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AI Tutoring Outperforms Active Learning

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Abstract

Advances in generative artificial intelligence (GAI) show great potential for improving education. Yet little is known about how this new technology should be used and how effective it can be. Here we report a randomized, controlled study measuring college students' learning and their perceptions when content is presented through an AI-powered tutor compared with an active learning class. The AI tutor was developed with the same pedagogical best practices as the lectures. We find that students learn more than twice as much when using an AI tutor, compared with the active learning class. They also feel more engaged and more motivated. These findings offer empirical validation for the efficacy of AI-powered pedagogy in significantly enhancing learning outcomes, presenting a compelling case for its broader adoption in educational settings.

Keywords: AI, active learning, STEM education, pedagogy