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Pre-Service Teachers' Competency in Teaching Early Mathematics through Intensive Training Workshop: AI-generated Picture Books

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Abstract

This mixed-methods study examined the effectiveness of Artificial Intelligence (AI)-generated mathematics picture books in enhancing pre-service teachers' competence in teaching early mathematics, as well as fostering children's interest in learning early mathematics. The project consisted of two stages. In the first stage, pre-service teachers (N = 27, 100% female) participated in four 2-hour intensive workshops focused on using AI tools to create mathematics picture books. A self-constructed questionnaire was used to assess their self-perceived competence in teaching early mathematics, employing a pretest–posttest design. In the second stage, the teachers (N = 10, 100% female) were randomly chosen to implement their AI-generated books during their teaching practicum. Semi-structured individual interviews were conducted to explore their experiences and perceptions of the effectiveness of these books in teaching and fostering children's learning in early mathematics. The findings indicated that AI-generated mathematics picture books enhanced pre-service teachers' competence while also supporting children's engagement in early mathematics learning. This study provides insights into teacher training in using AI tools and informs curriculum development, assessment, and future research in teaching early childhood mathematics.

Keywords: Children's engagement; Mixed-methods; Teacher education ; Teaching competence; Teaching practicum