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INSIGHTS

Learning with Generative AI: Making Thinking Harder, Not Easier

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Whether universities endorse generative artificial intelligence (GenAI), restrict it, or remain silent, learners have already integrated it into everyday study. The key question is no longer whether GenAI should be allowed, but how it should be used so that learning improves rather than erodes.

Educational outcomes depend not on access to GenAI, but on patterns of use - what learners ask it to do, how they engage with its outputs, and whether their own thinking is strengthened or displaced. The most serious risk is not only academic misconduct, but cognitive offloading: shifting reasoning, sense-making, self-monitoring, and judgment to systems that generate fluent answers without accountability. Used primarily as an answer machine, GenAI can create an illusion of mastery while weakening understanding.

Yet GenAI also presents real opportunity. Used deliberately, it can function as a cognitive amplifier rather than a substitute - prompting explanation, retrieval, comparison, critique, and refinement of ideas. This article argues that GenAI should increase cognitive effort, deepen reasoning, and strengthen self-regulated learning. The goal is not to make thinking easier, but to make learning more effortful, more reflective, and more durable.

Using GenAI to Strengthen, not Replace, Thinking

Learning is inherently effortful. Durable understanding develops through retrieval, struggle, feedback, and reflection - not by consuming more content, but by engaging with uncertainty, making judgments, correcting errors, and trying again. GenAI can either support this process or quietly undermine it.

In one common pattern, learners ask GenAI for final answers and mistake fluent output for understanding. Systems provide an explanation or plan, and they move on. This use displaces cognitive work where learning matters most, compressing reasoning into conclusions and encouraging passive consumption over active sense-making.

In a more productive pattern, learners use GenAI to make thinking harder. They ask questions rather than answers, challenge their reasoning, surface missing information, and invite structured critique. Here, GenAI adds educational value by creating useful struggles -slowing premature closure and forcing learners to articulate, inspect, and refine their thinking.

The difference lies less in the model than in learner intent and task framing. The same tool can either shortcut learning or deepen it, depending on how it is used. This distinction underpins three recurring confusions in learning with GenAI.

Three Confusions in Learning with GenAI

The first confusion is between cognitive offloading and desirable difficulty. Cognitive offloading occurs when GenAI does mental work and learners passively consume outputs. Desirable difficulty arises when the tool increases effort in ways that strengthen memory, reasoning, and transfer. GenAI supports learning only when it preserves learners' cognitive workload.

The second confusion is between fluency and understanding. GenAI outputs are often coherent and well structured, but fluency is not comprehension. Understanding requires reconstructing ideas, integrating prior knowledge, and applying them across uncertainty and context.

The third confusion is between plausibility and accuracy. Responses may sound reasonable yet be incomplete, inappropriate, or wrong. GenAI excels at persuasive plausibility - even when claims have not been verified or earned epistemic trust.

The principle is simple: GenAI should force explanation, expose gaps, and challenge assumptions, not supply final conclusions learners cannot justify.

A Three-Purpose Framework for Learning with GenAI

Most learners who use GenAI fall into three purposes: inquiry, practice, and production. Educational impact depends less on the tool itself than on which purpose dominates and how deliberately interactions are structured.

Inquiry use helps learners orient themselves - asking "why" and "how" questions, simplifying concepts, or comparing mechanisms. It supports learning only when outputs are treated as provisional explanations that require verification, given risks of oversimplification and unverified claims.

Practice use is often the most educationally powerful. When learners use GenAI to generate questions, simulate cases, test hypotheses, or receive feedback, it supports retrieval and

deliberate practice through cycles of attempt and revision. In this mode, GenAI works best as a learning partner, not an answer key.

Production use supports drafting, summarizing, or improving clarity. The key risk is not assistance itself, but outsourcing judgment. Production support is educationally sound only when learners remain accountable for meaning, accuracy, and interpretation.

Taken together, these purposes explain why debates about GenAI often stall. The same tool can enable shallow offloading or deep learning; outcomes depend on intent, framing, verification, and sustained cognitive engagement.

Risks, Skills, and Responsibilities

Learners' concerns about GenAI are well founded. Common worries include accuracy and hallucination, overreliance and deskilling, and uncertainty around academic integrity. These concerns are not resistance to innovation; they signal that learners have not yet been taught how to use GenAI effectively and responsibly.

GenAI use is a learned skill, not an instinct. Most learners acquire it informally, leading to shallow prompting, over-trust of fluent outputs, minimal verification, and weak metacognitive monitoring. This gap matters because GenAI is persuasive - it can create a false sense of understanding without cognitive work required for deep learning.

Responsible learning with GenAI therefore requires explicit skill development. Learners must verify claims proportionally to risk, prompt for reasoning rather than answers, monitor their own cognition, and disclose GenAI use transparently as a form of professional accountability.

These competencies align with international guidance emphasizing critical judgment, verification, bias awareness, accountability, and human oversight (Miao & Shiohira, 2024), and reflect a core professional principle: responsibility cannot be delegated to systems that do not bear consequences.

Conclusion

Generative AI is already embedded in learning environments. The core challenge is not its presence, but unskilled use that displaces thinking while appearing to support it. The solution is deliberate learning design that keeps reasoning, judgment, and humane accountability central. GenAI improves learning when it challenges reasoning, supports practice, and reinforces verification rather than supplying answers. Teaching learners to use GenAI effectively and responsibly is now a core educational responsibility. In a GenAI-rich world, the future of education will depend less on tool capability than on whether learning continues to demand harder, deeper, and more accountable human thinking - even as machines become more capable.

Reference

Miao, F., & Shiohira, K. (2024). *AI competency framework for students*. UNESCO Publishing.

** Edited with ChatGPT for clarity; all views expressed are solely those of the author.*
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