

Exploring Gender Disparities in Engineering Curricula through Ai-enhanced Learning Technologies

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Abstract

The use of artificial intelligence (AI) in higher education is changing how engineering curricula is taught through intelligent tutoring systems, coding assistants, and adaptive systems. While these new technologies are marketed as tools to improve student achievement and engagement, they can have unstudied effects on gender equity. This paper explores if AI-based learning tools promote women's confidence, persistence, and performance in engineering education, or if the hidden biases built into their design reproduce existing inequities. We use a mixed-methods design that combines quantitative data analyses of student performance, platform usage logs, and self-efficacy survey measures with qualitative interviews and focus groups. We situate our study in a core module that represents high-dropout rates, programming, mathematics, and mechanics, to evaluate how AI is used differently with male and female students. The initial findings indicate that while AI platforms offered personalized support that may increase women's engagement, issues with trust, biased feedback, and accessibility to the platform were key drawbacks. This study adds to the growing scholarship on equity in digital higher education, providing evidence of both the opportunities and challenges of implementing AI. We end with some suggestions for educators, policymakers, and designers about how to implement AI learning environments to promote engagement and equitable outcomes for women in engineering.

Keywords: Women in Engineering, Artificial Intelligence, Higher Education, Intelligent Tutoring Systems, Adaptive Learning, Gender Equity, Engineering Curricula