

## Super-Human or Stalled?

### *The Uneven Cognitive Effects of AI on Experts, Apprentices, and the Future of Learning*

#### **Abstract**

Artificial intelligence is rapidly transforming how knowledge is produced, communicated, and applied across organizations. As AI makes answers abundant, the scarce resource may become human judgment. Much of the current conversation emphasizes productivity and innovation gains. Yet a deeper question concerns how AI reshapes the development of human judgment, particularly in educational and early-career contexts.

This paper advances a central proposition: AI does not amplify cognition uniformly. It may amplify those with strong internal models of reasoning while constraining how novices develop them, creating a divergence between AI-amplified experts and AI-dependent learners.

The distinction hinges on the timing of cognitive development relative to technological assistance. Experts rely on structured mental models built through years of deliberate practice, allowing them to identify problems, evaluate explanations, and exercise judgment under uncertainty. When such individuals engage with AI, the technology functions as cognitive leverage, accelerating exploration and expanding the solution space. In this sense, AI can make experts “super-human,” not by replacing judgment, but by amplifying its reach.

For learners still developing these capabilities, however, the interaction may unfold differently. The path to expertise is shaped by productive cognitive friction—engagement with ambiguity, failure, and incomplete information that supports mental model formation and independent

reasoning. AI systems increasingly compress these frictions by providing immediate, well-structured outputs across tasks such as writing, coding, and analysis. While this improves short-term performance, it may reduce opportunities for deeper reasoning to develop. Learners may arrive at correct answers without fully developing the conceptual models needed to evaluate, adapt, or extend them.

This dynamic creates a judgment gap. Individuals who developed reasoning frameworks prior to widespread AI use retain the ability to interrogate machine-generated outputs. Those who rely on AI earlier in their development may be more likely to treat such outputs as authoritative, particularly when outputs appear coherent and confident. The risk is not a decline in intelligence, but a shift in the locus of cognition from internally constructed reasoning to externally generated synthesis.

These dynamics are not merely theoretical. In professional settings, emerging AI implementations are already restructuring work in ways that bypass the developmental stages through which judgment is formed. In auditing, for example, tasks historically performed by junior staff, such as examining transactions and identifying anomalies, are increasingly automated. Early-career professionals may be tasked with reviewing AI-generated outputs, while senior staff and managers evaluate increasingly abstracted summaries. As work progresses up the hierarchy, each level becomes further removed from the underlying cognitive processes.

The result is a widening gap between levels of expertise. This raises a critical concern: how can professionals develop the reasoning capabilities required at higher levels if they are not exposed to the foundational experiences that build those capabilities?

This challenge suggests that AI system design will play a central role in shaping the future of expertise. Rather than replacing cognitive effort, AI could preserve productive friction through an apprenticeship model of learning. Such systems would not simply generate answers, but make reasoning visible—guiding users through how conclusions are reached, highlighting decisions, and prompting reflection. In this model, AI functions less as an oracle and more as a scaffold that supports the development of judgment.

The implications for business education are significant. If AI tools are integrated without attention to development, curricula may prioritize performance over formation, rewarding output quality while underinvesting in the effort required to build understanding. This raises fundamental questions: What forms of struggle are essential for developing judgment? When does AI support rather than substitute for learning? How should curricula preserve the formative role of effort in an AI-rich environment?

To provide initial grounding for these questions, I draw on a set of classroom-based and professional workshop settings in which students, early-career professionals, and more experienced participants engage in AI-assisted innovation tasks. These settings create a structured opportunity to examine how individuals at different stages of development interact with AI in open-ended, judgment-intensive problems. The research design allows for comparison across experience levels, focusing on how participants use, interpret, and extend AI-generated outputs. In particular, I investigate whether more experienced individuals engage in more iterative and evaluative use of AI—treating outputs as inputs for further reasoning—while less experienced individuals are more likely to converge quickly on AI-generated suggestions. I also examine whether AI use narrows observable differences in output quality while leaving underlying differences in judgment formation less affected. Taken together, this setting provides a basis for

testing whether cognitive amplification depends critically on the prior development of internal reasoning frameworks.

This work aligns with the Jesuit tradition of education, which emphasizes the formation of the whole person and the cultivation of discernment through experience, reflection, and action. An apprenticeship-oriented approach to AI, in which reasoning is made visible and learners are guided through interpretation and reflection, preserves the formative role of effort, inquiry, and discernment.

More broadly, these dynamics can be understood within an integral ecology perspective, in which technological systems, educational practices, and human development are deeply interconnected. The design of AI in learning environments therefore shapes not only individual cognition, but the formation of responsible actors within broader organizational and social systems.

In an era where AI can generate answers with increasing fluency, the distinguishing capability may not be the ability to produce solutions, but the ability to ask meaningful questions, evaluate competing claims, and exercise judgment responsibly. Ensuring that AI enhances rather than erodes these capacities is a pedagogical and moral challenge—the future of learning and responsible leadership depends on preserving the development of human judgment in an age of intelligent machines.