

Difficulties Faced by Secondary School Students in Recent Innovations in Mathematics and Science

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Abstract

Recent innovations in mathematics and science education have introduced new teaching approaches, digital technologies, interactive learning tools, virtual laboratories, simulation-based activities, and problem-solving strategies into secondary schools. Although these innovations can make learning more engaging and effective, students may face various difficulties in adapting to rapidly changing educational practices. This study examines the major challenges experienced by secondary school students while learning mathematics and science through recent innovative methods. The difficulties may include inadequate technological skills, limited access to digital devices and reliable internet connectivity, lack of familiarity with new learning platforms, difficulty understanding abstract concepts through unfamiliar approaches, and insufficient individual guidance. Students may also experience anxiety when using technology or participating in inquiry-based and collaborative learning activities. Differences in learning abilities, language barriers, limited classroom resources, and inadequate opportunities for practical experimentation can further influence students' learning experiences. In mathematics, students may struggle with technology-assisted problem solving, mathematical modelling, and interpretation of digitally presented information. In science, difficulties may arise in understanding simulations, conducting virtual experiments, interpreting scientific data, and connecting theoretical concepts with practical applications. The study emphasizes the importance of appropriate teacher training, accessible learning resources, student-centred instructional strategies, and continuous academic support. Addressing these difficulties can help students develop confidence, critical thinking, problem-solving abilities, scientific reasoning, and mathematical competence. Effective implementation of educational innovations therefore requires consideration of both technological development and the diverse learning needs of secondary school students.

Keywords: Secondary school students, mathematics education, science education, educational innovation, digital learning, technology integration, learning difficulties, virtual laboratory, problem solving, scientific reasoning.