Piety, Love, and Wisdom in the Age of Artificial Intelligence: Reframing the Foundations of Adult Education

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Abstract

Artificial intelligence is rapidly reshaping knowledge production and learning environments, particularly in adult education. However, much of the current discourse on AI in education remains predominantly technical, focusing on efficiency, automation, and performance, while neglecting deeper epistemological and moral considerations. This paper addresses this gap by reframing adult education through a human-centered lens grounded in the enduring principles of piety, love, and wisdom. Drawing on andragogical theory and theological-philosophical foundations, it argues that while AI can enhance learning through increased access, personalization, and augmentation, it cannot replace the relational, ethical, and meaning-making dimensions central to adult learning. The paper advances a conceptual framework for human-centered AI pedagogy that emphasizes reflective practice, dialogic engagement, and moral discernment. Its primary contribution is a reorientation of AI in education toward human flourishing, asserting that the future of adult education depends not on technological advancement alone, but on preserving the capacities that make learning deeply human.

Keywords: AI pedagogy; adult education; critical thinking; AI literacy; ethical reasoning; human-centered learning

Introduction: AI and the Crisis of Foundations

The rapid integration of artificial intelligence (AI) into education and knowledge work has introduced a profound transformation in how learning is designed, delivered, and experienced. Across higher education, workforce training, and informal learning environments, AI-driven tools—ranging from large language models to adaptive learning systems—are increasingly mediating access to knowledge, shaping instructional practices, and influencing decision-making processes (Kasneci et al., 2023; Mollick, 2024). This shift reflects a broader transition from traditionally human-centered learning environments toward AI-mediated systems in which knowledge is generated, curated, and often validated through algorithmic processes rather than direct human interaction.

While these developments have significantly increased efficiency, scalability, and access, they also introduce a critical tension. On one hand, AI enables rapid synthesis of information, personalized feedback, and enhanced productivity. On the other hand, it risks diminishing essential dimensions of adult learning (Knowles, 1972; Henschke, 2008, 2017, 2020, 2021), including meaning-making, purpose, and relational depth (Bender et al., 2021; Williamson, 2023). Adult education has historically been grounded not only in the transmission of knowledge

but also in the cultivation of reflective judgment, dialogue, and human connection. As AI systems become more central to learning processes, there is a growing concern that these human-centered dimensions may be overshadowed by efficiency-driven models of education.

This shift raises important epistemological questions. AI systems, while powerful, are fundamentally pattern-recognition technologies trained on large datasets that reflect existing knowledge structures, cultural norms, and institutional biases. As a result, they can produce outputs that appear authoritative without necessarily embodying understanding, context, or ethical judgment (Floridi et al., 2018). In educational settings, this can lead to a form of cognitive offloading, where learners rely on AI-generated responses without engaging in the deeper processes of critical reflection and interpretation that define meaningful learning (Mollick, 2024). Consequently, the role of the learner risks shifting from an active constructor of knowledge to a passive consumer of algorithmically generated information.

At the same time, the increasing reliance on AI challenges traditional conceptions of authorship, expertise, and intellectual agency. When AI systems can generate essays, analyses, and solutions within seconds, the distinction between human and machine-generated knowledge becomes blurred. This raises a fundamental question for adult education: What does it mean to know, to understand, and to learn in an AI-mediated world? More importantly, what foundational principles should guide education when technology can replicate many aspects of cognitive performance but cannot replicate human experience, moral judgment, or relational engagement?

These concerns point to a broader crisis of foundations in adult education. While technological innovation continues to accelerate, the philosophical and ethical frameworks guiding educational practice have not evolved at the same pace. Much of the current discourse on AI in education focuses on implementation—how to use tools effectively—rather than on deeper questions of purpose, meaning, and human development (Holmes et al., 2022). Without a clear grounding in foundational principles, there is a risk that education will become increasingly instrumental, prioritizing efficiency and output over human flourishing.

In response to this challenge, it becomes necessary to revisit and reaffirm the epistemological foundations of adult education. This article argues that piety, love, and wisdom—longstanding concepts within philosophical and theological traditions—offer a critical framework for understanding and guiding learning in the age of AI. Piety, understood as humility and orientation toward purpose, provides a counterbalance to overreliance on technological authority. Love, in its relational and ethical dimensions, re-centers education on human connection and care. Wisdom, as the integration of knowledge, judgment, and ethical action, distinguishes human learning from machine-generated intelligence.

Together, these concepts provide a human-centered foundation for engaging with AI in education. Rather than rejecting technological advancement, this framework positions AI as a tool that must be guided by deeper principles of meaning, relationship, and moral responsibility. In doing so, it reframes adult education not as a purely technical enterprise, but as a

fundamentally human endeavor that remains grounded in purpose, connection, and wise judgment.

The Changing Landscape: AI as Epistemological Disruption

Artificial intelligence (AI) is no longer a peripheral tool in education; it has become a central actor in the production, organization, and interpretation of knowledge. Contemporary AI systems—particularly large language models—function simultaneously as knowledge generators, decision-support systems, and increasingly as "thinking partners" that collaborate with users in real time (Mollick, 2024; Dwivedi et al., 2023). These systems can synthesize vast amounts of information, generate coherent arguments, and provide contextually appropriate responses, thereby reshaping how learners and professionals engage with knowledge. As a result, the epistemological landscape of education is undergoing a significant transformation, one that challenges traditional assumptions about how knowledge is created and validated.

This transformation is accompanied by a redefinition of key concepts such as authorship, expertise, and cognition. Traditionally, authorship has been associated with individual intellectual labor and originality. However, when AI systems contribute substantively to the generation of text and ideas, the boundaries of authorship become blurred (Bommasani et al., 2021). Similarly, expertise—once grounded in accumulated knowledge and experience—is increasingly supplemented, and sometimes displaced, by AI systems capable of producing expert-like outputs across domains. This shift raises questions about what it means to be an expert when access to high-level information is instant and ubiquitous.

Cognition itself is also being reconfigured. Rather than viewing thinking as an exclusively human process, AI-mediated environments promote a form of distributed cognition, where human reasoning is intertwined with machine-generated outputs (Fischer et al., 2024). In this context, learners engage in a hybrid cognitive process that involves interpreting, selecting, and refining AI-generated content. While this can enhance efficiency and expand cognitive capacity, it also alters the nature of intellectual engagement, potentially reducing the depth of independent analysis.

These changes introduce several risks that are particularly relevant for adult education (Knowles, 1972). One of the most significant is cognitive offloading, where individuals rely on AI systems to perform tasks that would otherwise require critical thinking and problem-solving (Gerlich, 2025). While offloading can free cognitive resources for higher-order tasks, excessive reliance on AI may lead to diminished analytical skills and reduced capacity for independent judgment. In educational settings, this raises concerns about whether learners are developing the competencies necessary for lifelong learning or merely becoming proficient in interacting with AI tools.

A related risk is the loss of critical reflection. AI systems are designed to produce fluent and confident responses, often without explicitly indicating uncertainty or the limitations of their knowledge. This can create an environment in which learners accept AI-generated outputs at face value, bypassing the reflective processes that are central to meaningful learning (Parke &

Kosslyn, 2024). Without intentional pedagogical interventions, the ease of accessing information through AI may discourage deeper inquiry and critical engagement.

Another concern is the illusion of authority. AI-generated content often appears authoritative due to its coherence, structure, and linguistic fluency. However, this perceived authority can be misleading, as AI systems do not possess understanding or intentionality; they generate outputs based on statistical patterns in data (Bender et al., 2021). When learners attribute undue credibility to AI responses, they may fail to question underlying assumptions, biases, or inaccuracies. This dynamic is particularly problematic in fields that require nuanced judgment and ethical reasoning.

These risks underscore a critical epistemological distinction: AI produces information, but humans construct meaning. Information generated by AI systems is not equivalent to knowledge in the human sense, which involves interpretation, contextualization, and integration with lived experience. Meaning-making requires reflective judgment, ethical consideration, and an awareness of context—capacities that remain uniquely human. In adult education, this distinction is essential for preserving the integrity of learning as a process of transformation rather than mere information acquisition.

As AI continues to reshape the educational landscape, it is imperative to critically examine its epistemological implications. Rather than viewing AI as a replacement for human cognition, it should be understood as a tool that can augment, but not substitute, the processes of reflection, interpretation, and judgment that define meaningful learning. Recognizing this distinction provides a foundation for developing pedagogical approaches that leverage the benefits of AI while safeguarding the human capacities that are central to education.

Reclaiming Piety: Purpose, Humility, and Human Limits

In the rapidly evolving landscape of artificial intelligence (AI), the concept of piety requires careful reframing. Traditionally associated with religious devotion, piety can be understood more broadly—through both non-sectarian and theological lenses—as a disposition characterized by humility, purpose, and an orientation beyond the self. In contemporary adult education, this reframing is essential for addressing the epistemological and ethical challenges introduced by AI-mediated learning environments. As AI systems increasingly shape knowledge production and decision-making, the cultivation of piety offers a critical counterbalance to technological overreach.

At its core, piety emphasizes humility—the recognition of human limitations in the face of complex realities. In AI contexts, this humility is particularly important. AI systems, especially large language models, produce outputs that are often fluent, coherent, and seemingly authoritative. This can foster overconfidence in machine-generated knowledge, leading users to assume that AI outputs are inherently accurate or complete (Bender et al., 2021; Floridi & Chiriatti, 2020). However, these systems operate through probabilistic pattern recognition rather than genuine understanding. Without a posture of humility, learners and educators risk conflating computational output with truth, thereby undermining critical inquiry and reflective judgment.

Closely related to humility is the notion of purpose. Piety, in this sense, involves an orientation toward meaningful ends—whether framed in spiritual, ethical, or humanistic terms. Adult education has long been concerned with helping individuals make sense of their experiences, pursue personal and professional growth, and contribute to the common good (Merriam & Baumgartner, 2020). In AI-mediated environments, however, there is a risk that efficiency becomes the dominant value, overshadowing deeper questions of purpose. AI systems are optimized for speed, scale, and performance, but they do not possess intrinsic goals or values. As a result, learners may become focused on producing outputs quickly rather than engaging in the reflective processes that give learning its significance (Selwyn, 2021).

An orientation beyond the self further expands the concept of piety. This dimension emphasizes relational and ethical responsibility—toward others, communities, and, in theological frameworks, toward God. In educational contexts, this orientation encourages learners to consider the broader implications of their knowledge and actions. AI systems, by contrast, lack moral agency and cannot account for the ethical consequences of their outputs. They do not "care" about truth, justice, or human well-being; they generate responses based on data patterns (Floridi et al., 2018). Without a pious orientation that extends beyond individual convenience or efficiency, the use of AI risks becoming self-referential, detached from considerations of social responsibility and human flourishing.

The challenge posed by AI, therefore, is not merely technical but epistemological and ethical. Overreliance on AI can lead to a diminished awareness of human limits and an inflated sense of technological capability. This dynamic is evident in the growing tendency to treat AI as an authoritative source rather than a tool requiring critical evaluation. Such overconfidence can erode the habits of questioning, reflection, and discernment that are central to adult learning (Williamson, 2023). Reclaiming piety in this context means actively resisting the temptation to defer uncritically to machine-generated knowledge.

In the AI era, piety serves several important functions. First, it encourages recognition of the limits of AI systems. By understanding that AI operates without consciousness, intentionality, or moral judgment, learners can engage with these tools more critically and responsibly. Second, piety grounds learning in meaning and vocation. Rather than viewing education as a process of information acquisition alone, it frames learning as a purposeful activity connected to personal growth, ethical responsibility, and, for some, spiritual calling. This perspective aligns with emerging discussions on human-centered AI, which emphasize the need to design and use technology in ways that support human values and well-being (Holmes et al., 2022).

The implication of this reframing is clear: AI must serve human purpose—not define it. While AI can enhance efficiency and expand access to knowledge, it should not determine the goals of education or the meaning of learning. Those remain fundamentally human concerns, shaped by cultural, ethical, and, in many cases, spiritual frameworks. By reclaiming piety as a guiding principle, adult education can navigate the challenges of AI integration while preserving the humility, purpose, and ethical orientation necessary for meaningful learning.

Love as an Epistemological Foundation in AI-Mediated Learning

As artificial intelligence (AI) becomes increasingly embedded in educational contexts, it is necessary to revisit the epistemological foundations that guide how knowledge is constructed, interpreted, and applied. Among these foundations, love—understood not merely as emotion but as a relational and ethical orientation—offers a powerful lens for examining learning in AI-mediated environments. Drawing from classical and theological traditions, four forms of love—eros, storgē, philia, and agapē—provide a framework for understanding the relational dynamics that underpin meaningful adult learning (Henschke, 2008, 2017, 2020, 2021).

Eros represents the desire for knowledge, the intellectual and emotional drive that motivates learners to seek understanding. In AI-mediated environments, this desire may initially be stimulated by the accessibility and responsiveness of AI tools. However, without deeper engagement, the pursuit of knowledge risks becoming superficial, driven by convenience rather than genuine curiosity (Mollick, 2024). Storgē, or care and protection, emphasizes the importance of supportive learning environments in which individuals feel सुरक्षित and valued. In adult education, this form of love manifests in pedagogical practices that attend to learners' needs, backgrounds, and vulnerabilities (Noddings, 2013).

Philia, characterized by collaboration and dialogue, is central to the social construction of knowledge. Adult learning theories have long emphasized the importance of interaction, discussion, and shared inquiry in developing critical thinking and reflective understanding (Garrison et al., 2000). Finally, agapē represents selfless, human-centered purpose—a commitment to the well-being and flourishing of others. In educational contexts, agapē underpins ethical teaching practices and the pursuit of learning as a means of contributing to the common good (Freire, 2018; hooks, 1994).

While these forms of love highlight the relational dimensions of learning, AI systems introduce a fundamental challenge: relational absence. Despite their ability to simulate conversation and provide personalized feedback, AI systems lack key human capacities, including empathy, moral commitment, and relational accountability. AI does not "care" about learners; it does not form relationships, nor does it bear responsibility for the consequences of its outputs (Floridi & Chiriatti, 2020). This absence is not merely a technical limitation but an epistemological one. Knowledge constructed through purely algorithmic interaction risks becoming detached from the relational and ethical contexts that give it meaning.

The lack of empathy in AI systems is particularly significant. Empathy enables educators to understand learners' perspectives, respond to their needs, and adapt instruction in ways that foster growth and inclusion. Without empathy, AI-generated responses may be contextually appropriate but emotionally neutral, failing to engage learners at a deeper level. Similarly, AI lacks moral commitment—it does not possess values or intentions and cannot make ethical judgments. As a result, it cannot guide learners in navigating complex moral or social issues, which are central to adult education (Williamson, 2023).

Relational accountability further distinguishes human educators from AI systems. In human relationships, educators are accountable to their students, institutions, and communities. This

accountability shapes how knowledge is shared and applied. AI systems, by contrast, operate without responsibility; they generate outputs based on data patterns without regard for their impact. This raises concerns about the reliability and ethical implications of AI-mediated learning environments (Bender et al., 2021).

In response to these challenges, it becomes essential to re-center love as a foundational principle in education. Learning is not solely a cognitive process; it is inherently relational. Trust, dialogue, and community are critical for fostering meaningful engagement and deep understanding. Trust allows learners to take intellectual risks and engage with new ideas. Dialogue facilitates the exchange of perspectives and the co-construction of knowledge. Community provides a context in which learning is situated and sustained (Wenger, 1998).

The work of Paulo Freire (2018) and bell hooks (1994) underscores the centrality of love in education. Freire argued that dialogue—an essential component of learning—cannot exist without a profound love for the world and for people. Similarly, hooks described teaching as an act of love that affirms the humanity of both educators and learners. These perspectives highlight that education is not merely the transmission of information but a relational process grounded in care, respect, and ethical responsibility.

In AI-mediated learning environments, these principles take on renewed importance. While AI can support learning by providing access to information and facilitating certain forms of interaction, it cannot replace the relational and moral foundations that define education. The presence of love—expressed through empathy, care, dialogue, and ethical commitment—remains essential for meaningful learning. AI may enhance efficiency and expand access, but it must be integrated in ways that preserve and strengthen human relationships rather than diminish them.

Ultimately, the core claim is clear: AI can support learning, but it cannot substitute for the relational and moral dimensions that underpin education. By grounding AI integration in a framework of love, educators can ensure that technology serves human flourishing rather than undermining it.

Wisdom vs. Intelligence: The Critical Divide

The rapid advancement of artificial intelligence has intensified an important conceptual distinction: the difference between intelligence and wisdom. AI represents a powerful form of intelligence—defined by speed, pattern recognition, and computational efficiency—while humans uniquely contribute wisdom, which involves judgment, ethics, and contextual discernment. This divide is not merely philosophical; it has direct implications for the future of adult education. As AI becomes more integrated into learning environments, the central challenge is ensuring that education continues to cultivate wisdom rather than defaulting to the expansion of machine-driven intelligence.

Artificial intelligence excels at tasks associated with cognitive intelligence. It can analyze vast datasets, detect patterns, and generate coherent outputs with remarkable speed. However, these capabilities are bounded by algorithmic design and training data. AI systems do not possess consciousness, intentionality, or moral agency. As recent research on AI ethics emphasizes, even

highly advanced systems require human oversight because they cannot independently align with complex human values or ethical frameworks (Dabis & Csáki, 2024; Zawacki-Richter et al., 2025). In this sense, AI simulates reasoning but does not truly *understand* meaning in a human, experiential way.

In contrast, wisdom in adult education is grounded in human experience and reflective practice. It encompasses three interrelated dimensions: decision-making, contextual judgment, and moral reasoning. Adult learners draw upon lived experience to interpret ambiguous situations, navigate competing priorities, and make ethically informed choices. Theories of adult learning (Knowles, 1972; Henschke, 2008, 2017, 2020, 2021) consistently highlight the importance of critical reflection and meaning-making, where learners actively construct understanding based on context and prior experience (Yan et al., 2025). Wisdom, therefore, is not simply knowledge accumulation; it is the ability to apply knowledge responsibly and thoughtfully in real-world contexts.

The growing reliance on AI in education exposes what can be described as the "wisdom gap." Despite its computational sophistication, AI cannot fully interpret meaning, particularly in situations involving ambiguity, culture, or emotional nuance. It lacks the capacity for genuine ethical judgment, as moral reasoning requires empathy, accountability, and value-based deliberation—qualities rooted in human experience. Studies on AI moral alignment further demonstrate that while AI can mimic ethical responses, it struggles with consistency and depth when navigating complex moral scenarios (Ernst et al., 2026). Additionally, AI cannot integrate lived experience; it has no personal history, embodiment, or sense of consequence that informs human decision-making.

This wisdom gap presents a critical concern for adult education. If educational systems become overly dependent on AI-driven tools, there is a risk of prioritizing efficiency and output over reflection and ethical engagement. Scholars argue that the integration of AI must be accompanied by strong ethical frameworks and intentional pedagogical design to ensure that human judgment remains central (Holmes et al., 2024). Without this balance, education may inadvertently diminish opportunities for learners to develop the very capacities that distinguish human intelligence from machine processing.

The core argument follows: the future of adult education depends on preserving and cultivating wisdom, not merely expanding intelligence. AI should be positioned as a tool that enhances access to information and supports learning processes, but not as a substitute for human judgment. Educators play a crucial role in designing learning environments that emphasize critical thinking, ethical deliberation, and reflective practice. These elements are essential for preparing adult learners to navigate complex, real-world challenges that cannot be resolved through computation alone.

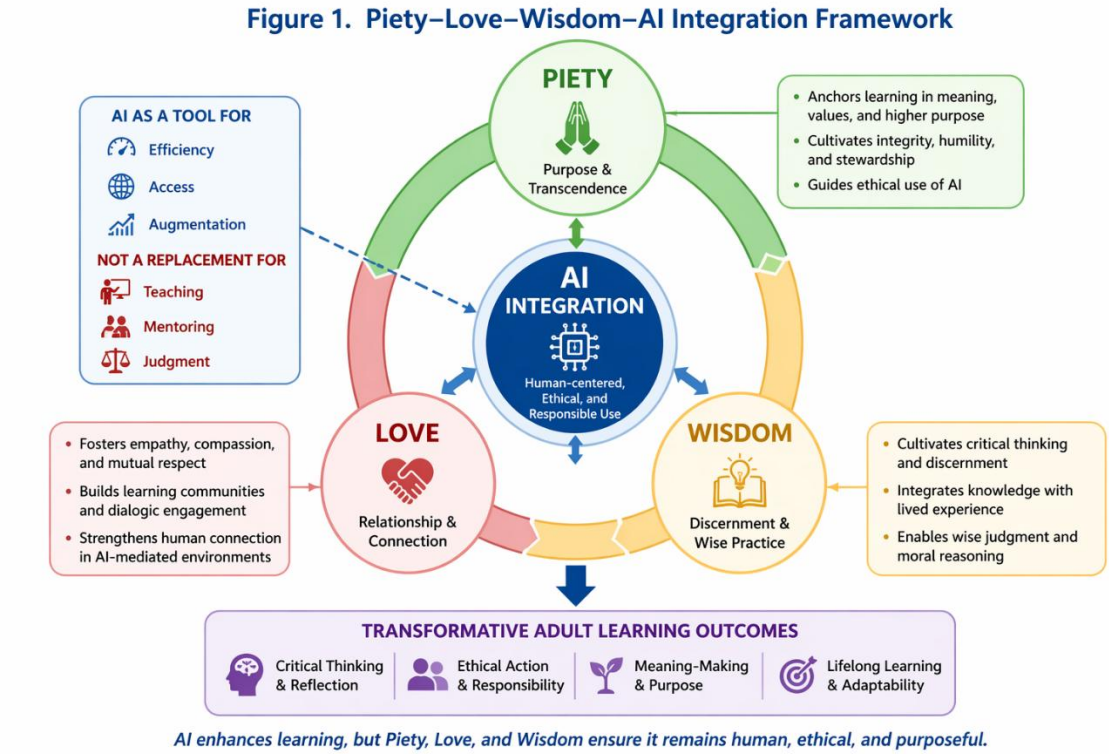
Ultimately, intelligence can be automated, but wisdom cannot. As AI continues to evolve, the value of education will increasingly lie in its ability to develop individuals who can think critically, act ethically, and make sound judgments in uncertain contexts. The enduring mission of adult education is not to produce faster thinkers, but to cultivate wiser ones—individuals capable of integrating knowledge, experience, and values in meaningful and responsible ways.

Toward a Human-Centered AI Pedagogy

The rapid integration of artificial intelligence into education demands a shift from technology-centered adoption to a human-centered pedagogical approach. While AI offers unprecedented capabilities for efficiency, personalization, and scalability, scholars increasingly warn that uncritical use risks reducing education to a technical process detached from ethical, relational, and developmental goals (Stavissky, 2025; Vinci et al., 2026). A human-centered AI pedagogy repositions education around core human values—purpose, relationships, and wisdom—while situating AI as a supportive tool rather than a replacement for human educators.

At the heart of this approach is an integrative framework that connects *piety, purpose, love, relationship, and wisdom as practice*. These dimensions reflect the deeper aims of education beyond knowledge transmission. Purpose anchors learning in meaning and direction, ensuring that AI-supported activities are aligned with human flourishing rather than mere productivity. Relationship emphasizes the social and emotional dimensions of learning, recognizing that meaningful education emerges through dialogue, trust, and connection. Wisdom, as practice, highlights the application of knowledge through ethical judgment, reflection, and lived experience. Human-centered frameworks similarly stress that AI should support cognitive, emotional, and ethical engagement rather than replace these human processes (Stavissky, 2025). This integrative vision aligns with broader calls for education systems that cultivate agency, ethics, and human development alongside technical skills (UNESCO, 2025).

Figure 1. Piety–Love–Wisdom–AI Integration Framework



The figure presents a conceptual model in which **AI integration is guided—not driven—by human-centered values**, specifically piety, love, and wisdom. At the center, AI is positioned as a tool that supports learning through efficiency, access, and augmentation. Its placement in the middle signals its operational role, but not its authority; it is intentionally surrounded and shaped by the three human dimensions.

The outer circular flow of **piety, love, and wisdom** indicates that these are not isolated traits but dynamically interconnected. **Piety** anchors the system in purpose, values, and ethical orientation, ensuring that AI use aligns with meaning and responsibility. **Love** emphasizes relationality—dialogue, empathy, and human connection—reminding us that learning remains fundamentally social even in AI-mediated environments. **Wisdom** represents applied judgment, integrating knowledge with lived experience to guide action and decision-making.

The directional arrows suggest a continuous feedback loop: human values shape how AI is used, and AI, in turn, supports outcomes that reinforce those values. The explicit boundary distinguishing what AI *can* do (efficiency, access, augmentation) from what it *cannot replace* (teaching, mentoring, judgment) reinforces the limits of automation.

Finally, the model culminates in **transformative adult learning outcomes**—critical thinking, ethical action, meaning-making, and lifelong adaptability—demonstrating that when AI is properly situated within a human-centered framework, it enhances rather than diminishes the deeper purposes of education.

Within this framework, the role of AI must be clearly defined. AI functions most effectively as a *tool*—one that enhances efficiency, expands access, and augments human capabilities. It can automate routine tasks, provide personalized feedback, and make educational resources more widely available. These affordances can significantly improve learning outcomes when used thoughtfully. However, the same literature consistently emphasizes that AI cannot replicate core human functions such as teaching, mentoring, and judgment. AI lacks empathy, moral reasoning, and the ability to interpret complex human contexts, making it unsuitable as a substitute for educators (Kaur, 2025). Instead, AI should operate as a mediator that supports learning while preserving human agency and oversight (Chiu, 2026). Human-centered AI explicitly prioritizes augmentation over replacement, reinforcing the idea that technology should extend—not diminish—human capacity (Schmager, 2025).

The distinction between augmentation and replacement is critical. When AI is treated as a replacement, education risks becoming transactional and depersonalized, reducing learners to data points and learning to algorithmic optimization. This concern is reflected in emerging research warning against the "learnification" of education, where efficiency overtakes ethical and relational dimensions (Stavissky, 2025). Conversely, when AI is used for augmentation, it can deepen learning by freeing educators to focus on higher-order activities such as mentoring, facilitating discussion, and guiding ethical inquiry. In this sense, AI becomes a catalyst for more meaningful pedagogy rather than a threat to it (Chatfield, 2025).

These distinctions lead directly to important instructional implications. First, learning environments must remain *AI-supported but human-led*. Educators retain responsibility for guiding learning, interpreting context, and making ethical decisions. AI can assist, but it cannot lead. Second, pedagogy should emphasize *dialogic engagement*. Research in AI ethics education highlights the importance of discussion-based, collaborative approaches that challenge learners to reason through complex ethical scenarios (Wiese et al., 2025). Dialogue fosters critical thinking, perspective-taking, and the co-construction of knowledge—capacities that cannot be automated.

Third, *reflective practice* must be central. Human-centered AI pedagogy encourages learners to critically examine both the outputs of AI and their own thinking processes. Reflection ensures that learners do not passively accept AI-generated information but actively evaluate its validity, bias, and implications. This aligns with broader concerns about maintaining critical thinking and intellectual autonomy in AI-rich environments (Chatfield, 2025). Finally, *ethical AI use* must be explicitly taught. Issues such as bias, transparency, accountability, and data privacy are not peripheral but foundational to responsible AI integration (Alfiras et al., 2025). Without ethical grounding, the use of AI in education risks reinforcing inequities and undermining trust.

Ultimately, a human-centered AI pedagogy is not to technological advancement but a necessary evolution of educational philosophy. It recognizes that while AI can enhance learning processes, the goals of education remain inherently human: to cultivate purpose, build relationships, and develop wisdom. The future of education depends not on how much AI we adopt, but on how well we preserve and elevate the human capacities that AI cannot replicate.

Implications for Workforce and Lifelong Learning

The rapid integration of artificial intelligence into the global economy is fundamentally reshaping workforce expectations and redefining the purpose of lifelong learning. Rather than eliminating human work, AI is transforming it—shifting emphasis away from routine tasks toward uniquely human capabilities such as adaptability, judgment, and ethical reasoning. As AI becomes embedded in nearly every profession, the central challenge for education systems is not simply technical training, but the cultivation of reflective, critical, and ethically grounded learners who can navigate complex human–machine environments.

AI-driven workplaces increasingly require *adaptability* as a core competency. Technological change is no longer episodic but continuous, requiring workers to regularly update their skills and adjust to new tools and workflows. Research on AI-enabled labor markets shows that reskilling and upskilling are now ongoing processes rather than one-time events, with adaptability serving as a foundational capability for workforce resilience (Ersanlı et al., 2025). Similarly, workforce frameworks emphasize that individuals must demonstrate the ability to apply AI tools flexibly across contexts while responding to evolving demands (SREB, 2025). This shift positions adaptability not as a soft skill, but as a central requirement for employability in AI-augmented environments.

Alongside adaptability, *judgment* and *ethical reasoning* have become increasingly important. As AI systems automate data processing and decision-support functions, human workers are tasked

with interpreting outputs, making final decisions, and ensuring ethical alignment. Studies indicate that AI is amplifying the value of human judgment, particularly in situations involving ambiguity, risk, and moral consequences (Workday, 2025; World Economic Forum, 2025). Ethical decision-making is especially critical, as AI systems can produce biased or misleading outputs if not carefully evaluated. Consequently, workers must be equipped not only to use AI tools, but to question their assumptions, limitations, and potential impacts.

This transformation elevates *critical thinking* as a core competency for the modern workforce. AI-generated content can appear authoritative and accurate, yet may contain errors, bias, or incomplete reasoning. Without strong critical thinking skills, individuals risk over-reliance on algorithmic outputs. AI literacy frameworks stress that workers must be able to evaluate AI-generated information, interpret results, and make informed decisions rather than passively accepting outputs (CFTE, 2025). In this context, critical thinking becomes inseparable from digital competence—it is the mechanism through which humans maintain agency in AI-mediated environments.

The growing importance of *AI literacy* further reinforces this shift. AI literacy extends beyond technical knowledge to include understanding how AI systems function, recognizing their limitations, and using them responsibly and ethically. Recent research highlights AI literacy as a multidimensional competency that includes critical thinking, ethical awareness, and practical application skills across diverse professional contexts (Kelley School of Business, 2025; CFTE, 2025). Without this literacy, workers may misuse AI tools or fail to recognize risks such as misinformation, bias, or automation errors. As AI becomes ubiquitous, literacy is no longer optional—it is a prerequisite for effective participation in the workforce.

Equally important is the role of *reflective practice* in lifelong learning. In AI-rich environments, learning cannot be reduced to skill acquisition alone; it must involve continuous reflection on how knowledge is applied and how decisions are made. Reflective practice enables individuals to assess both their own reasoning and the outputs generated by AI systems. It fosters deeper understanding, ethical awareness, and the ability to adapt learning to new contexts. Scholars argue that reflective and experiential learning approaches are essential for bridging the gap between technical capability and responsible AI use (Dos Santos et al., 2024; Tadimalla et al., 2025).

These developments lead to a critical redefinition of the adult learner. In the age of AI, adult learners must actively *question both human and algorithmic assumptions*. This includes recognizing that AI systems are not neutral, but are shaped by data, design choices, and underlying biases. At the same time, learners must critically examine their own assumptions, experiences, and decision-making processes. Emerging frameworks on AI literacy emphasize human agency—the capacity to make intentional, informed choices about when and how to use AI—as a central goal of education (Tadimalla et al., 2025). This dual critical stance ensures that learners remain active participants rather than passive consumers in AI-mediated environments.

Ultimately, the implications for workforce and lifelong learning are clear: the future belongs to individuals who can integrate technical proficiency with human judgment, ethical reasoning, and critical reflection. AI may transform how work is performed, but it amplifies—rather than

replaces—the need for deeply human capabilities. Education systems must therefore prioritize not only what learners know, but how they think, decide, and act in a world increasingly shaped by intelligent machines.

Implications for Educators and Institutions

The integration of artificial intelligence into education necessitates a fundamental pedagogical shift—from traditional models of content delivery toward deeper processes of meaning-making. AI systems can efficiently generate information, personalize instruction, and automate routine tasks; however, this very efficiency challenges the long-standing role of educators as primary sources of knowledge. Emerging research emphasizes that learning in AI-rich environments is increasingly collaborative and interpretive, requiring educators to design experiences where students actively construct meaning rather than passively receive content (Lan & Chen, 2024; Finkelstein, 2025).

This shift redefines the role of the educator. Rather than functioning as content transmitters, educators must act as *facilitators* of learning, guiding students in navigating complex information landscapes shaped by AI. They become *mentors*, supporting learners' intellectual and personal development, particularly as students engage with AI-generated knowledge that may lack context or reliability. Most critically, educators assume the role of *ethical guides*, helping students evaluate the implications of AI use, including issues of bias, authorship, and accountability. Recent studies highlight that AI integration introduces new dynamics of shared agency between humans and machines, making ethical guidance and relational engagement central to effective teaching (Shen, 2025; Favero et al., 2026).

At the same time, educators must resist the temptation to outsource core pedagogical responsibilities to AI. Evidence suggests that over-reliance on AI tools can diminish critical thinking, reduce cognitive engagement, and weaken learners' sense of agency (Gerlich, 2025; Favero et al., 2026). The growing use of AI for tasks such as grading and content generation has raised concerns about the erosion of professional judgment and the integrity of educational processes. Therefore, maintaining a human-centered approach is not optional but essential.

Institutional responsibilities are equally significant. Educational institutions must avoid *technology-first approaches* that prioritize adoption over purpose. Recent policy discussions stress that without coherent governance frameworks, AI implementation can become fragmented, inequitable, and misaligned with educational goals (Forbes Tech Council, 2026). Institutions must instead begin with pedagogical and ethical principles, ensuring that AI integration supports meaningful learning rather than simply increasing efficiency.

Designing *human-centered learning environments* is a key institutional priority. This includes investing in faculty development, establishing clear ethical guidelines, and fostering cultures of critical inquiry. Studies show that while AI adoption is growing rapidly, many educators lack adequate training and institutional support, leading to uneven implementation and uncertainty (Michigan Virtual, 2025). Effective institutional strategies must therefore include ongoing professional learning, interdisciplinary collaboration, and transparent policies that address issues such as data privacy, bias, and academic integrity.

Furthermore, institutions must recognize that AI is not merely a tool but a force that reshapes educational ecosystems. It influences curriculum design, assessment practices, and even the nature of knowledge itself. As such, institutional leadership must engage in continuous reflection on how AI affects equity, access, and the broader mission of education. Research underscores that human-centered, ethically grounded AI systems can enhance learning and support agency—but only when guided by intentional design and governance (Singh, 2025; UNESCO, 2025).

Ultimately, the implications for educators and institutions converge on a single principle: AI should augment, not replace, the human dimensions of education. The shift toward meaning-making, the redefinition of educator roles, and the emphasis on human-centered design all point to a future where technology serves pedagogy—not the other way around. In this context, the success of AI in education will depend not on how widely it is adopted, but on how wisely it is integrated.

Conclusion: Reframing the Future of Adult Education

The rise of artificial intelligence does not diminish the importance of human thinking; it intensifies it. As AI systems increasingly handle routine cognitive tasks, the value of *critical thinking* grows, becoming essential for interpreting outputs, identifying bias, and making informed decisions. Far from replacing human intellect, AI amplifies the need for deeper reflection, discernment, and intellectual responsibility (World Economic Forum, 2025; OECD, 2025). In this evolving landscape, education must prioritize not just what learners know, but how they evaluate, question, and apply knowledge.

Equally important is the renewed relevance of *piety, love, and wisdom*. These are not outdated ideals but foundational human capacities that anchor learning in meaning, relationship, and ethical purpose. Contemporary research emphasizes that human-centered skills—such as empathy, ethical reasoning, and relational understanding—are becoming more critical as technology advances (UNESCO, 2025; Chiu, 2026). These dimensions ensure that education remains connected to human flourishing rather than reduced to technical efficiency.

The final claim is clear: the future of adult education lies not in technological advancement alone, but in preserving and cultivating the human capacity for meaning, relationship, and wise judgment. AI may shape the tools of learning, but humans must continue to define its purpose.

Author's Reflection

As a former doctoral student of Malcolm Knowles at Boston University, it is my honor to contribute this article, extending andragogy into the context of AI in the Fourth Industrial Revolution. I have long held the belief that andragogy and AI, when thoughtfully integrated, can complement one another by supporting self-directed learning, critical inquiry, and human-centered development rather than replacing them. This work reflects a continuation of that commitment to advancing adult learning (Knowles, 1972; Henschke, 2008, 2017, 2020, 2021) theory in rapidly evolving technological environments. I am especially grateful that this open-

access journal will remain a major platform for scholars and practitioners to explore, challenge, and refine the relationship between andragogy, innovation, and the future of education.

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