

SCHOOL OF EDUCATION & PROFESSIONAL STUDIES

# Disciplined Inquiry in Education Seminar Series

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Literacy Center Balcony

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## **From Teacher-Crafted to AI-Supported: Cognitive Apprenticeship in Questioning for Middle School Mathematics**

**Abstract.** This qualitative case study explores how four in-service mathematics teachers engaged with generative AI to design probing questions for a middle school algebra task. It applies the framework of cognitive apprenticeship to understand how generative AI can support teachers in developing questioning strategies by modeling expert thinking, scaffolding task decomposition, and prompting reflective practice. Thematic analysis of class discussions and written reflections revealed that AI facilitated aspects of cognitive apprenticeship, such as articulation of reasoning and exploration of multiple solution paths. However, AI-generated questions often lacked cultural relevance, emotional sensitivity, and responsiveness to students' prior knowledge. This study contributes to the field of Artificial Intelligence in Education by demonstrating how AI-mediated cognitive apprenticeship can enhance teacher learning and discusses its limitations.

