Project Title

Understanding How Mechanical and Industrial Engineering Students Use Generative AI for Learning

Project Description

Generative Artificial Intelligence (AI) tools such as ChatGPT, Claude, and Copilot are rapidly changing how engineering students learn, solve problems, complete assignments, and prepare for assessments. While these tools have the potential to enhance learning and productivity, concerns remain regarding their impact on conceptual understanding, problem-solving skills, critical thinking, and the development of engineering expertise.

This research project aims to investigate how Mechanical and Industrial Engineering students use generative AI throughout their academic studies. The project will explore when and why students turn to AI tools, the types of tasks for which AI is used, students' perceptions of AI-generated assistance, and how different patterns of AI use influence learning outcomes, confidence, and skill development.

The research assistant will contribute to the design and implementation of a mixed-methods study involving surveys, interviews, focus groups, classroom observations, and learning analytics. Potential research questions include:

- How frequently do engineering students use generative AI tools?
- For what purposes do students use AI (e.g., learning concepts, solving problems, coding, report writing, exam preparation)?
- What types of AI interactions support meaningful learning, and which may contribute to overreliance or cognitive offloading?
- How do students evaluate the accuracy and trustworthiness of AI-generated responses?
- How do patterns of AI use differ across academic years, courses, and learning contexts?
- What strategies can educators implement to encourage AI-assisted learning while preserving critical thinking and problem-solving skills?

The project will involve data collection, qualitative and quantitative data analysis, literature reviews, and the development of evidence-based recommendations for AI integration in engineering education. Students will gain experience in educational research methods, survey design, interview techniques, statistical analysis, thematic coding, and human-centered AI research.

This project is particularly suitable for students interested in engineering education, artificial intelligence, learning sciences, human-computer interaction, educational technology, or the future of engineering practice. Findings from this work will contribute to the development of learning-aware AI systems and instructional approaches that leverage AI while supporting long-term student learning and professional skill development.

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