



3rd Global Conference on Innovations in Education

June 20-22, 2025

Singapore, Singapore

Evaluating AI Competencies in Pre-Service Teachers through the TPACK Framework

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ABSTRACT

This study aims to apply the TPACK framework to evaluate the AI competencies of pre-service teachers. A questionnaire was used to analyse the data. Research indicates that pre-service teachers generally exhibit competence in AI. In terms of AI content knowledge, they demonstrate an ability to utilise AI for self-directed learning and understand its application in teaching. However, their grasp of AI algorithms remains limited. Concerning AI pedagogical knowledge, pre-service teachers can adapt the use of AI tools based on students' needs and instruct them in using these tools safely. Nevertheless, they lack sufficient knowledge to promote critical thinking and problem-solving skills through AI. In the technological content aspect, pre-service teachers can learn to create or modify settings to meet teaching requirements. However, they display limited proficiency in developing interactive learning resources with AI. These findings highlight the need for professional development aimed at enhancing AI-related competencies, particularly in algorithmic understanding and pedagogical strategies that facilitate deeper learning. Addressing these deficiencies will better prepare pre-service teachers to fully leverage the potential of AI in educational settings.

Keywords: AI Competencies; AI Literacy; Pre-service teachers; Professional development; TPACK