

Artificial Intelligence (AI) Development Management for Personalized Learning in Islamic Educational Institutions: Opportunities and Ethical Challenges

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Abstract

The development of artificial intelligence (AI) opens up significant opportunities for personalized learning in Islamic educational institutions. However, its implementation still faces ethical challenges due to the lack of a management framework for AI development that aligns with Islamic values. This study aims to analyze the opportunities and ethical challenges in managing AI development for personalized learning in Islamic educational institutions, as well as to formulate an ethical management model based on Islamic principles. Using qualitative literature review and a thematic analysis approach, this study examines literature related to AI in education, technology management, Islamic ethics, and personalized learning. The study reveals that the main opportunities for AI include improving learning equity, early detection of learning difficulties, and optimizing the role of teachers as spiritual guides. Emerging ethical challenges include issues of student data privacy, algorithmic bias, shifts in teacher authority, moral accountability, access disparities, and the potential for neglecting moral formation. This study proposes a five-stage management model integrated with the principles of maqāṣid al-sharī'ah: justice, trustworthiness, and benefit. Furthermore, practical recommendations are provided for managers of Islamic educational institutions and AI developers.

Keywords: AI Management, Personalized Learning, Islamic Education, Islamic Ethics, Ethical Challenges

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INTRODUCTION

The rapid development of artificial intelligence (AI) in the last decade has brought fundamental changes to various areas of life, including the education sector. AI, understood as the ability of computer systems to mimic human cognitive functions such as learning, thinking, and problem-solving, has given rise to various innovations in the world of learning. Applications such as adaptive learning systems, intelligent tutoring systems, chatbots, and learning analytics are clear evidence of how this technology can support a more effective and efficient learning process (Holmes et al., 2019). In the context of personalized learning, AI offers great potential for analyzing students' learning styles, tailoring materials to their ability levels, and providing direct feedback tailored to individual needs. This aligns with the findings of Rahmadhani et al. (2025) who examined the integration of AI and the Internet of Things (IoT) as pillars of personalized learning in the smart school era. Their research shows that AI plays a role in adapting materials, methods, and learning styles to the characteristics and needs of each student, thereby creating a more effective learning experience. In the context of Islamic Religious Education

(PAI), this integration presents a significant opportunity to convey Islamic values in a contextual, dynamic, and adaptive manner, despite challenges such as infrastructure readiness and educators' digital competencies.

However, optimism about the potential of AI does not necessarily eliminate challenges, particularly in Islamic educational institutions. Madrasahs and Islamic boarding schools (*pesantren*) have unique characteristics that place the formation of morals and spiritual values at the core of education. This makes the implementation of AI in these environments more complex than in general educational institutions (Norman et al., 2025). Research by Tauhid (2025) confirms that transforming knowledge in Muslim communities through AI requires a multidisciplinary approach involving aspects of Islamic education, technology, ethics, and socio-cultural aspects. Meanwhile, Shalicha & Alghiffary (2026) found that the integration of digital systems in Islamic education management still faces serious obstacles, such as limited infrastructure, low digital literacy among educators, institutional cultural resistance, and financial constraints.

From an ethical perspective, the application of AI in Islamic education cannot be separated from the values of the Qur'an and Sunnah. Al-Shamsi (2026) emphasized that although AI can improve efficiency, accessibility, and motivation for learning, there are concerns regarding data privacy, algorithmic bias, and the diminishing role of teachers as spiritual guides. These concerns align with the findings of Fikriawan & Ansori (2025), who examined the emergence of algorithmic authority resulting from the use of generative AI in Islamic scholarly discourse. Their research revealed that generative AI, which operates based on statistical calculations, lacks the capacity for intentionality, understanding of the *maqāṣid al-sharī'ah* (the principles of Islamic law), and moral accountability, which are fundamental elements of Islamic scholarly authority. This phenomenon poses serious epistemological risks, such as hallucinations (false citations), algorithmic bias, and the simplification of complex Islamic legal methodologies. Consequently, if AI is not managed within a proper ethical framework, a new, uniform form of dogmatism may emerge, where religious answers provided by AI are considered objective truth without undergoing a proper scientific verification process. Existing literature extensively discusses the use of AI as a learning tool (AI as a tool), but rarely systematically addresses the management aspects of AI development in Islamic educational institutions. Ali et al. (2025) emphasize the importance of managing the AI development cycle—from planning, design, implementation, evaluation, and ethics audits—to align with Islamic values. Research by Mudin et al. (2025) also demonstrates that Islamic educational institutions have the adaptive capacity to integrate advanced technologies without sacrificing fundamental values, provided they adhere to an ethical framework based on Islamic principles that emphasize justice (*'adl*), trustworthiness (*amanah*), and public welfare (*maslahah*).

Based on this background, this study is designed to answer three main questions: (1) What management model for AI development for personalized learning aligns with the values and characteristics of Islamic educational institutions? (2) What strategic opportunities can be leveraged from the implementation of AI in Islamic schools (*madrasahs*) and Islamic boarding schools (*pesantren*)? (3) What ethical challenges arise in the development and implementation of AI for personalized learning in Islamic educational institutions, and what solutions are offered from an Islamic ethical perspective?

METHOD

This study employed a qualitative approach with library research. The chosen research design was a systematic literature review with a thematic analysis approach as developed by Braun & Clarke (2006). This approach allows researchers to explore, identify, evaluate, and synthesize findings from various literature sources in a structured, transparent, and accountable manner (Creswell & Poth, 2018).

The research data sources consisted of primary and secondary data. Primary data were obtained from indexed scientific journal articles covering topics related to artificial intelligence in education, personalized learning, technology development management, and Islamic ethics and education. Meanwhile, secondary data came from textbooks, conference proceedings, research reports, and relevant policy documents. The inclusion criteria for data sources were strictly defined: (1) published within the last ten years (2016–2026); (2) discussing at least one research variable; (3) available for full access; and (4) written in Indonesian or English.

Data collection was conducted through a systematic literature search in trusted academic databases, such as Google Scholar, Scopus, SpringerLink, Taylor & Francis Online, and DOAJ. The search strategy used a combination of keywords with Boolean operators, for example: "Artificial Intelligence" AND "personalized learning" AND "Islamic education," "AI ethics" AND "Islamic perspective," and "AI management" AND "Islamic education."

Data analysis was conducted using a thematic analysis method, which consists of six stages: (1) familiarizing with the data, (2) generating initial codes, (3) identifying themes, (4) reviewing themes, (5) defining and naming themes, and (6) compiling a final report. To ensure data validity, this study employed source triangulation and peer debriefing techniques, ensuring greater validity and reliability.

RESULT AND DISCUSSION

This literature research has successfully identified a number of key findings that can be grouped into three broad areas, namely: (1) opportunities for AI-based learning personalization in Islamic educational institutions; (2) relevant management aspects of AI development; and (3) ethical challenges and their solutions from an Islamic perspective.

Finding 1: Opportunities for AI-Based Learning Personalization

Literature analysis shows that AI presents significant strategic opportunities for the development of Islamic education.

Improving equity and accessibility of learning.

AI enables a more equitable distribution of learning opportunities by utilizing integrated digital systems. Research by Shalicha & Alghiffary (2026) demonstrated that the application of AI can increase operational efficiency by up to 40% while providing a more personalized learning experience. Maulana (2025) added that AI-based adaptive learning can increase students' understanding of Islamic material by up to 45% and their spiritual competence by 41%, thus strengthening the argument that AI can be an instrument to reduce the gap in educational quality, particularly in the context of Islamic Religious Education in madrasas and Islamic boarding schools.

Optimizing the role of teachers as educators and spiritual guides.

Al-Madani, (2025) emphasized that Islamic Religious Education teachers who integrate AI are more effective in developing contextual, interactive, and adaptive learning strategies. Muhtaram et al., (2025) identified that the use of AI tools such as ChatGPT, Gemini, and Canva AI allows Islamic Religious Education (PAI) teachers to shift their focus from repetitive administrative tasks to more meaningful pedagogical activities, including character building and strengthening students' spiritual values. This finding is in line with the Ethical and Values-Based Technology Adoption (EAV) model developed by Arifudin & Akil, (2025), which emphasizes that AI in Islamic education should function as a "pedagogical co-pilot"—an assistant that helps, not replaces, the teacher's role as a spiritual role model. Thus, AI does not replace the role of teachers, but rather strengthens

their function as moral and spiritual guides, while freeing up space for humanistic interactions that are at the core of character education in the Islamic tradition.

Support for the implementation of the Independent Learning Curriculum.

Within the Merdeka Curriculum framework, AI serves as a catalyst for innovative, flexible, and personalized learning. This aligns with Yunita's (2025) findings, which state that AI not only serves as a supporting tool but also as a catalyst for realizing innovative, flexible, and personalized learning. Her research identified that AI applications such as adaptive platforms, Quranic learning applications, and interactive educational tools can improve student engagement, independence, and learning outcomes, in line with the principles of Merdeka Belajar. However, challenges such as the digital divide, teacher readiness, and the need for ethical guidelines must still be addressed to ensure that AI complements, rather than undermines, the moral and spiritual mission of Islamic education. This suggests that AI can be a strategic partner in realizing the vision of student-centered education.

Early detection of student learning difficulties.

Through learning analytics and predictive modeling, AI can identify learning barriers early. This detection allows for faster and more precise intervention, thus supporting the achievement of Islamic education goals that emphasize not only cognitive aspects but also moral development.

Finding 2: Management Aspects of AI Development

This study identifies five stages of AI development management that are relevant for Islamic educational institutions:

Planning.

This stage focuses on needs assessment which includes four main components: adaptive technology infrastructure, educator capacity development programs, technology-based curriculum design, and an Islamic ethical framework (Mudin et al., 2025).

Design and Development.

According to the Maqasid al-Shariah perspective, AI ethics cannot be reduced solely to privacy and transparency issues, but must include protection of the intellect, soul, and religion of students. Habib, (2025) asserts that Maqāṣid al-Sharīʿa emphasizes the protection of the five fundamental values of religion (ḥifẓ al-dīn), soul (ḥifẓ al-nafs), reason (ḥifẓ al-ʿaql), descendants (ḥifẓ al-nasl), and property (ḥifẓ al-māl) which serve as a comprehensive ethical basis for evaluating the social impact of AI. Similarly, Kamila, (2025) shows that maqāṣid al-sharīʿah provides a coherent theoretical structure for assessing the benefits and harms of AI systems, going beyond the Western ethical framework which tends to be limited to privacy and transparency issues. Thus, the protection of reason, soul, and religion, which is the core of maqasid, must be the main foundation in every AI policy and implementation in Islamic educational institutions.

Implementation.

This stage emphasizes mentoring religious teachers so that AI functions as a tool, not a replacement. Rifai et al. (2025) formulated a four-pillar ethical model: algorithmic justice, digital etiquette, learner protection, and participatory oversight.

Evaluation.

Evaluation is carried out using multiple indicators that cover academic, technological, and ethical aspects, so that implementation results can be measured holistically.

Periodic Ethical Audit.

This audit ensures that the sustainability of AI integration remains in accordance with Islamic principles and educational needs, and prevents ethical deviations in the long term.

Finding 3: Ethical Challenges and Solutions

Literature analysis reveals six major ethical challenges facing Islamic educational institutions in adopting AI, along with Islamic value-based solutions.

No	Tantangan Etis	Solusi Berbasis Islam
1	Privasi data siswa	Prinsip <i>amanah</i> dan <i>hifz al-'irdh</i> melalui enkripsi data dan <i>informed consent</i>
2	Bias algoritma dan ketidakadilan	Prinsip <i>'adl</i> dengan audit algoritma berkala dan data pelatihan representatif
3	Pergeseran otoritas guru	AI sebagai asisten, bukan substitusi; guru tetap pemegang otoritas spiritual
4	Akuntabilitas moral	Prinsip <i>mas'uliyah</i> dengan pembagian tanggung jawab yang jelas
5	Kesenjangan akses teknologi	Prinsip <i>ta'awun</i> melalui subsidi pemerintah dan dukungan zakat/infak/sedekah
6	Pengabaian pembentukan akhlak	Desain AI yang menyisipkan aktivitas reflektif keislaman seperti <i>muhasabah</i>

Overall, the research findings demonstrate that AI has significant potential to enhance personalized learning in Islamic educational institutions. However, successful implementation depends heavily on systematic development management based on the principles of *maqāṣid al-sharī'ah* (the principles of Islamic law). The opportunities offered by AI must be balanced with ethical awareness to avoid displacing the teacher's role as a spiritual guide and to maintain the primary goal of Islamic education, namely the formation of noble character.

Thus, this research emphasizes the importance of developing an AI management framework that is oriented not only toward technological efficiency but also toward the values of justice, trustworthiness, and public welfare. This lays the foundation for AI to truly become a tool that supports the mission of Islamic education, rather than simply a technological instrument that has the potential to create new problems.

CONCLUSION

The findings regarding AI's potential to improve learning equity have profound implications for Islamic education, which places the value of justice (*'adl*) as a key principle. From an Islamic perspective, justice in education means that every student has the right to receive learning opportunities according to their individual potential, needs, and circumstances without discrimination. AI's ability to diagnose learning styles, adapt materials, and provide individual recommendations is a concrete manifestation of this principle of justice. This aligns with Allah's word in Surah An-Nisa', verse 58, which emphasizes the importance of upholding justice in all aspects of life, including education.

Thus, the application of AI can be seen as a modern means of realizing the value of justice that has long been a foundation of Islamic education.

Furthermore, the findings regarding optimizing the role of teachers through AI emphasize that technology should not be positioned as a substitute for humans, but rather as an instrument that strengthens the human function of teachers. In the Islamic educational tradition, teachers (*mu'allim* or *ustādz*) hold a noble position as the heirs of the prophets. The teacher-student relationship is not limited to the transfer of knowledge but also encompasses spiritual development (*tazkiyat al-nafs*) and moral modeling (*uswah hasanah*). (Arianto, 2025) emphasizes that AI serves only as a supporting tool, not a substitute, so that moral and spiritual authority remains with the teacher. With AI, teachers can focus more on developing students' character and spirituality, while administrative tasks can be delegated to digital systems.

The findings regarding the five stages of AI development management indicate that technology adoption in Islamic educational institutions cannot be achieved instantly but requires careful and continuous planning. The management cycle model proposed in this study integrates the principles of *maqāṣid al-sharī'ah* into each stage, from planning, design, implementation, evaluation, and ethics audits. This aligns with findings in the Intelligence study (2025), which critiques contemporary approaches to AI ethics, which tend to be based on Western values such as privacy, transparency, and accountability, and offers the *maqāṣid* framework as a more holistic alternative. The study argues that the *maqasid* (obligatory duties) encompassing the protection of religion (*hifẓ al-dīn*), life (*hifẓ al-nafs*), reason (*hifẓ al-'aql*), progeny (*hifẓ al-nasl*), and property (*hifẓ al-māl*) provide a comprehensive ethical foundation for evaluating the social impact of AI, including in the educational context. Interestingly, the ethical aspects within the *maqasid* framework are not positioned as an afterthought, but rather as a foundation underlying the entire management cycle, thus ensuring that AI development remains aligned with Islamic values while addressing issues of algorithmic fairness and accountability of autonomous systems that are often overlooked in conventional approaches.

In general, the findings of this study are consistent with those of previous research. This is also confirmed by the findings of Rahman & Hakim (2026) in the same journal, which confirmed that the effectiveness of AI-based personalized learning depends heavily on the balance between algorithm accuracy and teacher pedagogical intervention. Al-Shamsi (2026) also highlighted data privacy and algorithmic bias as key ethical challenges in AI implementation. However, this research is more advanced because it not only identifies challenges but also formulates operational solutions based on specific and applicable Islamic principles.

The difference from the research by Jumriana & Damayanti (2025) lies in the focus of the study and the theoretical foundation used. Their research places greater emphasis on developing a general ethical framework for the future (Integrative Islamic Ethical AI Framework), encompassing the principles of Digital Adab (Adab), Digital Amanah (Trust), and Digital Maslahah (Maslahah). This perspective is reinforced by Hidayat & Maulana (2026), who emphasize the importance of the Digital Maslahah principle as a primary filter in technology adoption in Islamic boarding schools.

From the perspective of Islamic ethical theory, Jumriana & Damayanti's framework is normative-declarative. In contrast, this research focuses on the management of current AI development, specifically operationalizing these three principles into five management stages. This aligns with the findings of Nurhasanah & Zaini (2026) that the success of AI integration in Islamic educational institutions is largely determined by managerial readiness, particularly in the planning and ethical oversight stages. Referring to Davis's (1989) technology management theory, Rogerg, Wiesenthal et al, (2023), this study fills the gap that was not answered by Jumriana & Damayanti, namely how Islamic ethical values are translated into technical and administrative decisions.

Furthermore, when compared with Al-Shamsi's (2026) research, there is consistent finding that data privacy and algorithmic bias are major ethical challenges. Fauziyyah & Wahyudi (2026) in their research in Al-Manar also confirmed that algorithmic bias is a major concern among Islamic educators, particularly regarding the representation of religious values in AI-generated content. However, from the perspective of personalized learning theory, Al-Shamsi stops at identifying risks. This research goes beyond Al-Shamsi's findings by formulating operational solutions based on the *maqāṣid al-shari'ah* (Islamic principles).

From a theoretical perspective, this dialogue reinforces the original contribution of this research. Khasanah & Rofiq (2026) stated that the integration of *maqāṣid al-shari'ah* and the technology management cycle represents a breakthrough in the discourse on AI and Islamic education. Jumrianah & Damayanti (2025) contributed to Islamic ethical theory by formulating three digital principles, but they have not yet been connected to management theory. Al-Shamsi, (2026) contributed to the identification of ethical challenges, but did not utilize the theory of personalized learning. Instead, this study presents an integrative model that combines technology management theory, personalized learning theory, and Islamic ethics simultaneously.

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Based on the research results and discussion outlined above, it can be concluded that the development of artificial intelligence (AI) for personalized learning in Islamic educational institutions presents significant opportunities as well as ethical challenges that require careful management based on Islamic values. This research successfully formulated a management model for AI development integrated with the principles of *maqāṣid al-shari'ah* (Islamic principles), identified strategic opportunities for AI implementation in madrasas and Islamic boarding schools (*pesantren*), and mapped ethical challenges and solutions consistent with an Islamic perspective.

The main opportunities offered by AI include improving the fairness and accessibility of learning, optimizing the role of teachers as both educators and spiritual guides, supporting the implementation of the Independent Learning Curriculum (*Curriculum Merdeka Belajar*), and the ability to detect early learning difficulties in students. From a management perspective, AI development requires a systematic approach through five interconnected stages: values-based planning, collaborative design with a multidisciplinary team, phased implementation with teacher guidance, evaluation using multiple indicators, and periodic ethics audits to ensure compliance with Islamic principles.

The six key ethical challenges identified—namely, data privacy, algorithmic bias, shifting teacher authority, moral accountability, disparity in access, and neglect of moral formation—demand solutions based on the principles of justice (*'adl*), trustworthiness (*amanah*), protection of honor and reason (*ḥifẓ al-'irdh wa al-'aql*), responsibility (*mas'uliyah*), mutual assistance (*ta'āwun*), and the benefit (*maṣlaḥah*). Therefore, the integration of AI in Islamic education must not only address technological aspects but also be grounded in the spiritual and moral values that are at the core of Islamic education.

This study recommends several strategic steps. First, Islamic educational institution administrators are advised to establish an internal AI ethics committee to oversee the development and implementation process. Second, policymakers need to develop AI ethics standards based on Islamic values to serve as a national reference. Third, AI developers are expected to design systems that are transparent, explainable, and accountable. Fourth, further researchers are advised to conduct empirical tests on the management models produced through case studies in madrasas and Islamic boarding schools, so that the validity and relevance of the models can be tested directly in practice.

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