Even those who enjoy math can find the subject hard to understand at times. One of the major challenges of learning mathematics is the abstract nature of the subject. Unlike other subjects where concepts can be visualized, math concepts are often difficult to grasp since they are not tangible. Students often find themselves struggling to understand these concepts. The intricacies of mathematical concepts, equations and proofs may appear quite frustrating for students to comprehend fully. Also, complex formulas, equations, and problem-solving techniques requires logical thinking; thus, mathematics can intimidate students.

Another challenge of learning mathematics is the need for precision. While other subjects accept a close approximation, math requires exact answers. It is true to say that one small error can result in an incorrect answer in mathematics; for that reason, this can be frustrating for students who try to get the precise answer. The pace of instruction in mathematics learning holds a significant place. Teachers have to make sure that they do not move quickly through lessons and ensure that students have a firm grasp of previous concepts. Fast pace of instruction is overwhelming for students who are struggling to keep up. With this

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in mind, the use of a variety of methods to explain concepts would be a good idea in order to help students understand better because some students may find that certain methods work better than others. In this article, I will try to discuss some of the challenges of learning mathematics and how to overcome them.

2. Literature Review

Despite its difficulty, through practicing regularly and with positive mindset and proper guidance students can overcome the obstacles and struggles they face in learning mathematics. It should be borne in mind that learning mathematics requires repetition to master so practice is indispensable. Moreover, breaking down problems into smaller parts, seeking for help when needed, and applying real-world examples are useful strategies to overcome learning difficulties. Providing extra assistance to students who are struggling can make math more accessible. In particular, one-on-one instruction plays a major role in facilitating comprehension of mathematics as students receive personalized guidance to tailor their learning needs (Mathunya, 2023). Students foster their confidence towards problem solving and they find themselves in a comfortable environment. And the provision of immediate feedback in one-on-one instruction greatly helps students develop their academic performance in math. It is crucial in mathematics learning to build a solid foundation starting from fundamental concepts and move to more advanced problems. It goes without saying that patience and persistence are major tools that will lead students to success in mathematics learning.

Farren (2008) argues that many students find mathematics boring, and hard to relate to due to the lack of real-world application in instruction. The abstract nature of mathematics makes it difficult for students to apply it for real-world situations. However, mathematics is being used in many different fields, so it is a crucial step for students to understand the real-world applications of it. If students have an idea about how math is used in the real world, it will be easy for them to comprehend the concepts they are learning at school. And if students see the relevance of mathematical concepts they are learning to their lives, they will be more motivated and develop a sense of purpose. Gallenstein (2005) stated that, “teachers need to connect science and mathematics knowledge to real-life situations...for children to have a greater appreciation for the content” (p. 38). A connection between mathematics and everyday life increases engagement and allows students to remember and recall key concepts.

The use of visual aids is useful to understand abstract concepts in mathematics. The use of diagrams and graphs can illustrate abstract ideas and make them more relatable for students. Moreover, the use of visual aids connects the abstract concepts to the real world and make learning more tangible. Quite many students may think that the use of some concepts such as imaginary numbers and infinity are not connected to real-world applications. Visual aids help students to create a link between abstract mathematical concepts and practical experiences and facilitate comprehension. Bowes (2010) stresses that “Technology supports achievement, enabling learners to be independent, competent and creative thinkers, as well as effective communicators and problem solvers” (p.1). Also, the creation of an engaging learning environment is beneficial for students to enjoy learning and promote a deeper comprehension of mathematical concepts. The implementation of visual aids helps students to visualize abstract concepts, discuss them with their peers and develop different perspectives.

For students to understand subsequent lessons, it is important to understand each concept being taught. In other words, mathematics builds on itself. Failing to understand a previously learned topic may not allow students to understand the upcoming topics. This can be overwhelming for students' achievement. Struggling with a particular topic will not enable students to understand the upcoming topics; thus, the new topics will become more intricate, and students may find themselves falling behind. It is important to address these challenges early on through regular practice and seek help when needed. Reinforcement of foundational skills, and receipt of personalized guidance are crucial ideas to regain confidence and develop a solid mathematical foundation.

Mathematics requires solving problems. Problem-solving is defined as “engaging in a task for which the solution method is not known in advance. In order to find a solution, students must draw on their knowledge, and through this process, they will often develop new mathematical understandings” (NCTM, 2000, p.52). For that reason, it necessitates critical thinking and analytical reasoning. However, many students may be overwhelmed while problem-solving due to lack of strategies and effective approaches. Unless these challenges are overcome, students may experience confusion and discouragement. However, teaching students problem-solving techniques is a useful strategy to help them with their problem-solving skills. Also, teaching them to break down problems into smaller components will benefit them with their critical thinking development thus solve the problems with ease.

Research suggests that effective instruction plays a key role in helping students to understand mathematics and to become successful (Sanders, 1998; Boaler, 2002). Strategies used by teacher while teaching are tools that ensure the achievement of the objectives. Activities carried out in a mathematics classroom, and instructional time allows students to enhance problem-learning strategies and reasoning skills. Moreover, effective teaching practices are essential for students to develop meaningful learning experiences and foster mathematical thinking. These skills will make a difference in mathematics learning. Effective instruction contributes to the following abilities:

- a) **Building conceptual understanding:** Effective instruction in the mathematics classroom assists students to foster a strong conceptual understanding of concepts. Teachers can facilitate students' comprehension of mathematics through well-planned lessons. Participation in discussions, and problem-solving activities enables students to connect abstract mathematical concepts with concrete experiences. Simply put, students improve deeper understanding while exploring real-world applications.
- b) **Fostering problem-solving skills:** Effective classroom instruction gives way to the enhancement of problem-solving skills. Teachers guide their students in employing the right strategies and analyzing the problems to find solutions. Furthermore, collaborative problem-solving activities are useful for students in that they foster logical reasoning and critical thinking. Encouraging students to work cooperatively with their peers in the classroom is a significant tool for dealing with complex mathematical problems (Davidson, 1990). Additionally, diverse learning needs of students should be taken into consideration and teachers need to provide differentiated approaches to address them. According to Grimes (2009), “Differentiated instruction is a teaching method used to meet the diverse needs of learners. Teachers implementing this method provide instruction for individuals or groups of students to benefit both those who find academic concepts difficult

and those who find them easy” (p. 677). The implementation of various instructional strategies leads to increased engagement of students in the classroom and improved mathematical performance.

- c) Improving mathematical communication: Effective communication skills while problem-solving deepens understanding of students. With this in mind, teachers need to create discussions in the classroom where students discuss how to solve problems. Group problem-solving activities stimulates students to apply their mathematical thinking skills (Artzt & Armour-Thomas, 1992). In other words, the development of communication skills helps students collaborate, justify solutions, and solve problems better.
- d) Cultivating mathematical confidence: Building mathematical confidence holds a very significant place in learning. Without self-confidence, it is not easy for students to succeed. For that reason, creating a supportive classroom environment is essential in mathematics classroom. Clear explanations, repeated practice, effective construction, and constructive feedback are tools which are required for the development of confidence. Needless to say, confidence and motivation creates a sense of accomplishment.

In addition, there are some other characteristics which are required for effective instruction:

- a) Introduction: An opening activity to see the prior knowledge of students can help teachers to focus on what and how students need to learn.
- b) Improvement of skills: The participation in instructional activities contributes to the development of skills to understand mathematical concepts.
- c) Guided practice: Group works allow students to discuss the problems together. With the help of these activities, students find an opportunity to check on their understanding.
- d) Independent practice: Individual practice is necessary to help students master mathematical skills. While working on problems, students reinforce their mathematical skills.

Teacher’s role has always been at the core in mathematics learning (Nabayra & Sagge, 2022). Engaging students, listening to their problems carefully and helping them with their challenges, clarifying and explaining, and trying to develop their thinking are all essential tools students need to struggle with their difficulties. Mathematics is not popular for most students; however, the way a teacher teaches it can eradicate the negative attitudes and perceptions against the subject. To put it in another way, teacher’s role is a key element for students to construct mathematical meaning (Hudson et al., 2006).

3. Conclusion

Despite its popularity among students, it is possible to combat against the negative attitudes about mathematics through using some strategies. The use of technology is a useful way to engage students because its incorporation can create fun and enhance their chances of being successful. Breaking down problems into smaller components, applying real-world examples, one-on-one-instruction are fundamental strategies to help students with their learning. Repetition plays a major role to master thus, practice is indispensable. Problem-solving activities are essential, so teachers need to guide their students to develop problem-learning strategies and reasoning skills.

References

- Artzt, A. F., Armour-Thomas, E., & Curcio, F. R. (2008). *Becoming a reflective mathematics teacher*. New York: Lawrence Erlbaum Associates.
- Bowes, K. (2010). Technology: Its place in math standards and getting it there. Retrieved from: users.math.umd.edu/~dac/650/bowespaper.html#National Council of Teachers
- Boaler, J. (2002). *Experiencing school mathematics: Traditional and reform approaches to teaching and their impact on student learning*. Mahwah, NJ: Lawrence Erlbaum.
- Davidson, N. (Ed.). (1990). *Cooperative learning in mathematics: A handbook for teachers*. Menlo Park, CA: Addison-Wesley.
- Farren, V. (2008). A reflection on my teaching practices using students' math moments. *College Quarterly*, 11(4), 74-81.
- Gallenstein, N. (2005). Engaging young children in science and mathematics. *Journal of Elementary Science Education*, 17(2), 27-41.
- Grimes, K., & Stevens, D. (2009). Glass, bug, mud. *Phi Delta Kappan*, 90 (9), 677-680.
- Hudson, P., Miller, S., & Butler, F. (2006). Adapting and merging explicit instruction within reform-based mathematics classrooms. *American Secondary Education*, 35(1), 19-32.
- Mathunya, M. (2023). Teaching Mathematics at the Supplementary Schools in Lesotho: Teachers' Perceived Benefits and Challenges. *Canadian Journal of Educational and Social Studies*, 3(1), 49-65. <https://doi.org/10.53103/cjess.v3i1.102>
- Nabayra, L. J., & Sagge, R. G. (2022). The Mathematics Teaching Performance of Scholar Education Graduates in Selected Public Schools in the Philippines: An Explanatory Sequential Mixed Method Study. *Canadian Journal of Educational and Social Studies*, 2(4), 23-36. <https://doi.org/10.53103/cjess.v2i4.47>
- National Council of Teachers of Mathematics. (2000). *Principles and standards for school mathematics*. Reston, VA: Author.
- Sanders, C. (1998). Geometric constructions: Visualizing and understanding geometry. *Mathematics Teacher*, 91, 554-556.