Artificial Intelligence in Secondary Mathematics Classrooms: Insights from a Scoping Review

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Despite numerous advancements in educational methods, mathematics remains a challenging subject for many students worldwide (Li & Schoenfeld, 2019). It is typically perceived as difficult and accessible only by those who are deemed "smart" (Boaler, 2022). Traditional teaching approaches that emphasise memorising procedures over developing a deep conceptual understanding of mathematics do not accommodate diverse learners, resulting in significant achievement gaps among students (Mohamed et al., 2022). In addition, traditional mathematics education, defined by the disconnect between school mathematics and real-world applications, does not support the learning of all students (Banerjee et al., 2025). In recent years, artificial Intelligence (AI) has rapidly gained attention in the educational sector. In mathematics education particularly, the potential of AI tools offers new affordances for students, from personalising learning to adaptive assessment (Opesemowo & Ndlovu, 2024), real-time feedback (Opesemowo & Ndlovu, 2024), to building problem-solving capacity (Thanasi & Mema, 2024), and providing interactive learning environments (Opesemowo & Ndlovu, 2024). However, the integration of AI into mathematics education remains understudied. There is limited research which synthesises the outcomes and impacts of AI use within secondary mathematics classrooms. To address this gap, a scoping review has been conducted to identify AI use in secondary mathematics classrooms by examining teacher practices and AI impact on student outcomes. This presentation will report the findings of the scoping review, addressing the research question: *How has AI been used in secondary mathematics settings?*

References

Banerjee, A. V., Bhattacharjee, S., Chattopadhyay, R., Duflo, E., Ganimian, A. J., Rajah, K., & Spelke, E. S. (2025). Children's arithmetic skills do not transfer between applied and academic mathematics. *Nature*. https://doi.org/10.1038/s41586-024-08502-w

Boaler, J. (2022). *The elephant in the classroom: Helping children learn and love maths* (Revised and updated UK edition). Souvenir Press.

Li, Y., & Schoenfeld, A. H. (2019). Problematizing teaching and learning mathematics as "given" in STEM education. *International Journal of STEM Education*, *6*(1), 44, s40594-019-0197–0199. https://doi.org/10.1186/s40594-019-0197-9

Mohamed, M. Z. B., Hidayat, R., Suhaizi, N. N. B., Sabri, N. B. M., Mahmud, M. K. H. B., & Baharuddin, S. N. B. (2022). Artificial intelligence in mathematics education: A systematic literature review. *International Electronic Journal of Mathematics Education*, *17*(3), em0694. https://doi.org/10.29333/iejme/12132

Opesemowo, O. A. G., & Ndlovu, M. (2024). Artificial intelligence in mathematics education: The good, the bad, and the ugly. *Journal of Pedagogical Research*, 3. https://doi.org/10.33902/JPR.202426428

Thanasi, T., & Mema, O. (2024, May 17–18). Enhancing mathematics education with artificial intelligence. *EIRP Proceedings: 19th International Conference on European Integration – Realities and Perspectives*, Galați, Romania. https://dp.univ-danubius.ro/index.php/EIRP/article/view/509

(2026). In N. Berger, M. Thompson, J. Ley & C. Wilsmore (Eds.), *Beyond boundaries: Strengthening futures in mathematics education. Proceedings of the 48th annual conference of the Mathematics Education Research Group of Australasia, Sydney* (p. 481). MERGA.