

Overreliance on Artificial Intelligence in Malaysian Education: Ethical Implications and a Maqasid Shariah-Based Hybrid Intelligence Framework

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ABSTRACT

Artificial Intelligence (AI) has rapidly transformed educational environments worldwide, offering unprecedented opportunities for personalized learning, intelligent tutoring, automated assessment, and data-driven decision-making. In Malaysia, the increasing adoption of AI technologies aligns with broader educational transformation agendas and the aspirations of Education 4.0. While AI presents substantial benefits for improving instructional efficiency and learner engagement, growing concerns have emerged regarding the phenomenon of AI overreliance among both students and educators. Excessive dependence on AI-generated outputs may inadvertently weaken critical thinking, cognitive autonomy, academic integrity, ethical judgment, and meaningful human interaction, thereby challenging the fundamental purposes of education. Despite extensive scholarly discussions on AI ethics and educational technology, limited attention has been given to examining AI overreliance through an Islamic ethical lens, particularly within the framework of Maqasid Shariah. This conceptual paper addresses this gap by critically synthesizing contemporary literature on AI adoption in education, AI overreliance, educational ethics, and Islamic perspectives on knowledge and human development. Drawing upon the principles of Maqasid Shariah, particularly the preservation of intellect (hifz al- 'aql), the study proposes a Hybrid Intelligence Framework that positions AI as a complementary educational tool rather than a substitute for human agency, moral reasoning, and pedagogical leadership. The paper argues that responsible AI integration requires a balanced approach that combines technological innovation with ethical governance, human oversight, and value-based education. The proposed framework contributes to ongoing debates on AI governance by offering an alternative model that integrates contemporary educational needs with Islamic ethical principles. The study further provides practical implications for educators, policymakers, educational institutions, and technology developers seeking to promote ethical, inclusive, and sustainable AI adoption in educational contexts.

Keywords: *Artificial Intelligence, AI Overreliance, Educational Ethics, Hybrid Intelligence, Maqasid Shariah, Islamic Education, Human-AI Collaboration, Higher Education, Educational Technology, Malaysia*

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INTRODUCTION

Artificial Intelligence (AI), spanning machine learning, natural language processing, and generative AI (e.g., ChatGPT, Gemini) has fundamentally reshaped global socio-technological and educational landscapes. Within higher education, AI has driven pedagogical innovation and aligned with "Education 4.0" trends by personalizing learning, automating administration, and assisting in research and content generation (Holmes et al., 2019; Zawacki-Richter et al., 2019). In Malaysia, this digital transformation is heavily supported by national policies like the Malaysia Education Blueprint, which aims to modernize teaching and cultivate a highly skilled, future-ready workforce.

Despite these benefits, the rapid diffusion of AI has sparked critical ethical and pedagogical concerns. Emerging scholarship warns that an overreliance on AI can diminish students' critical thinking, cognitive engagement, and academic independence, transforming intelligent systems from intellectual supplements into substitutes for human effort (Zhai et al., 2024; Gerlich, 2025). Furthermore, widespread AI adoption introduces severe challenges regarding academic integrity, algorithmic bias, privacy, and the potential erosion of human judgment in educational evaluation. Broadly, an uncritical, efficiency-driven reliance on AI risks reducing a traditionally holistic human development process into a purely transactional one.

This tension is highly pronounced when viewed through Islamic educational philosophy, where knowledge ('ilm) is a transformative pursuit cultivating wisdom (hikmah) and moral conduct (akhlaq). Within this paradigm, the human intellect ('aql) is paramount; its preservation and development (hifz al-'aql) constitute a core objective protected under *Maqasid Shariah* (the objectives of Islamic law). Because *Maqasid Shariah* prioritizes human well-being by preserving religion (din), life (nafs), intellect ('aql), lineage (nasl), and wealth (mal), it offers an ideal framework for evaluating emerging technologies.

Table 1:
Research Objectives and Research Questions

No.	Research Objectives	Research Questions
1	Examine the ethical and educational implications of overreliance on artificial intelligence within contemporary educational environments.	What are the major ethical and educational consequences of overreliance on artificial intelligence in educational settings?
2	Analyze AI overreliance through the theoretical lens of Maqasid Shariah, with particular emphasis on the preservation of intellect (hifz al-'aql).	How can the phenomenon of AI overreliance be understood through the principles of Maqasid Shariah, particularly the preservation of intellect (hifz al-'aql)?
3	Explore the limitations of existing AI ethics approaches in addressing cognitive, moral, and educational challenges associated with excessive AI dependence.	What limitations exist within current approaches to AI ethics and educational technology governance?
4	Develop a Maqasid-Shariah-Based Hybrid Intelligence Framework for the responsible and ethical integration of AI in education.	How can a Maqasid Shariah-Based Hybrid Intelligence Framework contribute to responsible, ethical, and human-centered AI integration in education?
5	Provide theoretical and practical recommendations for policymakers, educational institutions, educators, and technology developers regarding sustainable AI governance.	What implications does such a framework have for future educational policy, practice, and AI governance?

LITERATURE REVIEW

Existing literature remains limited. Current research predominantly addresses the technical benefits of AI or relies on secular ethical frameworks, leaving a significant gap regarding how AI overreliance specifically threatens cognitive autonomy and ethical agency through a religious or value-based lens. To bridge this gap, this paper argues that the concept of Hybrid Intelligence, which positions AI as a collaborative partner to enhance, rather than replace, human capability, offers a balanced pathway forward. Integrated with *Maqasid Shariah*, this approach ensures educational systems remain technologically advanced yet human-centered. Accordingly, this study critically examines the implications of AI overreliance in Malaysian education and proposes a Maqasid Shariah-Based Hybrid Intelligence Framework to foster responsible, sustainable, and ethically grounded AI integration.

Despite the rapid growth of scholarly literature on artificial intelligence in education, three significant gaps remain evident. First, existing studies predominantly focus on the pedagogical benefits and technological capabilities of AI, including personalized learning, intelligent tutoring systems, predictive analytics, and automated assessment. Comparatively less attention has been given to the phenomenon of AI overreliance and its long-term implications for cognitive autonomy, intellectual development, and educational integrity.

Second, although AI ethics has emerged as an important field of inquiry, most discussions are grounded primarily in secular ethical frameworks emphasizing fairness, accountability, transparency, and privacy. While these perspectives remain important, they do not adequately address broader questions concerning human purpose, moral development, spiritual responsibility, and the preservation of intellect as a foundational educational objective.

Third, limited research has examined AI overreliance within the context of Islamic educational philosophy and Maqasid Shariah. Existing Islamic scholarship on technology tends to focus on general ethical permissibility rather than developing comprehensive educational frameworks capable of guiding responsible AI adoption. Consequently, there remains a lack of conceptual models that integrate contemporary AI governance principles with Islamic understandings of human development, knowledge, and ethical responsibility.

This study addresses these gaps by synthesizing contemporary literature on AI overreliance and proposing a Maqasid Shariah-Based Hybrid Intelligence Framework that balances technological innovation with the preservation of human intellect, ethical agency, and educational integrity.

METHODOLOGY

Research Design

This study adopts an integrative literature review approach to critically examine the phenomenon of artificial intelligence (AI) overreliance in education and to develop a conceptual framework grounded in the principles of *Maqasid Shariah*. An integrative review was selected because it allows for the synthesis of diverse theoretical, empirical, and conceptual literature, thereby facilitating a comprehensive understanding of emerging phenomena that have not yet reached theoretical maturity (Snyder, 2019).

Unlike traditional narrative reviews, integrative reviews provide a structured mechanism for combining findings from multidisciplinary sources while identifying patterns, conceptual gaps, and theoretical relationships. This approach is particularly appropriate for examining AI overreliance, as the issue intersects multiple disciplines including educational technology, cognitive psychology, ethics, artificial intelligence governance, philosophy of education, and Islamic studies. The study is conceptual in nature and seeks not only to synthesize existing knowledge but also to propose a novel theoretical framework capable of guiding ethical AI implementation within educational environments.

Literature Search Strategy

A systematic search of scholarly literature was conducted using major academic databases, including Scopus, Web of Science (WoS), ERIC, IEEE Xplore, ScienceDirect, SpringerLink, Taylor, Francis Online and Google Scholar for supplementary retrieval. The search focused on publications between 2015 and 2025 to capture contemporary developments associated with generative AI and educational transformation. Keywords and search strings included combinations of "Artificial Intelligence in Education", "AI Ethics", "Educational Technology", "AI Overreliance", "Cognitive Offloading", "Human-AI Collaboration", "Hybrid Intelligence", "Educational Integrity", "Academic Ethics", "Maqasid Shariah and Technology", "Islamic Ethics and Artificial Intelligence" and "Human Agency in AI". Boolean operators (AND, OR) were utilized to refine searches and improve retrieval accuracy.

Inclusion and Exclusion Criteria

The literature selection process followed predetermined criteria to ensure relevance and quality. Studies were included if they discussed AI applications within educational settings, examined ethical implications of AI usage, addressed cognitive, pedagogical, or governance issues related to AI, explored AI ethics, human agency, or human-AI interaction, included discussions relevant to Islamic ethics, Maqasid Shariah, or value-based technology governance and were published in peer-reviewed journals, conference proceedings, policy reports, or authoritative academic books.

Studies were excluded if they focused exclusively on technical AI development without educational implications, addressed AI applications unrelated to human decision-making, lacked sufficient scholarly rigor, were duplicated across databases or were not available in English.

Data Analysis

The selected literature was analyzed using thematic synthesis. Through iterative reading and coding, recurring themes were identified and organized into five major categories namely AI adoption in education, AI overreliance and cognitive dependency, Ethical challenges in educational AI, Islamic perspectives on technology and knowledge and Human-AI collaboration and hybrid intelligence. These themes subsequently informed the development of the proposed Maqasid Shariah-Based Hybrid Intelligence Framework.

Theoretical Framework

Maqasid Shariah as an Ethical Foundation for Educational Technology

Maqasid Shariah represents one of the most comprehensive frameworks within Islamic intellectual tradition for evaluating human actions, policies, and innovations. Originally developed by scholars such as Imam al-Ghazali, Imam al-Shatibi, and later expanded by Ibn Ashur, Maqasid Shariah seeks to preserve and promote human welfare (*maslahah*) through the protection of five fundamental objectives namely Preservation of Religion (*Hifz al-Din*), Preservation of Life (*Hifz al-Nafs*), Preservation of Intellect (*Hifz al-'Aql*), Preservation of Lineage (*Hifz al-Nasl*) and Preservation of Wealth (*Hifz al-Mal*).

While all five objectives remain relevant to discussions on artificial intelligence, the preservation of intellect occupies a particularly significant position within educational contexts. Islam regards intellectual development not merely as the acquisition of information but as the cultivation of wisdom, critical reflection, ethical judgment, and responsible action. Knowledge acquisition is therefore inseparable from moral responsibility.

Allah SWT states; "Are those who know equal to those who do not know?" (Surah Az-Zumar, 39:9). This verse highlights the elevated status of knowledge and intellectual engagement within Islam. Consequently, any educational practice that weakens independent reasoning, critical inquiry, or cognitive autonomy requires careful ethical examination. Excessive reliance on AI-generated outputs may inadvertently undermine the objectives of *hifz al-'aql* if learners become passive

recipients of information rather than active constructors of knowledge. Thus, Maqasid Shariah provides an appropriate normative framework for evaluating whether AI enhances or diminishes human intellectual flourishing.

Human Agency and Educational Ethics

A second theoretical pillar underpinning this study is the concept of human agency. Human agency refers to the capacity of individuals to make informed choices, exercise judgment, and act intentionally within social contexts (Bandura, 2001). Educational systems traditionally aim to strengthen agency by cultivating independent thinkers capable of evaluating evidence, solving problems, and making responsible decisions.

The emergence of generative AI introduces a significant challenge to agency. While AI systems provide unprecedented access to information and decision-support capabilities, they may also encourage cognitive dependency when users routinely defer intellectual tasks to automated systems. Recent scholarship describes this phenomenon as automation bias and cognitive offloading, where individuals increasingly rely on technological systems to perform cognitive functions that were previously carried out independently (Passi & Vorvoreanu, 2022; Gerlich, 2025).

In educational settings, excessive cognitive offloading may lead to reduced critical thinking, declining analytical reasoning, diminished creativity, lower problem-solving resilience and increased intellectual passivity. Consequently, preserving human agency becomes a central ethical requirement in AI-enhanced education.

Hybrid Intelligence Theory

To address the limitations associated with both fully human-centered and fully automated educational models, this study adopts Hybrid Intelligence Theory as its third theoretical foundation.

Hybrid Intelligence refers to collaborative systems in which human intelligence and artificial intelligence complement one another to achieve outcomes that neither could accomplish independently (Zheng et al., 2017). Unlike automation-centered paradigms that seek to replace human functions, Hybrid Intelligence emphasizes Human oversight, Human judgment, Human accountability, Human values and Human creativity.

Within educational contexts, Hybrid Intelligence recognizes that AI possesses strengths in data processing, pattern recognition, adaptive learning, content generation and administrative automation. Conversely, educators possess strengths in moral reasoning, empathy, contextual judgment, character development and relationship building. Therefore, effective educational systems should not seek to replace teachers with AI but rather integrate both forms of intelligence in ways that maximize educational outcomes while preserving human dignity.

Integrating Maqasid Shariah and Hybrid Intelligence

This study proposes that Hybrid Intelligence becomes ethically sustainable only when guided by the principles of Maqasid Shariah. While Hybrid Intelligence explains how humans and AI may collaborate effectively, Maqasid Shariah provides guidance regarding why such collaboration should occur and what ethical boundaries must govern it.

The integration of both frameworks results in a human-centered model where AI supports learning rather than replacing intellectual effort, human reasoning remains central to educational decision-making, ethical accountability remains with human actors, educational technologies promote intellectual growth, and technological innovation serves societal well-being. The resulting framework positions AI as an instrument of empowerment rather than substitution.

LITERATURE REVIEW

Artificial Intelligence in Education: Opportunities and Transformation

Artificial Intelligence has emerged as one of the most influential technological innovations shaping contemporary educational practice. Educational AI encompasses a broad range of applications, including intelligent tutoring systems, adaptive learning environments, predictive analytics, automated assessment, conversational agents, and generative AI platforms.

Research consistently demonstrates that AI can enhance educational efficiency by personalizing learning experiences according to individual learner needs (Holmes et al., 2019). Through real-time analysis of learner performance, AI systems can identify learning gaps and provide targeted interventions. Furthermore, AI enables educators to automate routine administrative tasks, thereby increasing the time available for pedagogical interaction and student support. These developments align closely with the goals of Education 4.0, which emphasize flexibility, personalization, and digital transformation. Nevertheless, scholars increasingly caution against viewing AI solely through a lens of technological optimism.

AI Overreliance and Cognitive Offloading

Although AI offers substantial educational benefits, emerging research highlights growing concerns regarding overreliance on intelligent systems. Overreliance occurs when users place excessive trust in AI-generated outputs while reducing their own cognitive engagement and critical evaluation processes (Passi & Vorvoreanu, 2022).

The phenomenon is closely linked to cognitive offloading, whereby individuals delegate mental tasks to technological systems, including using AI to write assignments, allowing AI to generate arguments, depending on AI for problem-solving and relying on AI-generated summaries instead of reading original sources.

While cognitive offloading may reduce workload, excessive dependence can gradually weaken intellectual autonomy. Zhai et al. (2024) argue that long-term overreliance may contribute to declining critical thinking and reduced problem-solving capabilities among learners. Similarly, Gerlich (2025) suggests that excessive AI usage may negatively affect memory retention, attention span, and independent reasoning. These findings raise important questions regarding the long-term educational implications of AI-mediated learning.

Ethical Challenges in AI-Enhanced Education

Three ethical concerns dominate contemporary discussions regarding AI in education:

Transparency

Transparency refers to the ability of users to understand how AI systems generate outputs and make recommendations. Generative AI platforms frequently operate as "black-box" systems, making it difficult for users to evaluate information quality and source credibility. Educational decisions influenced by opaque systems may therefore undermine trust and accountability.

Accountability

Determining responsibility becomes increasingly complex when AI systems influence educational outcomes. Questions emerge regarding who should be held accountable when AI-generated recommendations are inaccurate, biased, or harmful. Maintaining meaningful human oversight remains essential to preserving educational integrity.

Privacy

Educational AI systems often require extensive data collection. Student performance records, behavioral patterns, and personal information may be continuously monitored and analyzed. Without adequate safeguards, such practices raise significant concerns regarding surveillance, consent, and data protection. Collectively, these challenges illustrate the necessity of robust governance frameworks capable of balancing innovation with ethical responsibility.

Islamic Perspectives on Technology and Human Development

Islam does not reject technological advancement. Rather, technology is evaluated according to its capacity to promote benefit (*maslahah*) and prevent harm (*mafsadah*). Throughout Islamic intellectual history, scholars have emphasized that technological progress should remain subordinate to ethical and spiritual objectives. Contemporary Islamic scholarship increasingly recognizes AI as a potentially beneficial tool while cautioning against its misuse.

From a Maqasid Shariah perspective, technology should contribute to intellectual development, human flourishing, social justice, ethical responsibility and community well-being. Consequently, AI should be assessed not only according to technical efficiency but also according to its impact on human character, knowledge formation, and societal welfare. This perspective provides a valuable alternative to purely utilitarian approaches to educational technology governance.

Towards a Human-Centered and Ethical AI Future

The literature collectively suggests that the central challenge facing educational institutions is not whether AI should be adopted, but how it should be adopted responsibly. Neither technological determinism nor technological rejection offers a sustainable pathway forward.

Instead, emerging evidence points toward the need for balanced models that preserve human agency while leveraging technological capabilities. Such models require ethical governance structures capable of ensuring that AI remains a servant of human development rather than a substitute for human intelligence. It is within this context that the present study advances the concept of a Maqasid Shariah-Based Hybrid Intelligence Framework, which is presented and discussed in the subsequent section.

FINDINGS AND THEMATIC SYNTHESIS

The thematic analysis of the reviewed literature revealed that the phenomenon of AI overreliance in education extends beyond technological dependency and constitutes a multidimensional challenge involving cognitive, ethical, pedagogical, and spiritual dimensions. Five interconnected themes emerged from the synthesis of the literature.

These themes collectively demonstrate that the primary challenge associated with artificial intelligence is not the technology itself, but the manner in which educational stakeholders engage with it. While AI possesses significant potential to enhance educational effectiveness, excessive dependence on AI-generated outputs may undermine the very intellectual and moral capacities that education seeks to cultivate. The findings are organized into two major domains: ethical consequences and educational consequences.

Ethical Consequences of AI Overreliance

Erosion of Accountability

One of the most significant ethical consequences identified in the literature is the gradual diffusion of accountability. Traditionally, educational decisions are made by human actors who are morally and professionally accountable for their

actions. Teachers are responsible for instructional decisions, students are responsible for their academic work, and institutions are responsible for maintaining educational quality and integrity.

However, AI-mediated decision-making introduces ambiguity regarding responsibility. When educational decisions become increasingly dependent on algorithmic recommendations, accountability becomes fragmented. Users may justify poor decisions by attributing them to AI-generated outputs rather than exercising independent judgment. This phenomenon creates what may be described as an “accountability vacuum,” whereby responsibility becomes increasingly difficult to assign.

From an Islamic perspective, this issue directly challenges the principle of amanah (trustworthiness). Human beings are regarded as trustees (khalifah) who remain accountable before Allah SWT for their decisions and actions. Delegating judgment entirely to technological systems does not eliminate this responsibility. Consequently, educational AI systems should be designed to support human judgment rather than replace human accountability.

Transparency Deficit and Knowledge Authenticity

The second ethical challenge concerns transparency. Generative AI systems frequently operate as opaque computational environments where users receive outputs without fully understanding the processes, datasets, or assumptions that produced them. While such systems may generate plausible responses, users often lack the ability to verify information accuracy, source credibility, embedded biases and reasoning pathways.

This creates what may be termed a transparency deficit. In educational contexts, transparency deficits can undermine academic integrity because students may unknowingly rely upon inaccurate or fabricated information. From an Islamic epistemological perspective, the authenticity of knowledge is a fundamental concern.

Classical Islamic scholarship developed rigorous mechanisms of verification, including sanad (chains of transmission), source validation, and scholarly authentication. The Quran repeatedly encourages believers to verify information before accepting or acting upon it: "O believers! If an evildoer brings you any news, verify it..." (Surah Al-Hujurat 49:6). Accordingly, unquestioning acceptance of AI-generated information contradicts the Islamic principle of responsible knowledge acquisition.

Privacy and Human Dignity

The third ethical consequence relates to privacy and data protection. Contemporary educational AI systems rely heavily on large-scale data collection. Student behaviors, learning patterns, assessment records, and personal information are continuously gathered and analyzed. While such practices enable personalization, they simultaneously raise concerns regarding informed consent, data ownership, surveillance and algorithmic profiling. The literature suggests that excessive data extraction may gradually normalize educational surveillance, particularly among younger learners who may not fully understand the implications of data sharing.

Within Islamic ethics, human dignity (*karamah insaniyyah*) represents a foundational value. Any technological practice that compromises privacy without legitimate necessity may conflict with Islamic teachings concerning respect for human dignity and personal rights. Consequently, AI governance frameworks must incorporate robust privacy protections to ensure that educational innovation does not occur at the expense of individual dignity.

Educational Consequences of AI Overreliance

Decline of Cognitive Autonomy

The most consistently reported educational consequence is the erosion of cognitive autonomy. Cognitive autonomy refers to an individual's ability to think independently, evaluate information critically, and formulate reasoned judgments without excessive external dependence. The literature indicates that students increasingly use AI systems not merely as learning

aids but as substitutes for intellectual effort. Examples for it include generating essays through AI, solving problems without attempting independent analysis, relying on AI-generated summaries instead of engaging with primary sources and accepting AI recommendations without critical evaluation.

Although such practices improve short-term efficiency, they may reduce opportunities for intellectual struggle, reflection, and deeper learning. Over time, learners may become dependent on technological systems to perform cognitive functions that are essential for intellectual development. This finding is particularly significant from the perspective of Maqasid Shariah because it directly threatens the preservation of intellect (*hifz al-'aql*).

Weakening of Critical Thinking and Reflective Judgment

Closely related to cognitive autonomy is the decline of critical thinking. Critical thinking involves questioning assumptions, evaluating evidence, comparing perspectives and constructing reasoned arguments.

Educational researchers increasingly warn that generative AI may unintentionally encourage passive consumption of information rather than active intellectual engagement. When students receive immediate answers to complex questions, they may bypass the reflective processes necessary for genuine learning. The resulting educational experience becomes transactional rather than transformative. Islamic educational philosophy similarly emphasizes reflection (*tafakkur*), contemplation (*tadabbur*), and reasoning (*ta'aqqul*) as essential components of knowledge development. Therefore, any educational practice that discourages reflective judgment may undermine both educational and spiritual objectives.

Reduction of Human Interaction and Moral Formation

Education extends beyond knowledge transmission. It also involves character development, emotional intelligence, social interaction and moral formation. The literature suggests that excessive dependence on AI may reduce opportunities for meaningful teacher-student interaction and peer collaboration.

As AI increasingly mediates communication, feedback, and learning support, educational relationships may become less personal and less transformative. This issue is particularly important because many educational outcomes are achieved through human relationships rather than information delivery alone. Teachers serve not only as instructors but also as mentors, role models, moral guides and facilitators of personal growth. These uniquely human functions cannot be replicated by AI systems regardless of technological sophistication.

A Maqasid Shariah-Based Hybrid Intelligence Framework

Rationale for the Framework

The literature reveals that both technological enthusiasm and technological resistance represent inadequate responses to AI integration in education. On one hand, unrestricted AI adoption risks fostering dependency, weakening human agency, and undermining educational integrity. On the other hand, rejecting AI entirely would deny learners access to valuable educational innovations. Therefore, a balanced approach is required.

This study proposes a Maqasid Shariah-Based Hybrid Intelligence Framework (MS-HIF) that integrates AI capabilities, human intelligence, educational ethics, islamic values and institutional governance. The framework seeks to ensure that AI functions as a tool for human enhancement rather than human replacement.

Core Principles of the Framework

The proposed framework is built upon five interrelated principles.

Table 2:

The Maqasid Shariah-Based Hybrid Intelligence Framework: Core Principles

Principle	Core Concept	Operational Mechanism/ Application	Ethical & Educational Value
1. Human Primacy	Human agency as the ultimate authority.	AI functions strictly as a supportive analytical tool; final pedagogical and administrative decisions remain exclusively human.	Protects accountability, agency and independent ethical judgment.
2. Preservation of Intellect (<i>Hifz al-'Aql</i>)	Cultivation of cognitive autonomy.	Discourages rote intellectual dependency; AI is deployed to stimulate, rather than replace, deep reflection and inquiry.	Strengthens critical thinking, problem-solving and human creativity.
3. Ethical Accountability (<i>Amanah</i>)	Shared moral responsibility.	Algorithmic actions cannot absorb human liability; teachers, students, and developers maintain shared moral ownership.	Upholds transparency and prevents the delegation of ethical duties to code.
4. Balanced Moderation (<i>Wasatiyyah</i>)	Dynamic equilibrium in tech adoption.	Rejects both techno-utopian dominance and technophobic avoidance, integrating AI deliberately into learning spaces.	Fosters technological innovation while fiercely safeguarding human-centered values.
5. Continuous Governance	Persistent iterative oversight.	Employs ongoing monitoring of AI systems to rigorously test data inputs, outputs, and algorithmic biases.	Ensures long-term fairness, privacy compliance, and alignment with societal values.

8.3 Conceptual Framework Table 1 Maqasid Shariah-Based Hybrid Intelligence Framework (MS-HIF) for Ethical AI Integration in Education

Dimension	AI Function	Human Function	Maqasid Shariah Principle	Expected Educational Outcome
Learning Support	Personalized learning, adaptive content	Critical reflection, contextual understanding	Hifz al-'Aql	Enhanced intellectual development
Assessment	Automated grading, analytics	Professional judgment, fairness verification	Al-'Adl (Justice)	Fair and transparent evaluation
Knowledge Generation	Information retrieval, content generation	Verification, interpretation, synthesis	Hifz al-'Aql	Authentic knowledge construction
Student Development	Learning analytics, performance tracking	Mentorship, empathy, character formation	Hifz al-Din & Hifz al-Nafs	Holistic human development
Governance	Data management, reporting	Ethical oversight, accountability	Amanah	Responsible AI governance
Innovation	Efficiency and scalability	Purpose and value alignment	Maslahah	Sustainable educational innovation

9.0 Discussion

The findings suggest that concerns regarding AI overreliance should not be interpreted as opposition to technological advancement. Rather, they reflect broader concerns regarding the future of human agency within increasingly automated

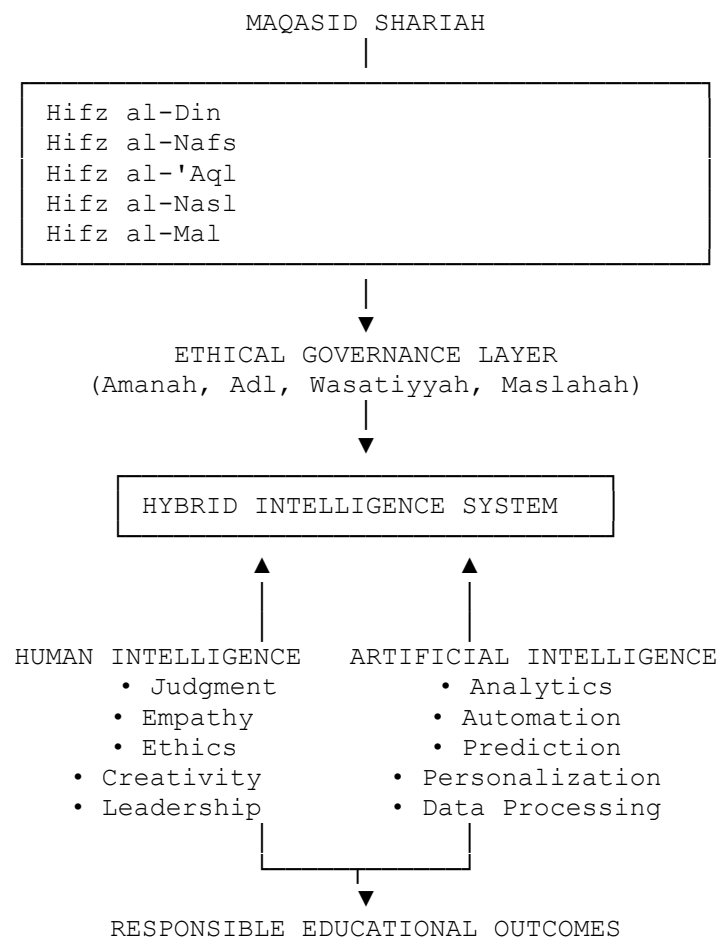
societies. Current debates often frame educational technology as a contest between humans and machines. However, the findings indicate that such binary thinking is conceptually flawed. The more relevant question is how humans and AI can collaborate in ways that preserve intellectual autonomy while enhancing educational outcomes. The proposed Maqasid Shariah-Based Hybrid Intelligence Framework addresses this challenge by repositioning AI as a supportive rather than substitutive technology.

This approach differs from many existing AI governance models that focus primarily on technical dimensions such as transparency, accountability, and privacy. While these considerations remain important, they do not fully address deeper educational questions concerning human flourishing, moral development, and intellectual cultivation. The incorporation of Maqasid Shariah expands the ethical conversation by introducing normative considerations related to human purpose, dignity, and societal well-being.

Furthermore, the framework contributes to emerging discussions regarding Human-Centered Artificial Intelligence (HCAI) by providing an alternative perspective grounded in Islamic ethical thought. Rather than viewing technology solely through utilitarian or efficiency-oriented lenses, the framework evaluates AI according to its capacity to preserve and enhance essential human capacities. Consequently, responsible AI integration should be measured not merely by technological performance but by its contribution to intellectual growth, ethical responsibility, and holistic human development.

Figure 1.

Conceptual Structure of the Maqasid Shariah-Based Hybrid Intelligence Framework



- Critical Thinking
- Intellectual Autonomy
- Academic Integrity
- Ethical Responsibility
- Human Flourishing

Practical and Policy Implications

The findings generate several implications for educational stakeholders. The following table summarizes the ethical implications and recommendations for key stakeholders in the field of education, as derived from the research findings:

Table 1: Ethical Implications and Recommendations for AI in Education

Stakeholder Group	Key Recommendations and Implications
Polymakers	• Develop national AI ethics guidelines specifically for the education sector. • Establish robust AI governance standards for all educational institutions. • Promote and fund initiatives for responsible AI literacy among educators and students.
Educational Institutions	• Formulate and implement clear institutional AI usage policies. • Provide comprehensive AI ethics training programs for staff and students. • Ensure consistent human oversight remains central to assessment and evaluation processes.
Educators	• Position AI as a pedagogical support tool to enhance, rather than replace, human teaching. • Design assessments that prioritize authentic learning and critical thinking skills. • Guide students in the critical evaluation of outputs generated by AI systems.
Technology Developers	• Prioritize and increase algorithmic transparency in educational tools. • Implement strengthened privacy protections for student and institutional data. • Design AI systems that foster active learning and prevent student dependency.
Islamic Educational Institutions	• Integrate the principles of Maqasid Shariah into institutional AI governance policies. • Cultivate ethical technology literacy that is grounded in Islamic values. • Ensure AI innovation is directed toward supporting holistic human development.

Theoretical Contributions

This study contributes to the growing body of literature on artificial intelligence in education in several important ways. First, the study advances current discussions on AI ethics by shifting attention from the commonly examined issues of transparency, privacy, and accountability toward the relatively underexplored phenomenon of AI overreliance. While existing scholarship has predominantly focused on technical governance challenges, less attention has been devoted to understanding how excessive dependence on AI may influence human cognition, intellectual autonomy, and educational integrity. By foregrounding overreliance as a distinct ethical and educational challenge, this study expands contemporary AI ethics discourse beyond algorithmic concerns to include human developmental considerations.

Second, the study contributes to educational technology literature by introducing the concept of cognitive preservation as a critical dimension of responsible AI integration. Existing educational AI frameworks generally emphasize efficiency, personalization, and learning optimization. In contrast, this paper argues that the preservation of critical thinking, reflective judgment, and intellectual independence should constitute equally important indicators of successful AI implementation. This perspective broadens prevailing understandings of educational effectiveness and challenges technology-centered narratives that equate innovation solely with automation.

Third, the study extends Human-Centered Artificial Intelligence (HCAI) scholarship by proposing a Maqasid Shariah-informed interpretation of human-centeredness. Existing HCAI models are primarily grounded in secular ethical traditions and focus on human welfare, autonomy, and control. While valuable, such approaches often lack deeper normative foundations concerning the purpose of knowledge, human flourishing, and moral development. By incorporating Maqasid Shariah, this study introduces an alternative ethical paradigm that situates AI governance within broader considerations of intellectual preservation, moral responsibility, and societal well-being.

Fourth, the study contributes to Islamic educational thought by demonstrating how classical Islamic concepts can be applied to contemporary technological challenges. Although Maqasid Shariah has been widely employed in discussions of economics, healthcare, and public policy, its application to educational AI governance remains limited. This paper therefore expands the scope of Maqasid-based scholarship by illustrating its relevance to emerging technologies and digital transformation.

Finally, the study develops and introduces the Maqasid Shariah-Based Hybrid Intelligence Framework (MS-HIF), which constitutes the principal theoretical contribution of this article. The framework provides a novel conceptual model that integrates educational technology, AI ethics, human agency, and Islamic ethical principles into a coherent structure capable of guiding responsible AI implementation in educational settings.

Practical Contributions

Beyond its theoretical significance, the study offers several practical contributions for policymakers, educational leaders, educators, and technology developers. For policymakers, the proposed framework provides a foundation for developing national AI governance policies that balance innovation with ethical responsibility. Rather than focusing exclusively on technological competitiveness, policymakers are encouraged to incorporate human-centered indicators such as critical thinking development, ethical literacy, and intellectual autonomy into national AI strategies.

For higher education institutions, the framework offers guidance for institutional AI governance. Universities and schools may utilize the proposed principles to develop AI usage guidelines, academic integrity policies, and ethical review mechanisms. Such initiatives are increasingly important as generative AI tools become embedded within teaching, assessment, and research practices. For educators, the study highlights the importance of maintaining pedagogical leadership within AI-enhanced learning environments. Teachers should be empowered to utilize AI as a supportive educational tool while preserving opportunities for critical reflection, collaborative learning, and authentic assessment. The findings further encourage educators to develop assessment approaches that evaluate higher-order thinking skills rather than merely content reproduction.

For students, the framework promotes responsible AI literacy. Students should be trained not only in how to use AI effectively but also in how to critically evaluate AI-generated information, recognize limitations, and maintain intellectual independence. Such competencies will become increasingly important within future knowledge economies. For technology developers, the framework provides ethical design principles for educational AI systems. Future AI applications should prioritize transparency, explainability, privacy protection, and human oversight while encouraging active learning rather than passive dependency. For Islamic educational institutions, the framework offers a practical mechanism for integrating technological innovation with Islamic educational values. The proposed model demonstrates that AI adoption and Islamic ethics need not be viewed as competing priorities but can be harmonized through thoughtful governance and implementation.

Limitations of the Study

Several limitations should be acknowledged when interpreting the findings of this study. First, the study is conceptual in nature and does not involve primary empirical data collection. Consequently, the proposed framework is derived from theoretical synthesis rather than direct observations of educational stakeholders. While conceptual approaches are valuable for theory development, empirical validation remains necessary to assess the practical applicability of the framework.

Second, the literature reviewed primarily reflects contemporary scholarship published between 2015 and 2025. Given the rapid pace of AI development, technological capabilities and educational practices may continue to evolve in ways that introduce new opportunities and challenges beyond those identified in the current study. Third, although the study adopts a Malaysian educational perspective, many of the reviewed sources originate from international contexts. Therefore, variations in cultural, institutional, and regulatory environments may influence the transferability of certain findings.

Fourth, the study focuses primarily on educational applications of AI and does not comprehensively address AI usage in other sectors such as healthcare, industry, or governance. Future investigations may explore whether the proposed framework can be adapted to these contexts. Finally, while the framework is grounded in Maqasid Shariah, other Islamic ethical traditions and philosophical approaches may offer complementary insights that warrant further exploration.

Future Research Recommendations

The findings of this study open several promising avenues for future research. First, empirical studies should be conducted to examine perceptions of AI overreliance among students, educators, administrators, and policymakers. Such studies would provide valuable insights into how AI dependency manifests within actual educational environments.

Second, quantitative investigations could be undertaken to examine the relationship between AI usage intensity and cognitive outcomes such as critical thinking, problem-solving ability, academic performance, and intellectual autonomy. Third, researchers may develop and validate measurement instruments capable of assessing AI overreliance among learners. Existing studies often rely on general technology usage indicators, highlighting the need for more specialized assessment tools. Fourth, comparative studies across countries, educational levels, and cultural contexts would enhance understanding of how AI overreliance is influenced by social and institutional factors.

Fifth, future research should empirically test the Maqasid Shariah-Based Hybrid Intelligence Framework (MS-HIF) through case studies, intervention programs, and policy implementation initiatives. Sixth, scholars may explore the integration of Maqasid Shariah with other emerging ethical frameworks, including Responsible AI, Explainable AI (XAI), Human-Centered AI, and Digital Ethics. Finally, longitudinal research is needed to investigate the long-term cognitive, social, and moral consequences of AI dependency among future generations of learners.

CONCLUSION

Artificial Intelligence is rapidly reshaping educational systems worldwide and has become an indispensable component of contemporary teaching and learning environments. While AI offers considerable benefits in terms of efficiency, personalization, accessibility, and innovation, its increasing integration into educational practice also raises important ethical and pedagogical concerns. Among these concerns, the phenomenon of AI overreliance has emerged as a critical issue that requires greater scholarly and policy attention.

This study has argued that excessive dependence on AI may contribute to the erosion of cognitive autonomy, critical thinking, reflective judgment, accountability, and meaningful human interaction. Such developments pose significant challenges to the broader aims of education, which extend beyond information acquisition to include intellectual cultivation, ethical development, and human flourishing. Drawing upon the principles of Maqasid Shariah, the study has proposed that responsible AI integration should prioritize the preservation of intellect (*hifz al-'aql*), human agency, and ethical accountability. Through a synthesis of contemporary AI ethics literature and Islamic educational philosophy, the study developed the Maqasid Shariah-Based Hybrid Intelligence Framework (MS-HIF) as a conceptual model for balancing technological innovation with human-centered educational values.

The framework emphasizes that AI should function as a supportive partner rather than a substitute for human intelligence. Educational systems must therefore ensure that technological advancement enhances rather than diminishes critical thinking, moral reasoning, and intellectual independence. By integrating contemporary AI governance principles with Islamic ethical foundations, the framework offers a novel contribution to discussions on responsible educational technology. Ultimately, the future of education should not be defined by the extent to which machines can replace human capabilities, but by how effectively technology can empower individuals to become more knowledgeable, ethical,

reflective, and socially responsible. In this regard, the challenge facing educational institutions is not whether to adopt AI, but how to ensure that AI remains a servant of human development rather than its master.

REFERENCES

- Akgun, S., & Greenhow, C. (2022). Artificial intelligence in education: Addressing ethical challenges in K–12 settings. *AI and Ethics*, 2(3), 431–440. <https://doi.org/10.1007/s43681-021-00096-7>
- AlFzari, S. M. A. A., Rosman, A. S., Bayoumi, K., & Darawi, A. B. S. (2024). Ten Ways the Metaverse will Reshape the World: An Islamic Perspective. *International Journal of Academic Research in Business and Social Sciences*, 14(11), 54–65. <http://dx.doi.org/10.6007/IJARBS/v14-i11/23170>
- Alimunir, N. H. (2023). Teknologi Kecerdasan Buatan dalam Proses Perancangan dan Pengajaran Guru Sejarah. *Munsiy Jurnal Pengajian Sejarah*, 1(2), 29-63.
<https://ejournal.upsi.edu.my/index.php/MUNSYI/article/download/8730/5369/51703>
- Al-Zahrani, A. M. (2024). Unveiling the shadows: Beyond the hype of AI in education. *Heliyon*, 10(9), e30696. <https://doi.org/10.1016/j.heliyon.2024.e30696>
- Akinde Michael Ogunmolu. (2025). Enhancing Data Security in Artificial Intelligence Systems: A Cybersecurity and Information Governance Approach. *Journal of Engineering Research and Reports*, 27(5), 154–172. <https://doi.org/10.9734/jerr/2025/v27i51500>
- Baker, T. and Smith, L. (2019) Educ-AI-Tion Rebooted? Exploring the Future of Artificial Intelligence in Schools and Colleges. <https://www.nesta.org.uk/report/education-rebooted/>
- Balfour, S. P. (2013). Assessing Writing in MOOCs: Automated Essay Scoring and Calibrated Peer Review™. *Research & Practice in Assessment*, 8, 40–48. <https://eric.ed.gov/?id=EJ1062843>
- Bernama. (2024, November 1). *Use AI but don't abandon reading and critical thinking – PM*. Astro AWANI. Retrieved from <https://international.astroawani.com/malaysia-news/use-ai-dont-abandon-reading-and-critical-thinking-pm-494372>
- Buçinca, Z., Malaya, M. B., & Gajos, K. Z. (2021). To trust or to think. *Proceedings of the ACM on Human-Computer Interaction*, 5(CSCW1), 1–21. <https://doi.org/10.1145/3449287>
- Budiman, M., Wijaya, M., Rizkillah, R., Noor, I., Safuan, S., & Destriana, R. (2024). Artificial Intelligence(AI)in Islam: Building Ethics and Solutions Based on Tawhid. *Proceeding of the International Conference on Religious Education and Cross-Cultural Understanding*, 1(2), 60–76. <https://prosiding.aripafi.or.id/index.php/ICRECCU/article/view/24/37>
- Chaushi, B. A., Ismaili, F., & Chaushi, A. (2024). *Pros and cons of artificial intelligence in education*. *International Journal of Advanced Natural Sciences and Engineering Researches*, 8(2), 51–57.
- Chen, L., Chen, P., & Lin, Z. (2020). Artificial intelligence in education: A review. *IEEE Access*, 8, 75264–75278. <https://doi.org/10.1109/ACCESS.2020.2988510>

- Dadeng Wahyudi, Maemunah Sa'diyah, Indra, H., & Budi Handrianto. (2024). Management of Educators and Education Personnel from an Islamic Perspective. *PPSDP International Journal of Education*, 3(2), 520–530. <https://doi.org/10.59175/pijed.v3i2.273>
- Dikli, S. (2006). An Overview of Automated Scoring of Essays. *The Journal of Technology, Learning and Assessment*, 5(1). <https://ejournals.bc.edu/index.php/jtla/article/view/1640/1489>
- Eden, C. A., Chisom, O. N., & Adeniyi, I. S. (2024). Integrating AI in education: Opportunities, challenges, and ethical considerations. *Magna Scientia Advanced Research and Reviews*, 10(2), 006-013. <https://doi.org/10.30574/msarr.2024.10.2.0039>
- Gedrimiene, E., Silvola, A., Pursiainen, J., Rusanen, J., & Muukkonen, H. (2020). Learning analytics in education: Literature review and case examples from vocational education. *Scandinavian Journal of Educational Research*, 64(7), 1105-1119. <https://doi.org/10.1080/00313831.2019.1649718>
- Gerlich, M. (2025). AI Tools in Society: Impacts on cognitive offloading and the future of critical thinking. *Societies*, 15(1), 6. <https://doi.org/10.3390/soc15010006>
- Greenhow, C., Galvin, S., Brandon, D., Askari, E.: A decade of research on K-12 teaching and teacher learning with social media: insights on the state-of-the-field. *Teachers College Record* 122(6), 1–7 (2020)
- Hakami, E., & Hernández Leo, D. (2020). How are learning analytics considering the societal values of fairness, accountability, transparency and human well-being: A literature review. In Martínez-Monés A, Álvarez A, Caeiro-Rodríguez M, Dimitriadis Y (Eds.), *Learning Analytics Summer Institute Spain 2020* (pp. 121-41). Aachen: CEUR. Valladolid, Spain. https://repositori.upf.edu/bitstream/handle/10230/47267/hakami_lasispain_howar.pdf?sequence=1&isAllowed=y
- Henderson, P., Sinha, K., Angelard-Gontier, N., Ke, N., Fried, G., Lowe, R., & Pineau, J. (n.d.). *Ethical Challenges in Data-Driven Dialogue Systems*. Retrieved June 14, 2025, from https://www.aies-conference.com/2018/contents/papers/main/AIES_2018_paper_159.pdf?utm_source
- Holmes, W., Bialik, M., & Fadel, C. (2019). *Artificial Intelligence in Education: Promises and Implications for Teaching and Learning*. Boston: Center for Curriculum Redesign. <AIED-Book-Excerpt-CCR.pdf>
- Hrastinski, S., Olofsson, A. D., Arkenback, C., Ekström, S., Ericsson, E., Fransson, G., Jaldemark, J., Ryberg, T., Öberg, L.-M., Fuentes, A., Gustafsson, U., Humble, N., Mozeliuss, P., Sundgren, M., & Utterberg, M. (2019). Critical Imaginaries and Reflections on Artificial Intelligence and Robots in Postdigital K-12 Education. *Postdigital Science and Education*, 1(2), 427–445. <https://doi.org/10.1007/s42438-019-00046-x>
- IEEE Corporate Advisory Group (CAG): IEEE guide for terms and concepts in intelligent process automation. The Institute of Electrical and Electronics Engineers Standards Association. 1–16 (2017). <https://ieeexplore.ieee.org/servlet/opac?punumber=8070669>
- Iman, M., Arabnia, H. R., Branchinst, R. M.: Pathways to artificial general intelligence: a brief overview of developments and ethical issues via artificial intelligence, machine learning, deep learning, and data science. Paper presented at International Conference on Artificial Intelligence (ICAI). Las Vegas, Nevada, USA. (2020) [\(PDF\) Pathways to Artificial General Intelligence: A Brief Overview of Developments and Ethical Issues via Artificial Intelligence, Machine Learning, Deep Learning, and Data Science](#)

- Ju, Q. (2023). *Experimental Evidence on Negative Impact of Generative AI on Scientific Learning Outcomes*. Social Science Research Network. <https://doi.org/10.2139/ssrn.4567696>
- Khan, A. A., Akbar, M. A., Fahmideh, M., Liang, P., Waseem, M., Ahmad, A., Niazi, M., & Abrahamsson, P. (2023). AI Ethics: An Empirical study on the views of practitioners and lawmakers. *IEEE Transactions on Computational Social Systems*, 10(6), 2971–2984. <https://doi.org/10.1109/tcss.2023.3251729>
- Koos, S., & Wachsmann, S. (2023). Navigating the impact of chatgpt/gpt4 on legal academic examinations: Challenges, opportunities and recommendations. *Media Iuris*, 6, 255–270. <https://doi.org/10.20473/mi.v6i2.45270>
- Lee, G. G., & Gimino, B. (2024, April 22). *Students rely heavily on AI to excel in coursework*. The Star. Retrieved from <https://www.thestar.com.my/news/nation/2024/04/22/students-rely-heavily-on-ai-to-excel-in-coursework>
- Leta, F. M., & Vancea, D. P. C. (2023). Ethics in Education: Exploring the ethical implications of artificial intelligence implementation. *Ovidius University Annals Economic Sciences Series*, 23(1), 413–421. <https://doi.org/10.61801/ouaess.2023.1.54>
- Luckin, R., Holmes, W., Griffiths, M., & Forcier, L. B. (2016). *Intelligence Unleashed: An Argument for AI in Education*. London: Pearson. https://www.researchgate.net/publication/299561597_Intelligence_Unleashed_An_argument_for_AI_in_Education
- Merikko, J., Ng, K., Saqr, M., & Ihtola, P. (2022). To opt in or to opt out? Predicting student preference for learning Analytics-Based Formative feedback. *IEEE Access*, 10, 99195–99204. <https://doi.org/10.1109/access.2022.3207274>
- Mamdukh Budiman, M., Wijaya, M. M., Rizkillah, R. W., Noor, I. H., Safuan, S., & Destriana, R. (2024). *Artificial intelligence (AI) in Islam: Building ethics and solutions based on Tawhid*. *Proceeding of the International Conference on Religious Education and Cross-Cultural Understanding*, 1(1), 60–76. <https://prosiding.aripafi.or.id/index.php/ICRECCU/article/view/24>
- Ministry of Education Malaysia. (2012). *National Philosophy of Education*. <https://www.moe.gov.my/>
- Mulaudzi, L. V., & Hamilton, J. (2025). Lecturer's perspective on the role of AI in Personalized learning: benefits, challenges, and ethical considerations in higher education. *Journal of Academic Ethics*. <https://doi.org/10.1007/s10805-025-09615-1>
- Murphy, R. F. (2019). Artificial intelligence applications to support K–12 teachers and teaching: A review of promising applications, challenges, and risks. *Perspective*, 1–20. <https://doi.org/10.7249/PE315>
- Naqvi, A.: *Artificial intelligence for audit, forensic accounting, and valuation: a strategic perspective*. Wiley (2020)

- Ogunmolu, A. M. (2025). Enhancing Data Security in Artificial Intelligence Systems: A Cybersecurity and Information Governance Approach. *Journal of Engineering Research and Reports*, 27(5), 154–172. <https://doi.org/10.9734/jerr/2025/v27i51500>
- Passi, S., & Vorvoreanu, M. (2022). Overreliance on AI literature review. *Microsoft Research*, 339, 340. <https://www.microsoft.com/en-us/research/uploads/prod/2022/06/Aether-Overreliance-on-AI-Review-Final-6.21.22.pdf>
- Qadir, J. (2023). Engineering Education in the Era of ChatGPT: Promise and Pitfalls of Generative AI for Education. 2022 *IEEE Global Engineering Education Conference (EDUCON)*, 1–9. <https://doi.org/10.1109/educon54358.2023.101251>
- Roll, I., & Wylie, R. (2016). Evolution and revolution in artificial intelligence in education. *International Journal of Artificial Intelligence in Education*, 26, 582–599. <https://www.learntechlib.org/p/176052/>
- Selwyn, N. (2019). *Should Robots Replace Teachers? AI and the Future of Education*. Polity Press. [Should robots replace teachers? AI and the Future of Education - Monash University](#)
- UNESCO. (2021). *AI and education: Guidance for policy-makers*. <https://unesdoc.unesco.org>
- Williamson, B., & Piattoeva, N. (2018). Objectivity as standardization in data-scientific education policy, technology and governance. *Learning, Media and Technology*, 44(1), 64–76. <https://doi.org/10.1080/17439884.2018.1556215>
- Zawacki-Richter, O., Marín, V. I., Bond, M., & Gouverneur, F. (2019). Systematic review of research on artificial intelligence applications in higher education – where are the educators? *International Journal of Educational Technology in Higher Education*, 16(1), 39. <https://doi.org/10.1186/s41239-019-0171-0>
- Zhai, C., Wibowo, S., & Li, L. D. (2024). The effects of over-reliance on AI dialogue systems on students' cognitive abilities: a systematic review. *Smart Learning Environments*, 11(1), 1–37. <https://doi.org/10.1186/s40561-024-00316-7>
- Zheng, N., Liu, Z., Ren, P., Ma, Y., & Wang, F. (2017). Hybrid-augmented intelligence: collaboration and cognition. *Frontiers of Information Technology & Electronic Engineering*, 18(2), 153–179. https://www.researchgate.net/publication/316618941_Hybrid-augmented_intelligence_collaboration_and_cognition