Integrating Artificial Intelligence in Islamic Education: Insights from Madrasah Aliyah in Karawang, Indonesia

Iwan Hermawan[1], **Tajuddin Nur**[2], **Masykur H Mansyur**[3], **Oyoh Bariah**[4], **Nur Aini Farida**[5*], **Radyallah Agnia Hermawan**[6], **Abdan Shibrul Wafa Hermawan**[7], **Roihan Al Muhtadi Billah**[8]

[1,2,3,4,5,6,7,8] Universitas Singaperbangsa Karawang, Indonesia
*e-mail: nfarida@fai.unsika.ac.id

ABSTRACT

The rapid integration of artificial intelligence (AI) and digital technologies into educational systems has created new opportunities and challenges for Islamic educational institutions. However, many madrasahs and Islamic higher education settings still face limited digital readiness, unclear ethical guidelines, and uneven pedagogical adaptation. This study aims to identify its forms of implementation, stakeholder perceptions, enabling and inhibiting factors, and its pedagogical implications. Using a qualitative descriptive design, data were collected through semi-structured interviews with principals, teachers, students, staff, parents, and religious leaders, and were analysed thematically following Braun and Clarke (2006). The findings reveal that AI tools have enhanced instructional efficiency, learner engagement, and administrative management, yet concerns persist regarding data privacy, teacher competency, and alignment with Islamic ethical values. Comparisons with previous studies indicate that while earlier research emphasized technology adoption and student motivation, this study contributes by integrating an Islamic ethical framework into digital transformation discourse. The results highlight the need for policy development, teacher training, and curriculum reform that harmonize AI usage with Qur'anic principles and the holistic aims of Islamic education. This study provides empirical insights relevant for educators, policymakers, and researchers seeking to strengthen digital innovation in madrasahs while ensuring ethical integrity and cultural relevance

INTRODUCTION

The rapid development of information technology, particularly in the field of AI, has changed various aspects of human life, including education. AI offers various opportunities to improve the efficiency and quality of education, such as automation of administration, personalization of learning, and management of student data (Sholihah, 2024). In the context of Islamic education, AI opens up space for innovations that can enrich the teaching and learning process, such as providing educational materials tailored to individual abilities and utilizing technology to support the teaching of religious values (Huda & Suwahyu, 2024)

According to Ana Khirunnisa et al (Khoirunnisa et al., 2023), Islam accepts artificial intelligence. Islam accepts artificial intelligence (AI) if it is used in accordance with ethics, sharia law, and for the good of the people. AI provides opportunities such as translating the Quran, assisting in the creation of fatwas, strengthening halal guarantees, and optimizing da'wah. However, AI can also be misused for apostasy, radicalization, terrorism, and cause ethical and privacy issues. Furthermore, the application of AI in Islamic educational institutions has the potential to pose risks, such as reduced human interaction, data privacy violations, and excessive dependence on technology (Ayanwale et al., 2022) There are even concerns that this technology could weaken the teaching of moral and spiritual values, which are at the core of Islamic education (Rubini & Herwinsyah, 2023).

Similarly, according to (Gunawan & Murtopo, 2023) AI has great potential to improve the effectiveness and interactivity of learning in Islamic education through personalization, teaching efficiency, and the integration of religious values. However, challenges related to the role of teachers, ethics, and data security require a prudent approach and collaboration between experts in Islamic education and technology to ensure that its use supports the learning process without neglecting ethical and cultural aspects.

Therefore, caution is needed to ensure that the implementation of AI remains in line with Islamic educational principles that emphasize a balance between worldly and spiritual knowledge. According to (A. K. Sari et al., 2024), risk mitigation measures against distortion and misinterpretation must be implemented to ensure the benefits of technology in Islamic education with an ethics-based approach so as not to sacrifice religious values (Kosasih et al., 2024). Rapid developments in digital technology have brought significant changes in various areas of life, including education. One technological innovation that is now widely used is Artificial Intelligence (AI). AI has great potential to improve the effectiveness and efficiency of the learning process, such as through adaptive learning systems, educational chatbots, and real-time analysis of student learning data (Wedi et al., 2025).

Islamic educational institutions, particularly Madrasah Aliyah Negeri (MAN), as part of the national education system, are required to be able to adapt to the times so as not to be left behind. The use of technology such as AI is a strategic opportunity to improve the quality of learning and education management in madrasahs (Alkandari & Alabdulhadi, 2023). This is in line with the objectives of Islamic education, which is not only to produce religious individuals, but also to be able to compete in the global era (Ismail et al., 2025). Artificial Intelligence (AI) is reshaping education globally, offering adaptive tutoring, automated assessment, and data-driven instructional support (Crompton & Burke, 2023; Septianingrum et al., 2025; Zhai et al., 2021). However, adoption in Islamic secondary schools (Madrasah Aliyah Negeri) remains constrained by unequal infrastructure, limited digital skills among teachers, and insufficient frameworks for aligning AI with Islamic pedagogical and ethical values (Arif, 2018; Holmes et al., 2022; Lythreatis et al., 2022) Empirical studies specifically examining how AI is implemented in Islamic educational settings, how teachers and students perceive AI, and how AI practices can be reconciled with the aims of maqāṣid al-tarbīyah al-Islāmiyyah remain scarce.

Although recent research highlights AI's growing role in instructional innovation (Durak, 2024; Fauzi et al., 2025; Wang, 2024) little is known about how these tools are adopted in madrasahs, which operate under unique spiritual and moral frameworks. Karawang Regency provides an important context due to its combination of digital expansion and persistent infrastructural inequalities. This study investigates (1) forms of AI use; (2) teacher and student perceptions; (3) enabling and inhibiting factors; and (4) effects on learning effectiveness. It contributes a theoretically informed and ethically grounded model for responsible AI integration in Islamic education.

Commented [tsb1]: The introduction needs to be strengthened with a more in-depth literature review from recent international sources (at least 10-15 Scopus-indexed references from the last 5 years), a clear identification of research gaps, and a specific problem statement; this section is currently too narrative and not critical enough of global issues such as the digital divide in developing countries, so it is recommended to add a theoretical framework (e.g., diffusion of innovations by Rogers) and initial hypotheses to increase academic rigor and connect the Indonesian context with international trends in AI in religious education.

METHODS

This study employed a qualitative descriptive design to explore the utilization of Artificial Intelligence (AI) within Madrasah Aliyah Negeri (MAN) across Karawang Regency. The qualitative approach was selected to capture the participants' lived experiences, interpretations, and values related to AI use in Islamic education. Data were obtained from six respondent groups principals, teachers, staff, students, parents, and religious leaders representing diverse perspectives within the madrasah ecosystem.

Primary data were collected through semi-structured interviews, allowing flexibility in exploring participants' insights while maintaining consistency across key themes. The interviews focused on four main aspects: (1) forms of AI utilization; (2) supporting and inhibiting factors; (3) impact of AI on learning effectiveness; and (4) perceptions of teachers and students. Data were analyzed using the thematic analysis framework of (Braun & Clarke, 2006), which emphasizes a systematic, flexible approach to identifying, analyzing, and reporting patterns within qualitative data. The analysis followed six sequential steps: (1) data familiarization through repeated reading of transcripts; (2) initial coding of meaningful units; (3) theme generation based on recurring ideas; (4) reviewing and refining themes; (5) defining and naming core themes; and (6) producing the final report supported by representative quotes. This process enabled the emergence of four overarching themes corresponding to the research objectives: AI utilization forms, supporting and inhibiting factors, learning impact, and perceptions. To ensure the credibility and dependability of findings, triangulation was applied through cross-verification of data sources (teachers, students, and administrators). Member checking was conducted by sharing thematic summaries with selected participants for validation. Ethical considerations were strictly observed: informed consent was obtained, participant anonymity was maintained, and data were used solely for research purposes in alignment with Islamic ethical principles of amanah (trust) and adl (justice).

RESULTS AND DISCUSSION

Forms of AI Utilization in Madrasah

Madrasahs are the forerunners of Islamic education in Indonesia, uniquely situated at the intersection between religious tradition and the demands of modern education (Arsyad, 2024; Ihsan et al., 2024). Rooted in the pesantren system, madrasahs have evolved to integrate Islamic knowledge and general knowledge, reflecting Indonesia's diverse society and the state's commitment to educational inclusivity (Setiawan et al., 2024) This integration aims to create a balance between religious values and scientific development, enabling students to understand and apply both aspects in their daily lives (Junaedi et al., 2025). One way to achieve this integration is by utilizing technology, such as AI, which can enrich students' learning experiences and help them develop skills relevant to this digital age (Saepurohman et al., 2025). Thus, the use of AI in madrasahs can increase the effectiveness of learning and prepare students to face the challenges of an increasingly digital world (Tanti et al., 2025).

The challenges faced by Islamic education in the digital age include the need to adopt new technologies, improve digital literacy, and ensure the relevance of religious teachings in an ever-changing social context (Aziza, 2024). In response to these challenges, madrasas need to develop curricula that integrate technology and religious values, as well as involve all stakeholders in the learning process (Naim et al., 2022). Thus, the integration of AI in Islamic education in madrasas not only improves the quality of education but also contributes to shaping students' characters in accordance with Islamic values.

Teachers in MAN Karawang widely used AI tools to generate learning objectives, draft teaching modules, create question banks, and design differentiated activities. Representative quotes include:

"Yes, I use AI to prepare teaching materials and create learning media."

"…developing teaching modules, materials, worksheets, and evaluation questions."

AI-driven visual tools (Canva AI, Gemini AI) were also used to produce Qur'anic stories, animated moral lessons, and multimodal presentations for Akidah Akhlak and Qur'an Hadith subjects.

AI-enhanced assessment tools such as Quizizz, Google Forms with add-ons, and other automated scoring platforms were utilised to streamline the evaluation process. These platforms supported instant scoring, automated feedback, and diagnostic analytics. Teachers reported that these AI-driven features significantly increased the efficiency of their assessment practices. They also emphasised that the analytics provided clearer and more actionable insights into student learning progress, allowing for more targeted instructional interventions. As mentioned by one teacher: "I use AI to create learning media and design quizzes".

Madrasah leaders increasingly integrated AI-assisted tools such as automated spreadsheets, basic dashboards, and data-management applications to support administrative decision-making. These tools were used to monitor and streamline several core governance activities, including attendance tracking and Student data management. Despite these advancements, the level of adoption varied significantly among madrasahs. Some schools demonstrated strong digital readiness and proactively used AI-assisted tools, while others faced constraints such as limited digital literacy, inadequate infrastructure, or concerns about data security.

Teachers' and Students' Perceptions of AI

Findings indicate that teachers generally expressed positive perceptions of AI as an emerging pedagogical support system. Many viewed AI as a facilitative tool that enhances instructional creativity, efficiency, and accessibility rather than replacing teachers' intellectual and moral roles. Teachers consistently emphasised that AI supports rather than substitutes the central task of Islamic education, which remains grounded in the teacher's role as murabbi and moral guide.

A significant number of teachers highlighted AI's ability to support differentiated instruction, particularly through adaptive platforms such as ChatGPT and Gemini AI. These tools enabled them to design learning materials aligned with students' individual abilities, reflecting the Islamic pedagogical principle of tarbiyah bi al-tadarruj (gradual and differentiated instruction). As one participant stated:

"Technology (AI) has been widely used in teaching SKI, fiqh, and Quran-Hadith, and it greatly assists both teachers and students in enriching and deepening their understanding of the material."

Another teacher added:

"It helps improve learning effectiveness because students are able to explore various phenomena visually and interactively."

Despite these advantages, teachers also raised concerns regarding academic integrity, overreliance on AI, and the potential decline in students' critical reasoning. Some reported instances

where students submitted AI-generated essays lacking personal reflection or theological depth. Ethical concerns were further echoed by parents, one of whom commented:

> "With AI, students are less able to think analytically, because everything can be solved by AI."

Consequently, teachers emphasised the need for clearer institutional policies governing acceptable AI use, particularly regarding plagiarism, data security, and the cultivation of authentic intellectual effort.

Students demonstrated a predominantly positive response, characterised by enthusiasm, curiosity, and a sense of increased autonomy. As digital natives, they integrated AI naturally into learning routines such as summarising texts, translating Arabic sources, and clarifying complex concepts. Many students reported that AI enabled them to learn more efficiently and independently, especially when teacher support was not immediately available. Typical responses included:

> "The learning process has become more efficient. Technology helps me manage assignments, search for information quickly, and receive instant feedback."

> "AI makes learning more practical and interesting… but I must be careful not to depend on it too much."

However, several students acknowledged a growing tendency toward intellectual dependence. One student stated:

> "It is very helpful… but it makes us lazy to think critically."

Students generally framed AI as a useful tool but recognised the importance of maintaining human effort and critical analysis.

DISCUSSIONS

Emerging Patterns of AI Integration in Madrasah

The integration of Artificial Intelligence (AI) into Madrasah Aliyah demonstrates a gradual yet notable shift toward technologically mediated pedagogy within Islamic educational settings. Existing literature highlights that AI, when implemented judiciously, has the potential to enhance digital literacy and support personalized learning pathways (Nasih et al., 2024; Yusuf, 2024). The field findings corroborate these claims: educators increasingly employ AI tools ranging from basic text generators to advanced adaptive learning platforms, illustrating a growing recognition of AI's pedagogical affordances.

Teachers reported using generative systems such as ChatGPT and Gemini AI for drafting learning objectives, producing item banks, and developing differentiated learning activities tailored to students' competencies. These practices are consistent with (Al-Ali, 2023) assertion that AI can augment instructional design while allowing teachers to reallocate time toward mentoring and formative support. In parallel, AI-driven media tools have enabled the production of multimodal teaching materials aligned with Islamic values, especially in subjects such as Akidah Akhlak and Qur'an Hadith. These tools facilitated the creation of contextually grounded visual narratives, which proved effective in engaging digital-native learners whose cognitive habits are shaped by interactive, image-based content (Xu et al., 2023).

AI-supported assessment platforms such as Quizizz and Google Forms with embedded analytics further streamlined formative evaluation. These systems offered instantaneous scoring, real-time progress indicators, and automated feedback loops, thereby promoting an evidence-based

approach to instructional decision-making (R. Sari & Prasetyo, 2024). In administrative contexts, school leaders utilized AI-enabled spreadsheets and analytic dashboards to monitor attendance, academic indicators, and data management. Although modest, this adoption reflects an emerging institutional orientation toward data literacy, aligning with national directives for Madrasah Reform (Kementerian Agama Republik Indonesia, 2023).

However, AI integration remains uneven across institutions due to disparities in infrastructure, technological readiness, and institutional culture. These discrepancies mirror what (Siregar & Wahyuni, 2024) describe as "digital stratification," a multilayered inequality encompassing technological access, pedagogical competence, and cultural receptivity. As a result, the capacity of AI to contribute to maqāṣid al-tarbiyah al-Islāmiyyah the objectives of Islamic education ultimately hinges on how institutions negotiate innovation, equity, and ethical stewardship.

In sum, while AI has begun to reconfigure the pedagogical landscape of Islamic secondary education, its adoption trajectory in madrasah remains embryonic and context-dependent. The extent to which these technologies can meaningfully contribute to the maqasid al-tarbiyah al-Islamiyyah (objectives of Islamic education) will depend on how educators navigate the intersection of innovation, equity, and ethics in the digital era.

Perceptions of AI Among Teachers and Students

Perception plays a central role in the diffusion of innovation (Rogers, 2003). In the context of madrasahs, the way teachers and students conceptualize AI influences not only its pedagogical legitimacy but also its ethical and spiritual positioning. Findings from Madrasah Aliyah Negeri in Karawang reveal an evolving but ambivalent set of perceptions, combining optimism regarding AI's educational benefits with caution about its potential risks.

Teachers overwhelmingly viewed AI as a pedagogical assistant rather than a replacement for human educators. Many highlighted AI's ability to facilitate personalized learning, particularly through adaptive content generation that aligns with students' cognitive levels. This corresponds with the Islamic principle of tarbiyah bi al-tadarruj (gradual and differentiated instruction) and supports prior studies positioning AI as a tool for pedagogical augmentation (Al-Ali, 2023). Nonetheless, teachers (also parents) expressed concerns about overreliance, plagiarism, and erosion of critical thinking ethical dilemmas that echo (Natsir & Lestari, 2023) warnings about diminishing ijtihād fikrī (intellectual striving) when learners depend excessively on automated outputs.

The ethical apprehensions extended to issues of authenticity, academic integrity, and data privacy. These anxieties reflect what (Halili, 2023) terms the "moral paradox of digital education," where technological empowerment coexists with moral vulnerability. Consequently, many educators emphasized the necessity of grounding AI use within an Islamic moral epistemology, guided by values such as amanah (trust), ikhlas (sincerity), and ʿadl (justice). This approach resonates with the ethical framework of al-Ghazālī, which situates knowledge acquisition within spiritual and moral development.

Students, meanwhile, demonstrated a mixture of enthusiasm and dependency. As digital natives, they perceived AI as an intuitive learning companion, frequently using it for summarization, translation, and conceptual clarification. Their behavior reflects processes of technological naturalization and supports the self-regulated learning hypothesis (Zimmerman, 2002). However, some admitted to cognitive passivity and reduced personal inquiry an indication of what (Postman, 1993) calls technopoly, where technological convenience supplants deeper intellectual engagement.

These findings underscore a dialectical relationship between technological innovation and Islamic educational values. As (Nasr, 2021) argues, technology in Islamic civilization is best approached through tawḥīdī synthesis harmonizing technological means with spiritual aims.

Accordingly, AI in madrasahs should be framed simultaneously as a pedagogical resource and a moral test, requiring discernment (fiqh al-wāqi') in its application.

Enabling and Constraining Conditions for AI Adoption

The factors supporting and inhibiting AI adoption reflect the broader structural, cultural, and ethical dynamics governing educational transformation. Leadership vision emerged as a strong enabler; administrators who articulated clear goals for modernization created an institutional climate conducive to experimentation. This aligns with scholarship emphasizing leadership agency as a decisive factor in digital transformation. Teacher motivation (particularly among digitally adept younger educators) as another key driver. Their willingness to explore new tools suggests an emerging digital pedagogy mindset that, if supported through sustained professional development, can accelerate AI integration across subjects.

Conversely, infrastructural disparities between urban and rural madrasahs represent significant barriers. Limited hardware, unstable connectivity, and insufficient maintenance capacities impede equitable adoption and risk reproducing existing educational inequalities. Gaps in digital literacy, especially among veteran teachers, further complicate implementation efforts. Addressing these gaps requires a culturally sensitive approach that values teachers' pedagogical expertise while equipping them for technological adaptation. The absence of clear ethical guidelines surfaced as the most critical constraint. Teachers' concerns regarding plagiarism, data security, and spiritual implications underline that AI adoption cannot be reduced to technical proficiency. Rather, it necessitates comprehensive institutional policies that articulate ethical boundaries and foster reflective, value-oriented engagement with technology. Developing such frameworks is essential for ensuring that AI enhances rather than compromises the Islamic mission of education.

Implications of AI for Learning Effectiveness

AI has begun to reshape the instructional landscape of madrasahs by enhancing efficiency, assessment accuracy, and learner engagement. Teachers reported that generative AI tools significantly reduced their workload in lesson planning and content development, enabling them to allocate more time to mentorship and interactive pedagogy. This finding corresponds with (Arif, 2023; Holmes et al., 2022), who describe AI as a catalyst for pedagogical agility the ability to modify education in response to the demands of students.

AI's translation and summarization capabilities also broadened access to diverse Islamic texts, including classical Arabic sources, thereby supporting tawassu' fi al-'ilm (knowledge expansion). In assessment, AI-enabled platforms provided immediate feedback, automated analytics, and data-driven insights that enhanced diagnostic precision. These tools align with (Siemens, 2013) framework of learning analytics, where continuous feedback promotes reflective teaching and self-regulation. In Islamic educational contexts, such practices resonate with murāqabah (self-accountability), encouraging learners to monitor and improve their performance. Despite these benefits, teachers cautioned that AI remains limited in assessing qualitative dimensions of learning such as moral reasoning, affective engagement, and spiritual depth which are central to Islamic pedagogy. Thus, while AI can strengthen technical aspects of assessment, it cannot replace the human judgment essential for holistic education.

CONCLUSION

This study demonstrates that the adoption of Artificial Intelligence in Madrasah Aliyah Negeri across Karawang Regency is still in its early stages yet shows strong potential to enhance pedagogical efficiency, learning engagement, and assessment practices. Despite these benefits, implementation remains constrained by infrastructural limitations, uneven digital literacy, and ongoing ethical

concerns particularly regarding doctrinal accuracy and responsible use within an Islamic educational framework. These findings highlight the need for policy interventions that support continuous professional development, strengthen digital infrastructure, and establish clear Islamic ethical guidelines aligned with the maqāṣid al-tarbiyah al-Islāmiyyah. Such efforts are essential to ensuring that AI strengthens, rather than displaces, the moral and intellectual mission of Islamic education in Indonesia.

For practitioners, the study underscores the pivotal role of teachers as ethical gatekeepers who mediate technology with pedagogical integrity and spiritual responsibility. For policymakers, it calls for a more coherent national roadmap for AI integration in religious education, supported by interdisciplinary collaboration between educators, technologists, and Islamic scholars. This research is limited by its regional scope and qualitative design, which rely on participants' perspectives and may not fully represent the diversity of Islamic schools in Indonesia. Future studies should consider longitudinal or comparative approaches across multiple provinces and educational settings, as well as mixed-method designs, to deepen understanding of how AI shapes learning processes, pedagogical ethics, and students' moral development over time. Through sustained inquiry and coordinated policy action, AI can become a meaningful instrument for realizing the higher objectives of Islamic education cultivating learners who are knowledgeable, ethical, and socially responsible.

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