



MATHEMATICAL PERSISTENCE: THE MISSING LINK BETWEEN MATHEMATICS AND SCIENCE ACHIEVEMENT

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ABSTRACT

Success in science is often associated with strong mathematical ability. However, recent educational research suggests that persistence may be equally important in determining student achievement. Mathematical persistence refers to a learner's willingness to continue solving problems despite difficulties, setbacks, or uncertainty. This article examines the importance of mathematical persistence in science learning and highlights how perseverance influences students' confidence, problem-solving skills, and academic success. Drawing from classroom observations and current educational literature, the discussion emphasizes the role of collaborative learning, resilience, and supportive learning environments in strengthening students' engagement with challenging mathematical and scientific concepts. As schools prepare learners for the demands of STEM education and future careers, fostering persistence becomes as essential as teaching content knowledge. Ultimately, students who learn to persevere through challenges are better equipped to succeed not only in mathematics and science but also in life.

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Mathematics has long been regarded as the language of science. Whether students are interpreting graphs, analyzing experimental data, or solving quantitative problems, mathematical thinking forms the foundation of scientific understanding. Yet many learners who demonstrate adequate mathematical knowledge often struggle when faced with complex scientific tasks. This observation suggests that success in science may depend on more than cognitive ability alone. Educational researchers have increasingly recognized that persistence—the willingness to continue learning despite challenges—plays a crucial role in academic achievement. According to Maamin et al. (2021), mathematical competence remains a strong predictor of STEM success, but students must also possess the determination to apply their knowledge when confronted with difficult problems.

Among Grade 7 learners, persistence is often most evident during collaborative learning experiences. Students tend to demonstrate greater confidence and motivation when working alongside their peers, where ideas can be shared and challenges can be addressed collectively. Research by Sofroniou and Poutos (2016) supports this observation, emphasizing that collaborative learning promotes critical thinking, communication, and problem-solving skills. In group settings, learners are encouraged to persist because mistakes become opportunities for discussion rather than sources of frustration. Such environments help

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students view challenges as manageable and encourage them to remain engaged even when solutions are not immediately apparent.

Despite the benefits of collaboration, many students encounter difficulties when solving mathematical problems independently. Uncertainty, fear of failure, and low confidence often discourage learners from persisting through challenging tasks. Ogbu and Ugwu (2023) describe mathematical persistence as the ability to sustain effort despite obstacles and setbacks. Learners who possess this quality continue searching for solutions, seek help when necessary, and remain motivated even after repeated errors. Conversely, students with low persistence are more likely to abandon tasks prematurely, limiting opportunities for growth and mastery. This issue becomes particularly significant in science education, where independent reasoning and sustained problem-solving are frequently required.

The importance of persistence extends far beyond mathematics classrooms. Scientific inquiry itself demands resilience, as experimentation, investigation, and discovery often involve repeated attempts before success is achieved. Students who develop persistence learn to embrace challenges, adapt to difficulties, and maintain confidence in their abilities. Teachers can nurture these behaviors through inquiry-based activities, guided problem-solving tasks, constructive feedback, and classroom cultures that view mistakes as part of the learning process. By fostering persistence alongside academic skills, educators help students become more independent, reflective, and capable learners prepared for the demands of STEM education and future careers.

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Conclusion

Mathematical persistence is more than a desirable academic trait—it is a critical component of student success in mathematics, science, and beyond. While content knowledge remains important, learners must also develop the resilience to continue learning when confronted with challenges. Schools that intentionally cultivate persistence empower students to approach difficult tasks with confidence, curiosity, and determination. As educators strive to improve science achievement and strengthen STEM education, equal attention should be given to developing perseverance, ensuring that students understand that meaningful learning is achieved not simply by finding the right answer, but by refusing to stop searching for it.

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