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Call for Papers

Reimagining Engineering Pedagogy: Balancing Cognitive Development and Generative AI in Computational Learning



The rapid integration of Generative AI tools has created a paradigm shift in engineering education. In disciplines rooted in logic, mathematics, and computational thinking, such as programming, computational systems design, and embedded systems, GenAI can instantly provide solutions. While this accelerates development, it risks bypassing the critical human cognitive learning curve that consists of the process of observing, rationalizing internal thoughts, and externalizing knowledge. Denying students AI access slows down technical mastery, yet uncritical access risks cognitive dependency. This Collection aims to explore how formal engineering classrooms must maintain their core rigor while transforming their pedagogical frameworks. It aims to gather research on how educators can design learning spaces where students utilize AI as an accelerant without sacrificing the essential "inner voice" of cognitive rationalization and problem-solving. We invite original research, conceptual frameworks, case studies, and reviews on topics including redesigning hardware/software laboratory assessments to evaluate process over output, pedagogical frameworks integrating GenAI while preserving student verbalization, the impact of GenAI on student cognitive load, hybrid instructional designs, and innovative assessment strategies to counter AI-assisted plagiarism.

Guest Editor:

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