Educating Humans, Training Machines: From Doing to Becoming in the Age of Artificial Intelligence

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Abstract

Artificial intelligence (AI) is rapidly reshaping higher education. Generative AI systems can summarize texts, generate written work, provide feedback, assist in problem solving, and support increasingly complex cognitive activities across disciplines. While these technologies create significant opportunities for teaching and learning, they also challenge long-standing assumptions about the relationship between academic task performance and evidence of learning. This paper argues that the central challenge for higher education is not simply integrating artificial intelligence into the classroom but reconsidering the purpose of education through a shift from task-oriented learning focused on “doing” toward developmental learning centered on “becoming.” Drawing upon Bloom’s Taxonomy, experiential learning, transformative learning, situated learning and research on human–AI collaboration, this paper develops a conceptual framework for examining the changing relationship between cognitive task performance and learner development in AI-augmented educational environments. Rather than assigning lower-order cognition to artificial intelligence and higher-order cognition exclusively to humans, the framework recognizes that AI can support activity across cognitive levels while distinguishing successful task performance from the intellectual development of the learner. The paper argues that the educational value of AI ultimately depends on whether its use contributes to the development of judgment, agency, reflection, ethical responsibility, creativity, and intellectual identity. Implications for curriculum design, assessment, faculty development, and institutional policy are discussed.

Preface

The paper develops a research-informed argument that higher education must shift its emphasis from task performance to human development. This shift can be understood as moving from “doing” to “becoming.” In this framework, artificial intelligence functions as a cognitive partner capable of supporting learners across a range of cognitive activities, while education remains centered on ensuring that AI-supported work contributes to the development of judgment, agency, reflection, ethical responsibility, creativity, and intellectual identity. The paper concludes by examining implications for curriculum design, assessment, faculty development, and institutional policy. The future of education depends not on competing with intelligent machines, but on creating learning environments in which increasingly capable technologies expand what students can accomplish while contributing to the continuing development of the human learner.

Introduction

Artificial intelligence has become an increasingly influential force in contemporary society, reshaping industries, economies, and educational systems (Holmes et al., 2019). Advances in machine learning, large-scale data analytics, and algorithmic decision-making have transformed how information is produced, processed, and applied across numerous fields. Artificial intelligence is reshaping not only technological systems but also the nature of human work and knowledge production, altering the kinds of skills and competencies that individuals must develop to thrive in modern societies (Brynjolfsson & McAfee, 2014; Holmes et al., 2019). As intelligent systems become more capable of supporting an increasingly broad range of cognitive activities, educators must reconsider which forms of human development-educational systems should prioritize and how those capacities should be cultivated (Miao & Holmes, 2023).

These developments raise important questions about the future of teaching and learning. For decades, educational institutions have relied heavily on written assignments, problem sets, and examinations to measure student learning. However, many of these tasks can now be completed with the assistance of AI systems (Holmes et al., 2019; Chen & Cheung, 2025). Recent research further demonstrates that generative AI can influence a range of university learning outcomes, including academic achievement and higher-order thinking, although the magnitude of these effects varies according to learner, instructional, technological, and contextual factors (Chen & Cheung, 2025). As a result, educators are increasingly asking fundamental questions: What does it mean to learn in a world where intelligent systems can contribute to increasingly sophisticated academic work? What does successful task performance reveal about the development of the learner? And how should education evolve in response to these technologies?

Historically, education has focused heavily on the acquisition and demonstration of knowledge. Students were expected to memorize information, apply procedures, and demonstrate mastery through assessment (Bloom et al., 1956; Anderson & Krathwohl, 2001). These practices remain essential components of education, but they do not define the full scope of human learning. As AI systems increasingly support activities

across a range of cognitive levels, the educational significance of knowledge and skills lies not only in successful task performance but also in how engagement with those tasks contributes to learner development. This emphasis is consistent with human-centered approaches to generative AI that argue technological integration should preserve human agency and support the development of human capabilities rather than simply automate existing educational practices (Miao & Holmes, 2023).

Artificial intelligence therefore does more than challenge existing educational practices. It exposes the limitations of educational models that rely primarily on task performance as evidence of learning. Recent research highlights this challenge, suggesting that generative AI increasingly complicates the distinction between authentic intellectual effort and AI-assisted performance (Nasr et al., 2026). Research also suggests that the cognitive effects of generative AI depend substantially on how it is incorporated into learning, with structured and scaffolded uses supporting higher-order thinking while unstructured reliance may contribute to cognitive offloading and reduced intellectual engagement (Li et al., 2026). The central educational question is consequently shifting from whether students can successfully complete particular cognitive tasks toward whether their engagement in those tasks—including engagement supported by AI—contributes to the development of judgment, agency, creativity, ethical reasoning, and reflective understanding.

This paper examines how artificial intelligence reshapes the relationship between cognitive task performance and learner development in higher education. Using Bloom's Taxonomy as a conceptual starting point, the paper explores how AI interacts with various levels of cognitive activity. Recent empirical research suggests that generative AI can support both lower- and higher-order learning outcomes, including critical and creative thinking when appropriately integrated into instruction, complicating any simple division in which lower-order cognition is assigned to machines and higher-order cognition exclusively to humans (Chen & Cheung, 2025; Li et al., 2026). The paper then examines established theories of human learning and emerging research on human–AI collaboration to consider the implications for curriculum design, assessment, pedagogy, faculty development, and institutional policy. Finally, it proposes a shift in educational philosophy from task-based learning focused primarily on "doing" toward developmental learning centered on "becoming."

Contribution to Literature

This study contributes to emerging scholarship on artificial intelligence and higher education by integrating established learning theories with a new conceptual model of human development in AI-augmented learning environments. While previous research has explored the potential of artificial intelligence to support instructional tasks and influence learning outcomes (Luckin et al., 2016; Holmes et al., 2019; Liu et al., 2026), this paper extends that literature by examining how these technologies reshape the relationship between cognitive task performance and the broader developmental purposes of education.

The framework developed in this paper synthesizes insights from Bloom's Taxonomy, experiential learning, transformative learning, and situated learning to examine the evolving relationship between human cognition and intelligent systems (Bloom et al., 1956; Anderson & Krathwohl, 2001; Kolb, 1984; Mezirow, 1991; Lave & Wenger, 1991). Building on this theoretical foundation, the paper proposes the "Doing → Becoming" model, which conceptualizes education not simply as the acquisition of skills or completion of tasks but as a developmental process through which learners cultivate judgment, creativity, ethical reasoning, and intellectual identity.

By framing artificial intelligence as a cognitive partner capable of supporting activity across a range of cognitive processes, this model aligns with emerging research on human–AI collaboration and hybrid intelligence (Dellermann et al., 2019; Oyelere, 2026). The framework does not assume a fixed division in which particular cognitive tasks belong exclusively to either humans or machines. Instead, it distinguishes between the successful performance of cognitive tasks and the development of the learner engaged in those tasks. In doing so, the paper contributes to ongoing discussions about the future of teaching, learning, and human development in technologically mediated environments. Rather than focusing primarily on artificial intelligence as an instructional tool, this paper reframes the discussion by asking how AI-supported educational activity can contribute to the continuing intellectual development of the learner.

Theoretical Framework

Understanding the role of artificial intelligence in education requires situating technological change within established theories of learning and human development. This study draws upon four complementary theoretical traditions: Bloom's Taxonomy of cognitive learning, experiential learning theory, transformative learning theory, and situated learning. Together, these perspectives provide a framework for examining how artificial intelligence intersects with human cognition and educational development. Recent scholarship on learner agency and cognitive offloading further suggests that the educational consequences of generative AI depend not simply on what the technology can accomplish, but on how its use shapes learners' engagement, judgment, and cognitive autonomy (Suazo Galdames et al., 2026).

Bloom's Taxonomy and Cognitive Learning

Bloom's Taxonomy remains one of the most widely used frameworks for organizing cognitive learning objectives in education. Originally developed by Bloom et al. (1956) and later revised by Anderson and Krathwohl (2001), the taxonomy describes a hierarchy of cognitive processes ranging from remembering and understanding to evaluating and creating. In traditional instructional design, these levels represent progressively more complex forms of thinking. Advances in artificial intelligence highlight the continued relevance of this framework. AI systems perform particularly well in tasks associated with the lower levels of the taxonomy, including remembering, understanding, and procedural application. AI-powered tools can summarize information, generate practice questions, and provide automated feedback efficiently, making them well suited for supporting foundational knowledge acquisition. However,

recent meta-analytic evidence indicates that generative AI can also support learning outcomes associated with higher-order cognitive processes, suggesting that Bloom's taxonomy should not be interpreted as establishing a simple division between lower-order tasks performed by AI and higher-order thinking performed exclusively by humans (Xia et al., 2025).

At the same time, the upper levels of Bloom's taxonomy, analysis, evaluation, and creation require forms of reasoning that extend beyond pattern recognition. These processes involve contextual interpretation, ethical judgment, and creative synthesis. Although generative AI systems can produce outputs associated with higher-order thinking, the production of such outputs does not itself demonstrate that the learner has independently engaged in or developed the corresponding cognitive processes, an increasingly important distinction as generative AI blurs the boundary between authentic intellectual effort and AI-assisted performance (Nasr et al., 2026). Bloom's framework therefore provides a useful lens not simply for distinguishing cognitive tasks that artificial intelligence can support, but for examining whether AI-supported task performance contributes to the cognitive development of the learner.

Experiential Learning

Experiential learning theory further emphasizes that knowledge is constructed through cycles of experience, reflection, conceptualization, and experimentation (Kolb, 1984). Learning is not simply transmitted from instructor to student but developed through active engagement with problems and real-world contexts. In AI-enhanced environments, this perspective highlights the importance of maintaining human cognitive engagement. If students rely excessively on automated tools to generate answers or solutions, they may bypass the reflective processes that lead to deeper understanding, a concern reinforced by recent research linking overreliance on generative AI with cognitive offloading, dependence, uncritical uptake, and weakened learner judgment (Wang et al., 2026). Artificial intelligence can support learning through resources, feedback, and simulations, but meaningful learning still depends on human participation in the experiential learning cycle.

Transformative Learning

Transformative learning theory extends this argument by emphasizing that education involves changes in perspective as individuals critically examine their assumptions and reinterpret experiences (Mezirow, 1991). From this viewpoint, learning is not merely about acquiring information but about developing the capacity for reflection and intellectual transformation. Artificial intelligence may assist with processing information and may even scaffold critical reflection, but transformative learning requires the learner to actively question beliefs, reconsider assumptions, and develop new perspectives (Chick, 2026). The distinction between information generation and intellectual development therefore becomes central: AI systems may generate information and alternative perspectives, but learners must interpret, evaluate, and integrate that information into their own developing understanding and worldview.

Situated Learning and Communities of Practice

Situated learning theory reinforces the social dimensions of this process. Human cognitive development is shaped through social interaction and collaborative problem solving, rather than solely through isolated information processing (Vygotsky, 1978). According to Lave and Wenger (1991), knowledge develops through participation in communities of practice rather than through isolated individual learning. Even as artificial intelligence tools become more capable, education continues to occur within social environments where students interact with instructors, peers, and professional communities. AI systems may assist with or mediate certain aspects of learning, but their increasing presence does not eliminate the importance of the social processes through which learners develop professional identity, ethical awareness, and disciplinary understanding (Lavercombe, 2026).

Human–AI Collaboration and Hybrid Intelligence

Research across economics, organizational science, and human–computer interaction increasingly suggests that the most productive future lies not in competition between humans and machines but in collaboration between them. Research on hybrid intelligence proposes that human and artificial intelligence can be deliberately combined so that their complementary capabilities contribute to complex problem solving (Dellermann et al., 2019). Within educational contexts, recent scholarship extends this concept toward human-centered hybrid intelligence systems in which humans and AI collaborate and adapt while human agency, contextual judgment, and ethical responsibility remain central to the educational process (Oyelere, 2026). Within this framework, artificial intelligence functions as a cognitive partner rather than a substitute for human learning, supporting learners across a range of cognitive activities while learners and educators remain responsible for interpreting, evaluating, contextualizing, and making decisions about AI-supported work.

Taken together, these theoretical perspectives clarify how artificial intelligence reshapes education without eliminating the need for human learning. Bloom’s Taxonomy provides a framework for examining whether AI-supported task performance reflects and contributes to the cognitive development of the learner. Experiential learning emphasizes active engagement and reflection, transformative learning underscores the importance of perspective change, and situated learning reminds us that education is fundamentally social and developmental. Within this integrated framework, artificial intelligence can function as a cognitive partner that supports learning across a range of cognitive activities, while the educational process remains centered on cultivating human judgment, agency, reflection, ethical reasoning, creativity, and intellectual identity.

These theoretical perspectives collectively suggest that advances in artificial intelligence do not diminish the importance of human learning but instead clarify why successful task performance alone is increasingly insufficient as evidence of learner development. As AI systems become capable of supporting a wider range of cognitive tasks, education must place greater emphasis on the development of learner agency,

interpretive reasoning, ethical judgment, creativity, and reflective thinking (Wang et al., 2026). This shift reframes the purpose of education from demonstrating what students can do toward developing who students become, an intellectual transition that is conceptualized in this paper as the movement from “doing” to “becoming.”

Conceptual Model: Human Learning in the Age of Artificial Intelligence

The conceptual model presented in Figure 1 synthesizes the theoretical perspectives discussed above to illustrate how artificial intelligence reshapes the relationship between cognitive task performance and learner development in education. Building on Bloom’s Taxonomy and theories of experiential, transformative, and situated learning, the model distinguishes between the successful performance of cognitive tasks and the developmental processes through which learners cultivate judgment, agency, reflection, creativity, ethical reasoning, and intellectual identity. Within this framework, AI functions as a cognitive partner that can support learners across a range of cognitive activities, while education remains centered on ensuring that AI-supported performance contributes to, rather than substitutes for, the development of the learner (Wang et al., 2026).

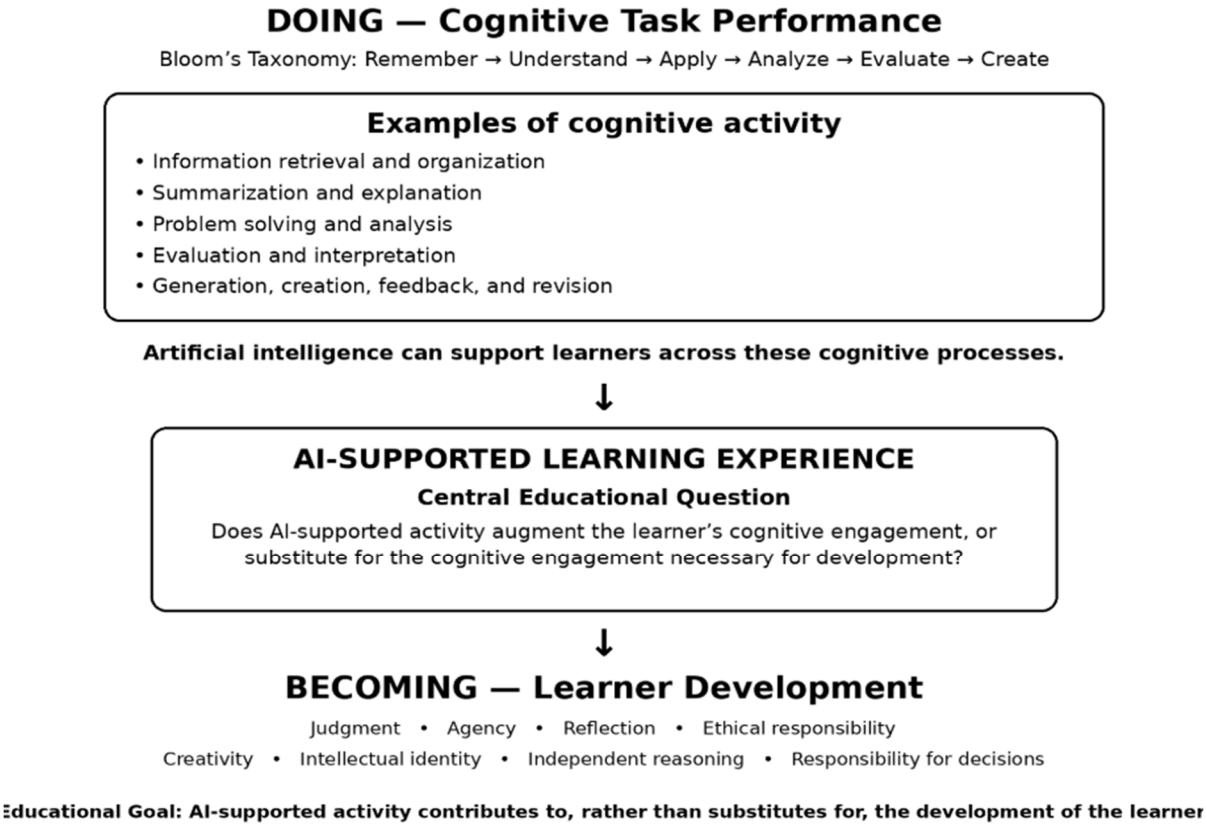

Figure 1: Human–AI Distribution of Cognitive Work and the Shift from “Doing” to “Becoming”

Figure 1 illustrates how the integration of artificial intelligence reshapes the relationship between cognitive task performance and learner development in educational environments. Rather than assigning particular levels of cognition exclusively to either humans or artificial intelligence, the model recognizes that AI can support learners across a range of cognitive activities. The educational significance of AI-supported performance therefore depends not simply on the sophistication of the task or product, but on whether the learner remains cognitively engaged in interpreting, evaluating, reflecting, deciding, and creating. Within this framework, the movement from “doing” to “becoming” represents a shift in educational emphasis from successful task performance alone toward the development of judgment, agency, reflection, ethical responsibility, creativity, and intellectual identity.

In the 2025 Student Generative AI Survey, 92% of surveyed undergraduates reported using AI in some form, while 88% reported using generative AI in relation to assessment (Freeman, 2025). These patterns reinforce the argument developed in this paper: as AI becomes increasingly integrated into academic work, educators must reconsider not only how learning is structured and assessed, but how AI-supported activity can preserve the cognitive engagement, reflection, and agency necessary for learner development.

Human–AI Collaboration

Research across economics, organizational science, and human–computer interaction increasingly suggests that the relationship between humans and artificial intelligence is moving beyond simple competition or substitution toward various forms of collaboration and augmentation (Dellermann et al., 2019). The effectiveness of this collaboration, however, cannot be assumed. A systematic review and meta-analysis of 106 experiments found that human–AI combinations generally improved performance relative to humans working alone but did not, on average, outperform the better-performing member of the human–AI system (Vaccaro et al., 2024). The effectiveness of collaboration varied according to factors such as task type and the relative capabilities of humans and AI. These findings suggest that the value of human–AI collaboration depends not simply on combining human and machine capabilities, but on how that collaboration is structured.

Human–AI collaboration can be understood in terms of complementary capabilities rather than a fixed division of cognitive strengths. Artificial intelligence can contribute speed, scalability, information processing, pattern recognition, and generative capabilities, while humans contribute contextual knowledge, judgment, goals, values, and responsibility for how AI-generated information is interpreted and used. The relative contribution of each may vary according to the task, context, and capabilities of the participants. Effective collaboration therefore depends on identifying when and how human and artificial intelligence can complement one another rather than assuming that either possesses a predetermined set of cognitive tasks (Vaccaro et al., 2024; Oyelere, 2026).

Within educational environments, this collaborative relationship suggests a new model of learning. Students must develop not only disciplinary knowledge but also the capacity to work critically and deliberately with intelligent systems. This includes determining when AI assistance is appropriate, evaluating the accuracy and relevance of AI-generated information, recognizing limitations or biases, and taking responsibility for the conclusions and products that emerge from AI-supported work. In this sense, AI literacy extends beyond technical proficiency to include judgment, intellectual skepticism, ethical responsibility, and the capacity for independent reasoning (Miao & Holmes, 2023).

Effective collaboration with artificial intelligence also requires metacognitive awareness and learner agency. Students must learn to reflect on when, why, and how they use AI and how that use influences their own thinking and decision-making processes. Recent research suggests that generative AI can support reflection, feedback, problem solving, and self-regulated learning when it is deliberately integrated into learning, but uncritical reliance can also encourage cognitive offloading, dependence, and diminished learner judgment (Wang et al., 2026). The educational objective should therefore not be to prevent cognitive offloading altogether, but to ensure that AI does not substitute for the cognitive engagement necessary for learner development.

Human–AI collaboration consequently presents both an opportunity and a pedagogical responsibility. AI can function as a cognitive partner that extends what learners are able to explore, analyze, and create, but the educational value of that partnership depends on whether learners remain intellectually engaged in the process. Effective educational design must therefore preserve opportunities for interpretation, evaluation, reflection, and independent judgment while teaching students to use artificial intelligence responsibly and productively. The goal is not simply to improve what learners can do with artificial intelligence, but to ensure that AI-supported activity contributes to who they are becoming as learners.

Ethical and Pedagogical Challenges

The integration of artificial intelligence into education introduces a range of ethical and pedagogical challenges that extend beyond the adoption of new instructional technologies. As AI tools become increasingly capable of generating written responses, solving problems, analyzing information, and producing sophisticated academic work, educators must reconsider both how learning occurs and how it is evaluated. These challenges involve not only academic integrity but also the authenticity of student work, cognitive dependency, algorithmic bias, data privacy, equitable access, and the development of responsible AI literacy (Miao & Holmes, 2023).

One of the most immediate challenges concerns assessments. Traditional assessments have often treated the quality of a completed product—an essay, a solution to a problem, a laboratory report, or project—as evidence of the cognitive processes involved in producing it. Generative AI complicates this assumption because students may now produce sophisticated academic work with substantial machine assistance. As a result, educators must increasingly distinguish between the quality of the submitted product and the learning demonstrated through the process of producing it (Nasr et al.,

2026). This distinction suggests a need for assessment practices that make student reasoning, reflection, decision making, and intellectual development more visible rather than relying exclusively on the evaluation of final products.

Academic integrity presents a related but more complex challenge. The widespread availability of generative AI has blurred traditional boundaries surrounding authorship, originality, collaboration, and acceptable assistance. Recent research suggests that students themselves frequently encounter uncertainty when determining what constitutes appropriate AI use, creating an ethical environment in which institutional expectations and individual practices may not always align (Ying, 2026). Rather than treating every use of AI as academic misconduct, institutions must develop clear expectations regarding when AI assistance is appropriate, how its use should be acknowledged, and what intellectual responsibilities remain with the learner.

A second concern involves cognitive dependency. Artificial intelligence can reduce unnecessary cognitive burden and provide valuable support for learning, but excessive or uncritical reliance may also encourage cognitive offloading, dependence, and reduced intellectual engagement (Wang et al., 2026; Suazo Galdames et al., 2026). The educational challenge is therefore not to eliminate cognitive offloading, which is a normal feature of human interaction with tools, but to distinguish productive cognitive support from substitution for the thinking necessary for learning. Students must learn when AI assistance enhances their reasoning and when reliance on AI may bypass opportunities for analysis, reflection, problem solving, and independent judgment. Ethical AI use also requires attention to the limitations of the technology itself. AI-generated information may contain inaccuracies, reproduce biases embedded in training data, or present uncertain information with apparent confidence. Questions of privacy, data security, transparency, and equitable access further complicate the adoption of these systems in educational environments (Miao & Holmes, 2023). AI literacy must therefore extend beyond learning how to operate particular tools. Students and educators need the capacity to evaluate AI-generated information critically, recognize technological limitations, understand the ethical implications of AI use, and assume responsibility for decisions made with AI assistance.

Taken together, these challenges suggest that the integration of artificial intelligence into education is not simply a technological issue but a pedagogical and developmental transformation. Addressing these concerns will require innovative approaches to assessment, clear expectations for responsible AI use, increased attention to AI literacy, and educational practices that preserve learner agency and intellectual responsibility. The central challenge is not merely to regulate the use of artificial intelligence, but to design learning environments in which AI supports rather than substitutes for cognitive engagement through which learners develop judgment, reflection, ethical awareness, and intellectual independence

Beyond Task Performance

The increasing capabilities of artificial intelligence invite educators to reconsider the broader goals of education. Historically, educational systems have emphasized the

demonstration of competence through task performance, solving problems, producing written work, or recalling information. These activities remain important components of learning. However, as generative AI becomes capable of supporting an increasingly broad range of cognitive activities, successful task completion alone becomes a less complete indicator of what a learner understands, can do independently, or is developing intellectually. The emergence of generative AI therefore raises a more fundamental educational question: if the performance of an academic task can increasingly be supported by an intelligent system, what should the educational experience ultimately develop within the learner?

This question provides the foundation for the distinction between “doing” and “becoming” proposed in this paper. “Doing” refers to the performance and completion of academic tasks through which competence has traditionally been demonstrated. “Becoming” refers to the developmental processes through which learners cultivate judgment, agency, reflection, ethical responsibility, creativity, and intellectual identity. These dimensions are not mutually exclusive. Doing remains an important part of learning, but its educational value increasingly depends on whether engagement in academic work contributes to the development of the learner. The purpose of education, therefore, extends beyond producing successful academic outputs toward creating experiences through which learners develop the capacities necessary to interpret, evaluate, create, decide, and act responsibly.

Dimension	***Doing: Task Performance***	***AI-Augmented Learning***	***Becoming: Learner Development***
Primary Educational Focus	Demonstrate competence through academic tasks	Use AI to support and extend learner cognitive activity	Cultivate intellectual and personal development
Evidence of Learning	Quality and accuracy of completed work	AI-supported products and learning processes	Demonstrated understanding, judgment, reflection, and growth
Cognitive Activity	Remember, understand, apply, analyze, evaluate, and create	AI may support activity across cognitive levels	Learners remain actively engaged in interpreting, evaluating, reflecting, and creating
Role of AI	Limited or peripheral	Cognitive partner, scaffold, feedback source, and generative tool	Augment rather than substitute for learner development
Role of the Instructor	Content expert, evaluator, and task designer	Designer and facilitator of AI-supported learning	Mentor and architect of experiences that foster judgment, agency, reflection, and intellectual growth
Role of the Student	Complete assigned tasks and demonstrate competence	Engage critically and deliberately with AI-supported work	Exercise agency, judgment, responsibility, and reflective thought

Assessment Emphasis	Evaluate the final product	Examine both product and process	Make reasoning, judgment, reflection, and development visible
Central Question	What can the student do?	What can the student accomplish with AI?	Who is the learner becoming through the educational experience?
Educational Outcome	Task competence and knowledge acquisition	Expanded capability through human–AI collaboration	Intellectual growth, agency, ethical responsibility, and identity formation

Table 1: *From "Doing" to "Becoming" in AI-Augmented Education*

Table 1 summarizes the conceptual shift proposed in this study. The model does not suggest that "doing" should be abandoned or that artificial intelligence assumes responsibility for one category of cognitive activity while humans retain another. Rather, it recognizes that AI can participate in activities across a range of cognitive levels and that the educational significance of those activities depends on how they contribute to learner development. The distinction is therefore not between tasks performed by machines and higher-order cognition performed by humans, but between the successful performance of cognitive tasks and the development of the human learner.

Understanding education as a process of becoming places intellectual development at the center of the educational experience. In a predominantly doing-oriented model, learning is often demonstrated through the successful completion of academic tasks. A becoming-oriented model asks an additional question: what capacities are developing within the learner through the performance of those tasks? From this perspective, the purpose of education is not simply to produce correct answers or sophisticated products but to cultivate individuals capable of interpreting complex problems, exercising sound judgment, reflecting on their assumptions, acting responsibly, and developing increasingly sophisticated intellectual identities. This perspective aligns with theories of learning as identity formation, which emphasize that education involves becoming a participant in communities of knowledge and practice rather than merely acquiring discrete skills (Wenger, 1998).

The theoretical perspectives discussed earlier—experiential learning, transformative learning, and situated learning—reinforce this developmental orientation. Learning emerges through cycles of experience and reflection (Kolb, 1984), through critical examination of underlying assumptions (Mezirow, 1991), and through participation in communities of practice (Lave & Wenger, 1991). In AI-augmented environments, these processes remain important because the educational value of artificial intelligence depends not simply on what technology enables learners to produce, but on how its use shapes learner engagement, reflection, judgment, agency, and responsibility. Artificial intelligence may support these developmental processes through feedback, dialogue, information access, simulation, and cognitive scaffolding, but educational design must ensure that such support augments rather than substitutes for the learner's participation in the learning process (Wang et al., 2026).

Understanding education as a process of becoming therefore reframes the role of artificial intelligence in the classroom. Rather than assigning routine cognition to machines and higher-order cognition to humans, educators can ask how AI should be incorporated into learning experiences so that technological assistance contributes to human development. The educational objective is not to minimize the use of artificial intelligence or to preserve forms of academic work simply because they predate AI. It is to design learning environments in which students learn to use increasingly capable technologies while continuing to develop the judgment, agency, reflection, ethical responsibility, creativity, and intellectual identity necessary to direct those technologies purposefully and responsibly.

In this sense, artificial intelligence does not diminish the importance of human learning; it makes the developmental purpose of education more visible. As the ability to produce sophisticated academic outputs becomes increasingly shared between humans and intelligent systems, education must look beyond the output itself and ask what has developed within the learner through the process of producing it. The movement from "doing" to "becoming" therefore represents not an abandonment of knowledge, skills, or task performance, but a reorientation of their purpose: what students do remains important because of what those experiences enable them to become.

Implications for Higher Education

The emergence of artificial intelligence carries significant implications for how higher education institutions design curricula, assess learning, and support faculty development. If AI systems increasingly perform structured cognitive tasks, educational environments must place greater emphasis on the development of higher-order intellectual capacities.

Curricula may need to prioritize critical thinking, ethical reasoning, and interdisciplinary problem-solving capacities that allow students to interpret complex situations and make informed decisions in technologically mediated environments. This shift does not eliminate the value of foundational knowledge or procedural learning but repositions them within a broader developmental framework. Similarly, assessment practices may need to evolve (Nasr et al., 2026). Alternative approaches such as oral examinations, project-based learning, and reflective portfolios may better capture students' reasoning processes and intellectual development.

Faculty development will also play a critical role in this transition. Many instructors recognize the potential of artificial intelligence but remain uncertain about how to incorporate these tools effectively into their teaching. Professional development initiatives focused on AI literacy, ethical considerations, and instructional design will therefore be essential.

Finally, institutions must develop clear policies governing the responsible use of artificial intelligence in academic settings. Such policies can help ensure that AI technologies

support learning rather than undermine it, while also providing guidance for both students and faculty navigating rapidly evolving technological landscapes.

Conclusion

Artificial intelligence is reshaping the educational landscape by transforming how information is generated, accessed, analyzed, and applied. As increasingly capable AI systems support learners across a broad range of cognitive activities, they challenge long-standing assumptions about the relationship between academic task performance and evidence of learning. The significance of this transformation lies not simply in what artificial intelligence can do, but in what its growing capabilities require educators to reconsider about the purpose of education.

This paper has argued that the critical distinction in AI-augmented education is not between lower-order cognition performed by machines and higher-order cognition performed by humans. Rather, it is between the performance of cognitive tasks and the development of the human learner. Artificial intelligence can contribute to increasingly sophisticated academic work, but the quality of an AI-supported product does not, by itself, reveal the extent to which the learner has developed understanding, judgment, agency, reflection, ethical responsibility, creativity, or intellectual identity. The educational challenge is therefore not simply to determine what students can accomplish with artificial intelligence, but to ensure that their engagement with these technologies contributes to their continuing intellectual development.

Viewed through this lens, the integration of artificial intelligence does not diminish the role of education; rather, it sharpens its purpose. This paper conceptualizes that purpose as a movement from “doing” to “becoming.” “Doing” represents the knowledge, skills, tasks, and intellectual activities through which learners engage with disciplinary and professional problems. “Becoming” represents the developmental process through which those experiences contribute to the formation of judgment, agency, ethical awareness, reflective thought, creativity, and intellectual identity. The movement from doing to becoming does not diminish the importance of knowledge, skills, or task performance. Instead, it repositions them as essential components of a larger developmental process.

The future of higher education therefore lies neither in competing with artificial intelligence nor in simply incorporating increasingly capable technologies into existing educational practices. It lies in designing learning environments in which human–AI collaboration expands what students can accomplish while preserving and strengthening the intellectual engagement and responsibility through which they develop. This requires educators to consider not only the quality of what students produce, but also the reasoning, reflection, judgment, agency, and growth that occur through the process of producing it. The central question for education is therefore not simply what students can do with artificial intelligence, but who they are becoming through their engagement with it.

Artificial intelligence will continue to change what students can do. The enduring responsibility of education is to ensure that, through what they do, students continue to become thoughtful, capable, ethical, reflective, and intellectually independent human beings.

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