AI FOR SUPPORTING MATHEMATICS LEARNING

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Introduction and Background

Mathematics continues to be regarded as a foundational discipline, even amid rapid technological change and the ongoing effort to adapt educational practices to new challenges brought about by the emergence of artificial intelligence assistants. Concerns regarding how mathematics is taught and learned have long engaged researchers, teachers, and parents alike. In recent years, technological developments have prompted a rethinking of instructional approaches, particularly as AI tools are increasingly used to support students' learning processes and to promote deeper engagement with mathematics.

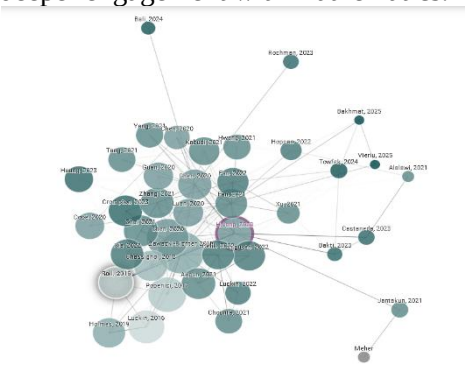

Figure 1. Bibliometric Network of AI in Mathematics Education.

Methodology

The study examined both AI tools specifically designed for mathematics learning and general-purpose systems that can be adapted for this purpose. Relevant sources were selected to identify how existing research describes and evaluates the role of AI in mathematics education. The overarching aim was to synthesize current findings and to highlight trends that illustrate how artificial intelligence is being integrated into mathematics teaching and learning.

Results

Previous work includes systematic reviews that map the evolution of AI applications in mathematics education [1]. A noticeable rise in publications on this topic has been recorded in recent years, with mathematics education emerging as a particularly active area of inquiry (Figure 1). Findings reported across studies suggest that AI can enhance student engagement, improve the precision of instructional feedback, and support pedagogical decisions informed by data [2]. Commonly referenced tools include ChatGPT, algorithmic learning platforms, and a variety of specialized applications such as Photomath, Mathway, WolframAlpha, Symbolab, MathSolver, Yippity, Magic School AI, and Curipod.

Conclusions and Implications

AI systems cannot function independently within educational contexts; their effectiveness depends on thoughtful integration into a broader instructional framework in which the teacher remains central. Key concerns—ranging from reduced opportunities for creativity and critical thinking to issues of algorithmic transparency, data privacy, emotional disconnect, and unequal access—underscore the need for careful, responsible implementation. The literature indicates that meaningful use of AI in mathematics education requires transparency, equitable access, and active collaboration among educators, researchers, policymakers, and developers. Ultimately, AI integration must align with core pedagogical principles to ensure that learning remains purposeful and relevant. The teacher's role therefore, remains crucial, both in terms of willingness to incorporate AI tools and in developing the competencies necessary to use them effectively.

Keywords: *artificial intelligence, adaptive learning, mathematics education*

References

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