

Thinking Before Tools: A Human-Centered Framework for Cognitive and Motivational Engagement with Generative AI

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Abstract

The rapid integration of generative artificial intelligence (GenAI) into educational settings has intensified longstanding questions about how learners cognitively and motivationally engage with intelligent systems. Drawing on Bandura's reciprocal determinism, this research-in-progress investigates the dynamic interplay between learners' personal beliefs about AI, their behavioral patterns of engagement, and the environmental expectations that shape human-AI collaboration. Informed by informal action research in both instructional and professional contexts, the researcher observed how participants interacted with AI tools and collected their spontaneous verbal reflections. Two contrasting patterns quickly emerged: the use of GenAI as a cognitive shortcut aimed at minimizing mental effort, and its use as a genuine thinking partner that supports reflection, idea generation, and deeper processing. Preliminary observations indicate that when AI is explicitly framed as a tool that augments rather than supplants human reasoning, learners tend to exhibit higher levels of engagement, more critical scrutiny of AI-generated outputs, and a stronger sense of authorship over their work. Building on these insights, the study will develop and test structured instructional approaches that prioritize "thinking before tools," foster ethical AI literacy, and incorporate guided metacognitive reflection. By integrating Cognitive Load Theory, Cognitive Dissonance Theory, and Self-Determination Theory, this work aims to contribute a practical, human-centered framework for designing learning environments that harness GenAI without eroding learners' agency, critical thinking, or intrinsic motivation.

Keywords: Artificial Intelligence; Cognitive Engagement; Human-AI Collaboration; Motivation; Self-Determination