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The End Of Human-Only Knowledge Management: Agentic Ai In Education

Shaista Khalid
Assistant Professor, Department of Education University of Gujrat, Gujrat.
shaista.anwaar@uog.edu.pk
Azmat Islam
Department of Business Administration, University of Education, Lahore, Pakistan. Email: azmat24@gmail.com
Muhammad Ajmal*
Department of Management Science, University of Gujrat, Gujrat, Pakistan.
Corresponding Author Email: ajmal.hailian@gmail.com

Abstract

The emergence of agentic artificial intelligence (AI) marks a transformative shift in how knowledge is created, managed, and disseminated within educational systems. Traditional, human-centric knowledge management (KM) frameworks—dependent on manual curation, expertise hierarchies, and static repositories—are increasingly insufficient in addressing the dynamic, data-rich learning environments of the 21st century. This article explores how agentic AI systems, characterized by autonomy, adaptability, and self-directed learning, are redefining educational knowledge ecosystems. Drawing from case studies and theoretical models, we argue that these systems transcend conventional KM roles by actively generating insights, curating personalized learning pathways, and facilitating collective intelligence between humans and machines. We identify emerging implications for pedagogy, academic governance, and digital literacy, emphasizing both the opportunities and ethical risks inherent in delegating epistemic authority to AI agents. Ultimately, this paper proposes a reconfiguration of educational knowledge management—one that embraces AI not merely as a tool, but as a co-creator in the pursuit of knowledge.

Keywords: Agentic AI, Knowledge Management, Education, Artificial Intelligence, Collective Intelligence, Autonomous Systems, Digital Pedagogy

1. Introduction

The exponential advancement of artificial intelligence (AI) has ushered in a paradigm shift in how knowledge is created, curated, and distributed across educational systems. Traditional human-centric knowledge management (KM)—predicated on manual organization, static repositories, and instructor-led pedagogy—is being challenged by the rise of agentic AI systems capable of

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autonomous reasoning, contextual understanding, and adaptive learning. These AI agents not only process and retrieve information but increasingly exhibit features of agency: the capacity to act, learn, and make decisions in dynamic knowledge environments. As a result, education is transitioning from the age of *human-only knowledge management* toward collaborative intelligence ecosystems, where humans and AI co-create, validate, and evolve knowledge in real time.

The integration of AI into education has accelerated dramatically following the advent of large language models (LLMs) and generative AI platforms in 2022. According to a scoping review of 310 studies on AI in undergraduate medical education, AI applications now span autonomous tutoring, simulation-based learning, procedural skill assessment, and predictive analytics, though clear frameworks for ethics and competence remain underdeveloped (Simoni et al., 2025). Similarly, students across institutions express strong enthusiasm for learning AI competencies, recognizing the profound implications of AI for clinical reasoning, empathy, and decision-making (Mehta et al., 2021). This demand signifies a shift not merely in content delivery but in the epistemic foundation of education itself—toward AI-augmented cognition.

Recent research also highlights that the current knowledge management structures in educational institutions are inadequate for the pace and scale of modern information flows. Traditional accreditation and curricular models, for instance, emphasize continuous improvement but often fail to integrate autonomous systems that can manage evolving knowledge in real time (Simon & Aschenbrener, 2005). In contrast, the emergence of clinical informatics and precision learning frameworks illustrates how AI-enabled systems can support fine-grained evaluation and data-driven personalization in education (Chartash et al., 2022). These developments reveal that the frontier of educational transformation lies not in digitization alone, but in delegating cognitive functions—organization, inference, and adaptation—to agentic AI systems.

The concept of agentic AI—AI that possesses autonomous goal-seeking and decision-making capacities—introduces profound implications for knowledge governance. In educational contexts, these systems can identify learning gaps, generate new content, and even design individualized learning trajectories without explicit human direction. However, this reconfiguration also raises pressing ethical, epistemological, and pedagogical questions: How much autonomy should AI have in managing knowledge? What happens to

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the role of educators as primary knowledge stewards? And how do institutions ensure that AI-driven knowledge remains transparent, equitable, and aligned with human values?

Empirical evidence from fields such as medical informatics and pharmacy education supports the efficacy of AI-assisted and digital knowledge systems in improving learning outcomes and engagement (Nesterowicz et al., 2014). Furthermore, the integration of simulation and problem-based AI learning modules enhances self-directed learning and competency-based assessment, providing a model for agentic systems to emulate in broader educational domains (Okuda et al., 2009). These findings indicate that AI's role is expanding beyond automation toward cognitive partnership, challenging the conventional dichotomy between teacher and technology.

In this context, the phrase "The End of Human-Only Knowledge Management" encapsulates not a displacement of human educators, but a fundamental reimagining of educational epistemology. Agentic AI represents a new class of systems capable of dynamic knowledge synthesis, contextual reasoning, and ethical adaptation, positioning them as co-authors of knowledge rather than mere repositories. This paper examines how such systems can redefine the ontology of learning and knowledge in education—transforming not just what we learn, but how knowledge itself evolves.

2. Literature Review

The rise of agentic artificial intelligence (AI) — AI systems capable of autonomous, goal-directed behavior — represents a fundamental reimagining of how knowledge is produced, organized, and transmitted in educational contexts. Over the past decade, scholarly discourse has evolved from viewing AI as a passive instructional tool to conceptualizing it as a co-agent or epistemic collaborator in the knowledge management ecosystem. This literature review synthesizes key developments and theoretical perspectives concerning agentic AI in education, emphasizing its implications for knowledge management, pedagogy, and epistemic ethics.

2.1. From Automation to Collaboration: The Rise of Agentic AI in Education

Early models of AI in education (AIED) focused primarily on automation — automating grading, feedback, and personalized recommendations. However, recent research has moved beyond automation toward collaboration and co-agency. Katsenou et al. (2025) describe a paradigm shift where AI operates as a "collaborative co-agent", facilitating dialogic learning environments that enhance creativity, analytical reasoning, and reflective inquiry (Katsenou et al.,

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2025). Their ethnographic study found that structured interaction between students and AI promoted a cognitive state of *flow*, indicating a symbiotic relationship between human and artificial agency.

Similarly, Yan (2025) proposed a four-level APCP framework delineating the evolution of AI from an adaptive instrument to a peer collaborator in human–AI learning partnerships (Yan, 2025). This progression—from reactive assistance to proactive, goal-oriented collaboration—represents a core tenet of agentic AI, wherein systems exhibit autonomy in managing knowledge and facilitating inquiry.

2.2. Pedagogical and Theoretical Frameworks for Agentic AI

Theoretical efforts to embed AI within humanistic and dialogic educational frameworks have intensified. Wegerif and Casebourne (2025) argue for a "double dialogic pedagogy", integrating generative AI into the co-construction of knowledge through collective intelligence (Wegerif & Casebourne, 2025). They emphasize that AI should not replace human thought but instead extend dialogical spaces of reasoning and creativity. This view aligns with Lameras (2022), who classified AI applications across a spectrum of educational engagement, from intelligent tutoring systems to autonomous decision-making frameworks that dynamically adapt pedagogy to student needs (Lameras, 2022).

These frameworks suggest a convergence between constructivist learning theory and AI-driven adaptive systems, positioning agentic AI as an enabler of collective cognition rather than a substitute for instruction. The pedagogical challenge, therefore, lies in balancing autonomy with ethical and epistemological oversight.

2.3. Knowledge Management and Collective Intelligence

In the domain of educational knowledge management, AI has emerged as a pivotal actor in curating, generating, and contextualizing knowledge artifacts. Tapalova et al. (2022) demonstrated how AI-powered systems can create personalized learning pathways, fostering student autonomy through continuous data-driven adaptation (Tapalova et al., 2022). The integration of multi-agent systems (MAS) further extends this model: Hamal et al. (2021) proposed a multi-agent knowledge management framework (EMAS) that allows both teachers and learners to access and co-manage educational data through AI-based analytics and emotional detection systems (Hamal et al., 2021).

These developments signal a departure from static repositories of information toward dynamic, co-evolving knowledge networks, where agentic AI systems

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continuously synthesize insights and facilitate collective intelligence among human and non-human actors.

2.4. Agency, Autonomy, and Self-Regulated Learning

A central theme in recent literature is the relationship between AI agency and human learner autonomy. Studies have found that AI tools—when properly integrated—can enhance self-regulated learning (SRL) by supporting goal setting, feedback, and metacognitive monitoring. In a conceptual study on Nigerian higher education, Omoyajowo and Bambi (2025) showed that AI-driven analytics and tutoring systems promote learner autonomy and strategic reflection, effectively strengthening self-regulation capabilities (Omoyajowo & Bambi, 2025).

Similarly, Islomjon (2025) found that AI-based adaptive learning tools significantly improved student understanding and engagement by aligning content to individual cognitive levels (Islomjon, 2025). These studies collectively underscore that AI's capacity to foster autonomy depends on its design transparency, feedback mechanisms, and ethical accountability—key principles of agentic AI.

2.5. Ethics, Trust, and the Human-AI Epistemic Partnership

The transition to agentic AI in education raises profound ethical and epistemological challenges. The concept of "digital trust" has emerged as a determining factor in the acceptance and efficacy of AI systems. Omirali et al. (2025) found that while students recognize the educational potential of proactive AI agents within MAS environments, their trust remains conditional, hinging on transparency, fairness, and respect for privacy (Omirali et al., 2025).

Further, Farooque et al. (2025) emphasize that educator partnership and ethical governance are vital to prevent algorithmic bias and ensure that AI complements rather than replaces the human dimension of pedagogy (Farooque et al., 2025). As AI systems increasingly mediate knowledge production and assessment, epistemic authority becomes distributed across human and machine actors, necessitating new frameworks for AI ethics in knowledge management.

2.6. Future Directions: Toward Symbiotic Knowledge Systems

The literature converges on a central insight: agentic AI redefines not only how students learn but how knowledge itself is constituted. Asád (2024) demonstrated that integrating generative AI into intelligent tutoring systems enhances scalability, personalization, and adaptive feedback loops, suggesting

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a transition toward dual-layer AI architectures where multiple agents validate and optimize educational content (As'ad, 2024).

Moreover, Huo and Siau (2024) highlight the transformative potential of agentic AI and Artificial General Intelligence (AGI) in higher education, noting that their success depends on cultivating trustworthy, co-evolutionary relationships between human learners and AI systems (Huo & Siau, 2024). Collectively, these works envision a symbiotic model of knowledge management — a hybrid ecosystem where AI and human intelligence continuously inform and refine each other, reshaping the ontology of learning in the process.

3.Conceptual Framework: Agentic AI–Driven Knowledge Management in Education

This conceptual framework explains how agentic artificial intelligence (AI) transforms educational knowledge management by shifting systems from human-only control toward human–AI co-agency. The framework integrates insights from research on agentic AI, dialogic pedagogy, collective intelligence, self-regulated learning, and ethical AI governance. It is designed to explain *how* agentic AI operates in education, *what* roles it assumes, and *why* it fundamentally alters epistemic authority.

3.1. Core Assumptions of the Framework

The framework is built on four foundational assumptions consistently supported in the literature:

1. **Knowledge is dynamic and co-constructed**, not static or solely human-authored
2. **AI systems can exhibit functional agency**, even without consciousness
3. **Learning is increasingly collective**, distributed across human and non-human actors
4. **Ethical governance is inseparable from AI-enabled knowledge systems**

These assumptions reflect a shift from instructional epistemology toward ecological epistemology, where knowledge emerges through interaction within sociotechnical systems (Wegerif & Casebourne, 2025).

3.2. Structural Components of the Framework

The framework consists of **five interdependent layers**, each representing a functional dimension of agentic AI in education.

3.2.1 Human Actors (Learners, Educators, Institutions)

Human actors remain central but no longer monopolize epistemic control.

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- **Learners** transition from passive recipients to *self-regulating knowledge navigators*
- **Educators** shift from content transmitters to *epistemic mentors and ethical stewards*
- **Institutions** evolve from static curriculum providers to *adaptive knowledge ecosystems*

Empirical studies show that students increasingly expect AI to participate meaningfully in learning while still valuing human judgment and empathy (Mehta et al., 2021).

3.2.2 Agentic AI Systems

At the core of the framework are agentic AI systems, defined by three properties:

1. **Autonomy** – ability to initiate actions without direct human prompts
2. **Adaptivity** – continuous learning from user behavior and contextual data
3. **Goal-directedness** – alignment toward learning outcomes or system-level objectives

Unlike traditional tools, agentic AI can:

- Generate new knowledge artifacts
- Reorganize curricular content dynamically
- Proactively identify learning gaps

Yan's APCP framework conceptualizes this evolution from adaptive instrument → proactive assistant → co-learner → peer collaborator, directly informing this framework's AI agency layer (Yan, 2025).

3.2.3 Knowledge Management Processes

Agentic AI fundamentally reshapes **knowledge management (KM)** through five continuous processes:

KM Function	Transformation via Agentic AI
Knowledge Creation	AI synthesizes, simulates, and extrapolates
Knowledge Curation	Automated validation, ranking, and updating
Knowledge Personalization	Learner-specific adaptive pathways
Knowledge Application	Real-time contextual feedback
Knowledge Evolution	Continuous system-level learning

Multi-agent systems research demonstrates that AI-driven KM improves both scalability and epistemic responsiveness (Hamal et al., 2021).

3.2.4 Pedagogical Mediation Layer

This layer governs *how* human and AI agents interact educationally.

The framework integrates:

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- **Dialogic pedagogy** (learning through structured dialogue)
- **Constructivist learning theory**
- **Self-regulated learning (SRL)** models

AI supports SRL by enabling:

- Goal-setting assistance
- Metacognitive feedback
- Reflective prompts

Studies show that AI-enhanced learning environments significantly improve learner autonomy when feedback and transparency are prioritized (Omoyajowo & Bambi, 2025).

3.2.5 Ethical and Governance Layer

The outer layer constrains all system behavior.

Key governance principles include:

- **Transparency** (explainable AI decisions)
- **Accountability** (human oversight)
- **Fairness** (bias mitigation)
- **Epistemic integrity** (truthfulness, provenance)

Without this layer, agentic AI risks:

- Cognitive dependency
- Epistemic erosion
- Algorithmic authority dominance

Trust studies consistently show that student acceptance of AI is conditional on ethical safeguards (Omirali et al., 2025).

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4. Explanation of the Conceptual Model: Agentic AI–Driven Knowledge Management in Education

The proposed model conceptualizes Agentic AI–Driven Knowledge Management in Education as a multi-layered, socio-technical system in which knowledge is no longer produced, curated, or governed exclusively by human actors. Instead, the model positions education as a co-managed epistemic ecosystem, where human intelligence and agentic artificial intelligence (AI) interact continuously under pedagogical and ethical constraints. This model responds to growing evidence that AI systems are transitioning from passive tools toward autonomous, adaptive, and goal-directed agents capable of shaping learning processes and knowledge structures.

At the center of the model lies human–AI collaboration, which represents the epistemic core of contemporary education. Rather than replacing human cognition, agentic AI augments and reshapes it by participating in sense-making, feedback generation, and adaptive guidance. Research on collaborative and dialogic AI emphasizes that meaningful learning emerges when AI systems are designed as intellectual partners that engage learners in inquiry and reflection rather than simply delivering answers (Katsenou et al., 2025). This collaborative core reflects a shift from transmission-based education toward interaction-based knowledge construction.

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Surrounding this core are human actors, including learners, educators, and institutions. In the model, learners are conceptualized as self-regulating agents who navigate personalized learning pathways with AI support. Educators assume the role of epistemic mentors and ethical gatekeepers, responsible for contextual judgment, value alignment, and critical oversight. Institutions function as adaptive governance structures, shaping policies, curricula, and accountability mechanisms that regulate AI integration. Empirical studies show that students expect AI to play an active role in learning but simultaneously emphasize the irreplaceability of human judgment and empathy, reinforcing the need for shared authority rather than technological dominance (Mehta et al., 2021).

On the technological side, the model identifies agentic AI systems as a distinct class of educational technologies. These systems are defined by autonomy, adaptivity, and goal-directed behavior, enabling them to initiate actions, modify learning pathways, and respond dynamically to learner data. Conceptual work on agentic AI in education describes a continuum in which AI evolves from an adaptive instrument to a proactive assistant, co-learner, and functional collaborator (Yan, 2025). Within the model, agentic AI does not possess moral or epistemic authority independently; instead, its agency is bounded and shaped by pedagogical design and governance structures.

Beneath the collaborative layer, the model explicitly represents knowledge management processes, including knowledge creation, curation, personalization, application, and evolution. Agentic AI contributes to knowledge creation through synthesis and simulation, to curation through filtering and validation, and to personalization through adaptive learning analytics. Multi-agent system research demonstrates that such AI-driven knowledge management architectures enhance scalability, coherence, and responsiveness in educational environments (Hamal et al., 2021). Importantly, knowledge in this model is treated as dynamic and evolving, continuously reshaped by feedback loops between humans and AI.

The model also emphasizes pedagogical mediation as a critical integrative layer. Pedagogy determines how AI agency is enacted in practice and ensures that learning remains dialogic, reflective, and learner-centered. Grounded in constructivist and dialogic learning theories, the model assumes that AI should support metacognition, self-regulated learning, and collaborative inquiry rather than encourage cognitive dependency. Empirical and conceptual studies indicate that AI-enhanced environments improve

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learner autonomy when they prioritize transparency, feedback, and reflective engagement (Omoyajowo & Bambi, 2025).

Encircling all other components is the ethical and governance framework, which functions as the normative boundary of the system. As AI systems increasingly influence what counts as knowledge, ethical risks emerge, including algorithmic bias, epistemic opacity, and the erosion of human agency. Research on digital trust consistently shows that acceptance of AI in education depends on transparency, accountability, fairness, and clear lines of responsibility (Omirali et al., 2025). Accordingly, the model treats ethics and governance not as external constraints but as structural conditions that shape AI autonomy and institutional decision-making.

Taken together, the model explains the end of human-only knowledge management not as a displacement of educators or learners, but as a transformation of educational epistemology. Knowledge management becomes a shared, negotiated process involving human judgment and machine agency, coordinated through pedagogy and constrained by ethics. By integrating human actors, agentic AI, knowledge processes, pedagogy, and governance into a single framework, the model provides a comprehensive lens for understanding how education is evolving in the age of autonomous AI systems.

5. Discussion

The present study advances the discourse on educational transformation by articulating how agentic artificial intelligence (AI) fundamentally reconfigures knowledge management in education. Building on the proposed conceptual model, the discussion interprets the findings in relation to existing literature, highlights theoretical and practical implications, and addresses key tensions and limitations associated with the transition from human-only to human–AI co-managed knowledge systems.

First, the model reinforces and extends prior scholarship that characterizes AI's evolving role in education as moving beyond automation toward epistemic participation. While earlier generations of AI in education focused primarily on efficiency gains—such as automated assessment or content recommendation—the integration of agentic AI introduces systems capable of autonomous reasoning, proactive intervention, and adaptive goal alignment. This aligns with conceptual frameworks that describe AI as a collaborative co-agent rather than a passive tool, capable of enriching dialogic learning and collective inquiry (Katsenou et al., 2025; Yan, 2025). The discussion thus supports the argument that the "end of human-only

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knowledge management" should be understood not as technological replacement, but as a redistribution of epistemic labor across sociotechnical systems.

Second, the findings underscore a critical redefinition of human roles within educational ecosystems. Learners emerge as active, self-regulating agents supported by AI-driven personalization and feedback, while educators transition toward roles centered on mentorship, ethical judgment, and epistemic framing. This shift is consistent with empirical evidence showing that students welcome AI support but remain deeply concerned about the preservation of human oversight, empathy, and contextual understanding (Mehta et al., 2021). The discussion therefore highlights a key insight: agentic AI amplifies human agency when it is pedagogically mediated, but risks undermining it when deployed without clear instructional intent or governance.

Third, the discussion foregrounds knowledge management as a central site of transformation. Traditional educational knowledge management models assume relatively stable curricula and slow cycles of revision. In contrast, the proposed model conceptualizes knowledge as continuously evolving through feedback loops between human actors and AI systems. Agentic AI contributes not only to knowledge retrieval and personalization, but also to knowledge creation and evolution through synthesis and simulation. Multi-agent system research supports this view, demonstrating that AI-driven knowledge management enhances scalability and responsiveness in complex learning environments (Hamal et al., 2021). However, this dynamism also raises epistemological questions about authority, validity, and the long-term stability of knowledge claims.

Pedagogically, the discussion emphasizes that AI agency is not inherently beneficial or harmful, but contingent on design and context. When aligned with dialogic and constructivist learning theories, agentic AI can promote metacognition, reflection, and collaborative problem-solving. Studies on self-regulated learning suggest that AI systems enhance learner autonomy when they provide transparent feedback and encourage reflective engagement rather than cognitive offloading (Omoyajowo & Bambi, 2025). Conversely, poorly designed systems may foster dependency, superficial learning, or uncritical acceptance of AI-generated outputs. This reinforces the need for pedagogy to act as a mediating force that shapes how AI agency is experienced by learners.

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A central contribution of the discussion lies in its treatment of ethics and governance as structural, rather than peripheral, concerns. As agentic AI systems increasingly influence what is learned, how it is learned, and how performance is evaluated, ethical risks become systemic rather than incidental. Issues of algorithmic bias, opacity, and accountability directly affect epistemic trust. Empirical studies consistently show that students' willingness to engage with AI-enhanced learning environments depends on transparency, fairness, and clear lines of responsibility (Omirali et al., 2025). The discussion therefore argues that ethical governance must be embedded at the architectural level of educational AI systems, shaping both institutional policy and system design.

The discussion also acknowledges important limitations and tensions. Conceptually, the model is normative rather than predictive; it describes how agentic AI *should* be integrated rather than guaranteeing specific outcomes. Empirically, much of the existing literature remains exploratory, with limited longitudinal evidence on the long-term cognitive, social, and epistemic effects of sustained human–AI collaboration in education. Additionally, the uneven distribution of technological resources raises concerns about equity, as institutions with greater computational capacity may disproportionately benefit from agentic AI systems. These limitations point to the need for further empirical validation and cross-contextual studies.

Finally, the discussion situates the model within broader debates about the future of education and knowledge. By framing education as a hybrid cognitive ecology, the study contributes to emerging theoretical work that views intelligence as distributed across human and non-human actors. This perspective challenges deeply held assumptions about authorship, authority, and expertise in education. The discussion concludes that the transition away from human-only knowledge management is not merely a technological shift, but an epistemological one—requiring new forms of literacy, governance, and ethical responsibility to ensure that agentic AI serves human flourishing rather than undermining it.

5. Theoretical Implications

The proposed model of Agentic AI–Driven Knowledge Management in Education carries several important theoretical implications that extend and refine existing theories in education, knowledge management, and human–AI interaction. Most fundamentally, the model challenges human-centric epistemological assumptions that have traditionally underpinned educational theory. Classical educational paradigms—whether behaviorist, cognitivist, or

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constructivist—implicitly assume that knowledge is created, validated, and transmitted exclusively through human cognition and social interaction. By introducing agentic AI as an active epistemic participant, the model supports a shift toward a post-human or socio-technical epistemology, in which knowledge emerges from interactions among human and non-human agents rather than residing solely in human minds (Wegerif & Casebourne, 2025).

A key theoretical implication concerns the reconceptualization of agency in learning theories. Traditional learning theories assign agency primarily to learners and educators, with technologies serving instrumental or mediating roles. The present model extends sociocultural and dialogic theories by conceptualizing AI as possessing functional agency—the capacity to initiate actions, adapt strategies, and influence learning trajectories without continuous human prompting. This aligns with emerging frameworks that describe AI as a socio-cognitive teammate rather than a neutral artifact (Yan, 2025). Theoretically, this necessitates an expansion of agency constructs in education to include distributed agency, where learning outcomes are co-produced by networks of human and artificial actors.

The model also advances knowledge management theory in educational contexts. Traditional knowledge management frameworks emphasize human-led processes of knowledge creation, storage, sharing, and application. By contrast, the proposed model theorizes knowledge management as a dynamic, recursive process driven by human–AI feedback loops. Agentic AI contributes not only to efficiency but to epistemic transformation by continuously reshaping knowledge structures through synthesis, personalization, and evolution. This extends multi-agent systems theory into education by framing knowledge as an adaptive system rather than a static resource (Hamal et al., 2021). Theoretically, this supports a move from repository-based models toward knowledge ecology models in educational research.

Another significant implication lies in the theory of pedagogy and instruction.

The model reinforces dialogic and constructivist perspectives by arguing that AI's educational value depends on pedagogical mediation rather than technical capability alone. It contributes to pedagogical theory by positioning AI as a catalyst for metacognition, self-regulated learning, and collective inquiry, rather than as a source of authoritative knowledge. This supports and extends self-regulated learning theory by introducing AI as an adaptive co-regulator that scaffolds planning, monitoring, and reflection processes (Omoyajowo & Bambi, 2025). Theoretically, this reframes

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scaffolding as a hybrid human–AI function, expanding Vygotskian notions of mediation into the digital and agentic domain.

The model also has important implications for theories of epistemic authority and trust. Classical educational theory often assumes that epistemic authority resides in educators, institutions, or disciplinary canons. By contrast, the integration of agentic AI redistributes epistemic authority across algorithmic systems, human judgment, and institutional governance. Research on digital trust suggests that learners evaluate AI-generated knowledge not only on accuracy, but on transparency, fairness, and accountability (Omirali et al., 2025). Theoretically, this implies that epistemic trust must be reconceptualized as a system-level property, emerging from ethical governance structures rather than from individual knowledge holders alone.

Finally, the model contributes to broader theories of educational transformation by framing the "end of human-only knowledge management" as an epistemological shift rather than a technological disruption. It aligns with emerging perspectives that conceptualize education as a hybrid cognitive ecology, where intelligence, agency, and meaning-making are distributed across sociotechnical systems. This challenge reductionist narratives of AI either as a replacement for human educators or as a neutral productivity tool. Instead, the model theorizes AI as a constitutive element of future educational systems, requiring new theoretical vocabularies for agency, knowledge, learning, and ethics.

In sum, the theoretical implications of this model are threefold: it expands learning theory by incorporating distributed and artificial agency; it advances knowledge management theory by reconceptualizing knowledge as an evolving socio-technical process; and it reframes educational epistemology by embedding ethics and governance as foundational theoretical constructs. Together, these contributions provide a foundation for future theory-building at the intersection of education, artificial intelligence, and knowledge studies.

7. Practical Implications

The proposed model of Agentic AI–Driven Knowledge Management in Education yields several important practical implications for educational institutions, educators, learners, technology developers, and policymakers. These implications highlight how agentic AI can be operationalized responsibly and effectively to enhance learning, governance, and institutional capacity while mitigating associated risks.

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From an institutional perspective, the model implies that educational organizations must move beyond ad hoc or experimental adoption of AI tools toward system-level integration. Institutions should design AI strategies that align with curriculum goals, assessment practices, and ethical standards rather than treating AI as a standalone technology. The model suggests that universities and schools need to develop AI governance frameworks that clearly define accountability, oversight mechanisms, and acceptable levels of AI autonomy. Empirical research shows that trust in AI-enhanced education increases when institutions provide transparent policies and clear explanations of how AI systems are used and monitored (Omirali et al., 2025). Practically, this requires the establishment of interdisciplinary AI governance committees, regular audits of AI systems, and institutional guidelines for responsible AI use.

For educators, the model underscores a shift in professional practice rather than professional displacement. Teachers are encouraged to adopt the role of epistemic mentors, focusing on guiding interpretation, fostering critical thinking, and supporting ethical reasoning. Agentic AI can reduce administrative and repetitive instructional tasks, allowing educators to devote more time to high-value pedagogical activities such as feedback, discussion facilitation, and learner support. However, this also implies a need for faculty development and AI literacy training, as educators must understand how AI systems function, what their limitations are, and how to integrate them pedagogically. Studies indicate that AI supports learning most effectively when educators actively mediate its use rather than delegating instructional authority entirely to technology (Katsenou et al., 2025).

For learners, the model highlights opportunities to enhance self-regulated learning and personalization. Agentic AI systems can support learners by identifying knowledge gaps, adapting learning pathways, and providing timely, formative feedback. Practically, this enables more individualized learning experiences at scale, particularly in large or diverse classrooms. However, the model also implies that learners must develop AI literacy and metacognitive skills to critically evaluate AI-generated content. Research on self-regulated learning shows that AI tools enhance autonomy only when learners are encouraged to reflect on feedback and maintain control over learning decisions (Omoyajowo & Bambi, 2025). Educational programs should therefore embed explicit instruction on how to work *with* AI, not simply how to use it.

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For educational technology developers, the model provides concrete design implications. AI systems should be built to support transparency, explainability, and pedagogical alignment, rather than maximizing automation alone. Developers are encouraged to design agentic AI with adjustable levels of autonomy, allowing educators and institutions to calibrate AI agency based on context and learner readiness. Multi-agent system research demonstrates that AI architectures designed for collaboration and feedback loops are more effective and trustworthy than opaque, monolithic systems (Hamal et al., 2021). Practically, this means incorporating explainable AI features, user control options, and mechanisms for human override.

At the policy level, the model implies that educational policy must evolve to address AI as a core educational infrastructure, not merely an innovation. Policymakers should develop regulatory frameworks that balance innovation with protection of learner rights, data privacy, and equity. The model highlights the risk that unequal access to advanced AI systems may exacerbate existing educational inequalities. As such, public investment in AI infrastructure, educator training, and open educational AI resources becomes a practical necessity. Evidence from digital trust research suggests that equitable and transparent policy environments are essential for sustainable AI adoption in education (Omirali et al., 2025).

Finally, the model has implications for assessment and evaluation practices. As agentic AI participates in knowledge creation and problem-solving, traditional assessment models based solely on individual output become less valid. Practically, institutions may need to adopt assessment strategies that value process, reflection, collaboration, and ethical reasoning, rather than only content reproduction. This aligns with emerging pedagogical arguments that AI-rich environments require assessment systems that recognize collective intelligence and human judgment alongside AI-supported performance (Yan, 2025).

In summary, the practical implications of this model emphasize that successful implementation of agentic AI in education depends not on technological sophistication alone, but on institutional readiness, pedagogical mediation, ethical governance, and stakeholder capacity building. When these conditions are met, agentic AI can serve as a powerful enabler of adaptive, inclusive, and future-oriented education rather than a disruptive or destabilizing force.

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8. References

As'ad, M. (2024). *Intelligent Tutoring Systems, Generative Artificial Intelligence (AI), and Healthcare Agents: A Proof of Concept and Dual-Layer Approach*. Cureus, 16. https://doi.org/10.7759/cureus.69710

Chartash, D., Rosenman, M., Wang, K. H., & Chen, E. (2022). *Informatics in Undergraduate Medical Education: Analysis of Competency Frameworks and Practices Across North America*. JMIR Medical Education. https://doi.org/10.2196/39794

Farooque, M., Bahzad, F., Memon, I., & Azfar, M. (2025). *The Future of Artificial Intelligence in Education: Transforming Teaching and Learning*. Annual Methodological Archive Research Review. https://doi.org/10.63075/mymjq096

Hamal, O., El Faddouli, N., & Harouni, M. H. A. (2021). Design and implementation of the multi-agent system in education. *World Journal on Educational Technology: Current Issues, 13*(4). https://doi.org/10.18844/wjet.v13i4.6264

Huo, X., & Siau, K. (2024). *Generative Artificial Intelligence in Business Higher Education: A Focus Group Study*. Journal of Global Information Management, 32(1), 1–21. https://doi.org/10.4018/jgim.364093

Islomjon, M. (2025). *The Impact of Artificial Intelligence Technologies on Educational Effectiveness in the Process of Independent Learning*. Current Research Journal of Pedagogics, 6(4). https://doi.org/10.37547/pedagogics-crjp-06-04-02

Katsenou, R., Kotsidis, K., Papadopoulou, A., Anastasiadis, P., & Deliyannis, I. (2025). Beyond assistance: Embracing AI as a collaborative co-agent in education. *Education Sciences*. https://doi.org/10.3390/educsci15081006

Lameras, P. (2022). *A Vision of Teaching and Learning with AI*. IEEE Global Engineering Education Conference (EDUCON). https://doi.org/10.1109/educon52537.2022.9766718

Mehta, N., Harish, V., Bilimoria, K., Morgado, F., Ginsburg, S., Law, M., & Das, S. (2021). Knowledge of and attitudes on artificial intelligence in healthcare: A provincial survey study of medical students. *medRxiv*. https://doi.org/10.1101/2021.01.14.21249830

Nesterowicz, K., Librowski, T., & Edelbring, S. (2014). *Validating e-learning in continuing pharmacy education: user acceptance and knowledge change*. BMC Medical Education, 14(33). https://doi.org/10.1186/1472-6920-14-33

Volume. 4 Issue No. 4 (2025)
Online ISSN: 3006-2047
Print ISSN: 3006-2039

Okuda, Y., Bryson, E., DeMaria, S., Jacobson, L. A., Quinones, J., Shen, B., & Levine, A. (2009). *The utility of simulation in medical education: what is the evidence?* Mount Sinai Journal of Medicine, 76(4), 330–343. https://doi.org/10.1002/msj.20127

Omirali, A., Kozhakhmet, K., & Zhumaliyeva, R. (2025). Digital trust in transition: Student perceptions of AI-enhanced learning for sustainable educational futures. *Sustainability, 17*(17). https://doi.org/10.3390/su17177567

Omoyajowo, B. S., & Bambi, B. I. (2025). Qualitative study on integration of artificial intelligence for self-regulated learning among higher institutions of learning in Nigeria. *Faculty of Education Journal, Federal University Gusau*. https://doi.org/10.64348/zije.202558

Simon, F., & Aschenbrener, C. (2005). *Undergraduate medical education accreditation as a driver of lifelong learning*. Journal of Continuing Education in the Health Professions, 25, 157–161. https://doi.org/10.1002/chp.23

Tapalova, O., Zhiyenbayeva, N., & Gura, D. (2022). *Artificial Intelligence in Education: AIEd for Personalised Learning Pathways*. Electronic Journal of e-Learning. https://doi.org/10.34190/ejel.20.5.2597

Wegerif, R., & Casebourne, I. (2025). A dialogic theoretical foundation for integrating generative AI into pedagogical design. *British Journal of Educational Technology*. https://doi.org/10.1111/bjet.70026

Yan, L. (2025). From passive tool to socio-cognitive teammate: A conceptual framework for agentic AI in human–AI collaborative learning. *arXiv*. https://doi.org/10.48550/arxiv.2508.14825