ARTIFICIAL INTELLIGENCE FOR PERSONALIZED MATHEMATICS LEARNING IN SRI LANKAN SECONDARY EDUCATION: A RAPID REVIEW OF OPPORTUNITIES AND CHALLENGES

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Abstract

Artificial intelligence (AI) is increasingly applied in mathematics education through adaptive learning systems, intelligent tutoring systems, chatbots, and automated feedback. However, evidence on AI-supported personalized mathematics learning in Sri Lankan secondary education remains limited. This rapid review aimed to synthesize recent evidence on the opportunities and challenges of AI-supported personalized mathematics learning and to examine what this evidence implies for Sri Lankan secondary mathematics education. Academic databases were searched for papers published between 2020 and 2026 using keyword combinations related to AI, personalized and adaptive learning, mathematics education, and secondary education. Fifteen papers were selected for synthesis based on their relevance to these areas. A structured extraction framework covering educational context, participants, research design, AI technology, personalization mechanisms, findings, limitations, and relevance to Sri Lanka was applied to the selected papers. A narrative synthesis was used because the papers varied in design, technology, educational setting, and outcomes. The evidence was organized into four themes: personalization and adaptive learning; mathematics learning and problem-solving; teacher capacity and implementation; and equity, ethics, and risks. The literature indicates that AI-supported systems can provide differentiated learning pathways, individualized feedback, adaptive support, and assistance with mathematical problem-solving, while teacher AI literacy, pedagogical integration, infrastructure, equitable access, data privacy, and potential over-reliance on AI were identified as important implementation considerations. The included evidence contained a Sri Lankan study describing an AI-supported personalized mathematics learning system for Grade 10–11 students, incorporating placement-based learning packages, chatbot assistance, and feedback. The findings highlight the need for context-sensitive implementation and further classroom-based empirical research to inform the adoption of AI-supported personalized mathematics learning in Sri Lankan secondary education.

Keywords: Artificial intelligence, Mathematics education, Personalized learning, Secondary education, Sri Lanka