Reconstructing the Islamic Boarding School: Strategies for Preserving the Spiritual Values of Pesantren in the Age of Artificial Intelligence

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Abstract

Since it was first introduced in the mid-20th century at a conference in Dartmouth, where John McCarthy coined *the* term *"artificial intelligence" (AI)*, research in this field has been underway. The use of AI has had a significant impact on all aspects of life, particularly in the field of Islamic religious education at Islamic boarding schools (pesantren). The application of AI in religious education is now rapidly expanding as a tool to support adaptive, efficient, and inclusive learning. The integration of AI into religious education offers high efficiency in terms of easy access to classical texts, the delivery of course material, and the personalization of learning methods. AI offers various benefits that are claimed to simplify several aspects of learning. Although AI provides convenience in all aspects of learning, there are concerns regarding its impact on the existing values within religious education at Islamic boarding schools. This study aims to analyze the urgency of reconstructing the pesantren curriculum amid the development of AI, identify opportunities and challenges in responding to technological advancements, and formulate a curriculum model that integrates pesantren values and AI ethics. The study employs a qualitative approach using library research methods. Data were obtained from books, scientific journals, and conference proceedings, which were analyzed thematically. The results indicate that curriculum reconstruction in Islamic boarding schools must integrate traditional boarding school cultural values with AI ethics education, enabling boarding schools to shift from a traditional, text-based approach toward an adaptive paradigm shift without losing their core identity rooted in boarding school values. The findings of this study contribute to the development of an AI-based pesantren curriculum framework that balances the spiritual values of the pesantren with adaptation to technological disruption.

Keywords: Artificial intelligence, Islamic education, pesantren curriculum.

Introduction

The development of artificial intelligence (AI) in the Society 5.0 era is accelerating and having a major impact on various aspects of life, particularly in the field of education. AI is essentially the ability of machines or computers to mimic human cognitive abilities so they can make decisions independently and intelligently (Afdan Rajabi, 2025). The use of AI is not limited to the economic and industrial sectors; it has already made a massive entry into the education sector (Khasif Ahmad, 2023). AI-based platforms are now widely available and in use in the world of education, such as Gemini, ChatGPT, and virtual tutors. The results of several studies indicate that the use of AI offers a more effective learning process and can be tailored to the needs of individual students. However, the convenience provided by AI also presents new challenges in the field of education related to technological ethics, a shift in scholarly authority, and moral degradation (Rusdi et al., 2026).

Islamic boarding schools, particularly modern ones, are now facing a critical challenge in balancing Islamic scholarly traditions with digital transformation. (Aceng et al., 2024). With more than 34,000 Islamic boarding schools and over 1.4 million students spread across Indonesia, these institutions serve as the cornerstone of Islamic education in the country. (Portal Informasi Indonesia, 2024). This fact underscores the strategic role that Islamic boarding schools play in the Islamic education system amid technological advancements.

Pesantren, as one of the oldest institutions in Indonesia, are known for their strong religious values and have endured as centers for the transmission of Islamic knowledge, character building, and the preservation of the intellectual traditions of the Nusantara (Azra, 2019). Pesantren preserve classical scholarly traditions through the study of classical Islamic texts (kitab kuning), the talaqqi system, the cultivation of adab, and the spiritual relationship between the kiyai and the santri (Z Dhofier, 2011). However, technological disruption demands that pesantren continue to adapt to global dynamics. Today, students live in a digital space that allows them instant access to information. They no longer acquire religious knowledge solely from teachers and classical texts. This situation shapes the students' learning patterns within Islamic education at pesantren. The emergence of AI raises questions about the extent to which algorithms can support the study of classical Islamic texts without diminishing the spiritual essence and character of students in pesantren (Muqorinah et al., 2025). This issue is not merely a technical one but relates to the nature of knowledge, moral responsibility, the teacher-student relationship, and the goals of Islamic education.

At the same time, Islamic boarding schools risk being left behind in the face of technological disruption due to limitations in digital infrastructure and low digital literacy among teachers. Many boarding schools still adhere to traditional, text-centered learning models without integrating technology into their curricula. Therefore, educational transformation must be directed toward harmonizing the integration of technological advancements with Islamic scholarly traditions in a balanced manner. The digitization of learning can serve as a tool to support the documentation of knowledge, access to scholarly journals, the study of religious texts, and the development of digital libraries, while the cultivation of etiquette and character still requires role modeling and real-world interaction (Awaliyah et al., 2023). Consequently, curriculum restructuring is of utmost importance. The pesantren curriculum no longer emphasizes only normative religious mastery but also fosters digital literacy and critical thinking. Based on this, research on the reconstruction of the pesantren curriculum is urgently needed to identify the best strategies for integrating pesantren education with technology. This curriculum reconstruction is relevant because it determines the direction of the knowledge being studied, the development of competencies, the instillation of values, and the use of assessment methods and systems. There is concern that integrating AI without curriculum reconstruction will result in technology being used merely as an add-on, rather than leading to a purposeful transformation of education.

Several previous studies have extensively discussed the transformation of Islamic religious education from various perspectives. Research findings demonstrate how to develop a framework for AI integration that systematically links algorithmic capabilities with the principles of Islamic epistemology (Amin, 2026). (Diana et al., 2023) examined the importance of integrating digital technology into Islamic religious education to meet the demands of the times. (Ahmad et al., 2023) explain that AI can improve the quality of learning through the development of adaptive learning. (Annisa et al., 2025) propose the application of AI through

features such as content customization, automated feedback, the digitization of Islamic literature, and modern technologies that make learning more interactive and adaptive. Meanwhile, (Yono et al., 2025) conclude that Islamic boarding schools possess strong cultural resilience in maintaining their authenticity amid the influence of AI.

Most studies view AI as a tool to support learning and have not yet addressed mechanisms that can ensure AI-based learning remains within the ethical framework of Islamic boarding schools, which adhere strictly to Islamic scholarly authority. Therefore, there is a need for research that examines conceptual models that balance the effectiveness of technology with the preservation of Islamic knowledge traditions in Islamic boarding schools. This study is expected to offer innovation through a curriculum paradigm that adapts to technological developments without compromising the pesantren's scholarly traditions, as well as to develop a model for reconstructing the pesantren education curriculum.

The urgency of reconstructing the pesantren curriculum is critical, given the reality that the learning model in pesantren still relies on traditional approaches. Most importantly, there is a concern regarding the distortion of religious teachings should AI be fully integrated into the pesantren's educational system.

Method

Research Design

This study employs a qualitative research design using the library research method, which involves data collection through the understanding and study of theories from various literature relevant to the research (Adlini et al., 2022). This approach was chosen to understand the phenomenon of artificial intelligence (AI) in the Islamic boarding school (pesantren) environment through a conceptual analysis of relevant scientific literature. This method was selected to comprehensively discuss how traditional values are positioned amid the disruption caused by artificial intelligence technology (Saputra, 2024). The literature review method focuses on a theoretical examination of curriculum reconstruction in Islamic boarding schools in the AI era. This method allows researchers to conduct a contextual exploration of Islamic education theory, Islamic boarding school curricula, digital literacy, and the development of AI in education (Fadli, 2021).

Participants

The literature review was conducted by examining scientific documents, as this study did not directly involve respondents. The process involved collecting, screening, and selecting literature relevant to the study (Utami, 2021).

Research Procedures

The research procedure involves several stages. The first stage consists of preparing the necessary equipment, compiling a working bibliography, organizing one's time, and reading or taking notes on research materials (Zed, 2004). Data collection draws from sources such as books, journals, and previous research studies. These sources will be analyzed in depth and critically to support the research needs. The next stage involves identifying important information, coding the data, and grouping emerging themes (Yusuf, 2024). All documents include articles discussing artificial intelligence, Islamic education, and pesantren studies.

Data Collection Technique(s)

The data analysis technique used in this study is *content analysis*, employing a *thematic analysis* approach. This approach was chosen because it allows researchers to systematically examine various literature, identify key ideas, and understand the interrelationships among concepts relevant to *artificial* intelligence (*AI*), Islamic education, pesantren curricula, and the ethics of technology use in learning. Document analysis can be used to systematically evaluate and interpret documents to gain understanding and develop empirical knowledge (Bowen, 2009). Through this approach, the study focuses not only on gathering information from various sources but also on critically interpreting the meaning, relevance, and implications of the literature's findings for the development of pesantren curricula amid the rapid advancement of AI technology.

The data analysis process was carried out through four interrelated stages (Miles et al., 2014). The first stage was **data reduction** , which involved selecting, sorting, and focusing on information from books, scientific journal articles, research findings, and conference proceedings relevant to the study's focus. At this stage, the researcher identifies various important pieces of information regarding the development of AI in education, the characteristics and objectives of the pesantren curriculum, the core values of the pesantren system, as well as the opportunities and challenges of utilizing technology in the learning process. The selection of literature is carried out by considering the relevance of the sources to the research questions and objectives so that the information analyzed can provide an adequate foundation for the discussion.

The second stage involves **data coding and categorization**, which is the process of assigning codes to information relevant to the research focus and then grouping it into specific thematic categories. These categories include AI-based learning transformation, the continuity of pesantren scholarly traditions, ethics in AI use, Islamic scholarly authority, and the development of students' digital competencies. This categorization aims to identify patterns of thought emerging in the literature while mapping out the key issues that need to be considered in the reconstruction of the pesantren curriculum. Thus, the use of AI is not merely understood as a technical issue in learning but also as a phenomenon with pedagogical, epistemological, and ethical dimensions.

The third stage is **thematic analysis**, which involves identifying and interpreting patterns, similarities, differences, and relationships among the themes found in the literature. At this stage, various perspectives and research findings are critically compared to understand how the development of AI interacts with the principles of pesantren education. Special attention is given to the relationship between technological innovation and the characteristics of pesantren education, which emphasize mastery of Islamic studies, the cultivation of good manners, the exemplary role of the kiai, respect for scholarly authority, and the moral responsibility of the santri. This analysis also aims to identify aspects of learning that have the potential to be developed through the use of AI and those that still require direct human supervision, guidance, and role modeling.

The fourth stage is **conceptual synthesis**, which involves integrating the results of the analysis into a conceptual framework that explains the urgency and direction of pesantren curriculum reconstruction in response to developments in AI. This synthesis is achieved by aligning technological potential, learning needs, and the fundamental values of Islamic education. The results are used to formulate a conceptual framework for an AI-based pesantren

curriculum that is not only oriented toward improving the effectiveness and relevance of learning but also focuses on character development, strengthening digital literacy, academic integrity, and the ethical responsibility of students. Within this framework, AI is positioned as a tool to support learning, not as a substitute for the role of kiai and ustaz or for the process of character development—which is a defining feature of pesantren education.

To maintain the credibility of the interpretation, the analysis was conducted by comparing arguments from various sources, considering the context in which ideas emerged, and examining the similarities and differences in perspectives found in the literature (Patton, 1999). Each theme was interpreted with regard to its relevance to the research focus so that the resulting conclusions would not only be descriptive but also have a strong argumentative foundation. The results of the analysis are then presented in a descriptive-analytical manner, outlining the opportunities, challenges, and principles of AI integration into the pesantren curriculum.

Through these stages, this study is expected to produce a comprehensive conceptual framework for the reconstruction of the pesantren curriculum that is adaptable to technological developments, without neglecting its identity and scholarly traditions. Curriculum reconstruction in this context is not intended to replace the educational values of the pesantren with a technology-oriented approach, but rather as an effort to update learning approaches and strategies so that they remain relevant in the face of changing times. Thus, the integration of AI is expected to support the strengthening of students' digital competencies while preserving the values of spirituality, the cultivation of good manners, Islamic scholarly authority, and moral responsibility as the primary foundations of pesantren education. Data will be collected through systematic recording and documentation.

Results

The data analysis process in this study was conducted through four stages of thematic analysis and conceptual synthesis, namely data reduction, coding or categorization, thematic analysis, and conceptual synthesis. Based on a review of scientific literature and research documents related to the disruption caused by Artificial Intelligence (AI) and pesantren curricula, the results of this study are grouped into four main sub-discussions.

The Transformation of Religious Education and Adaptation to Disruption in Islamic Boarding Schools

The global education paradigm is undergoing major changes as a result of developments in Artificial Intelligence (AI). Modern education systems are increasingly moving toward more flexible, technology-based learning models. Consequently, Islamic educational institutions—particularly Islamic boarding schools (pesantren)—are required to transform themselves to better meet the needs of the times (Rusdi, 2026). Data reduction and analysis results indicate that the use of Artificial Intelligence (AI) has penetrated the Islamic education sector on a massive scale. The use of platforms such as ChatGPT, Gemini, Meta, and virtual tutors offers ease of access to classical religious texts, personalized learning methods, and more interactive delivery of material.

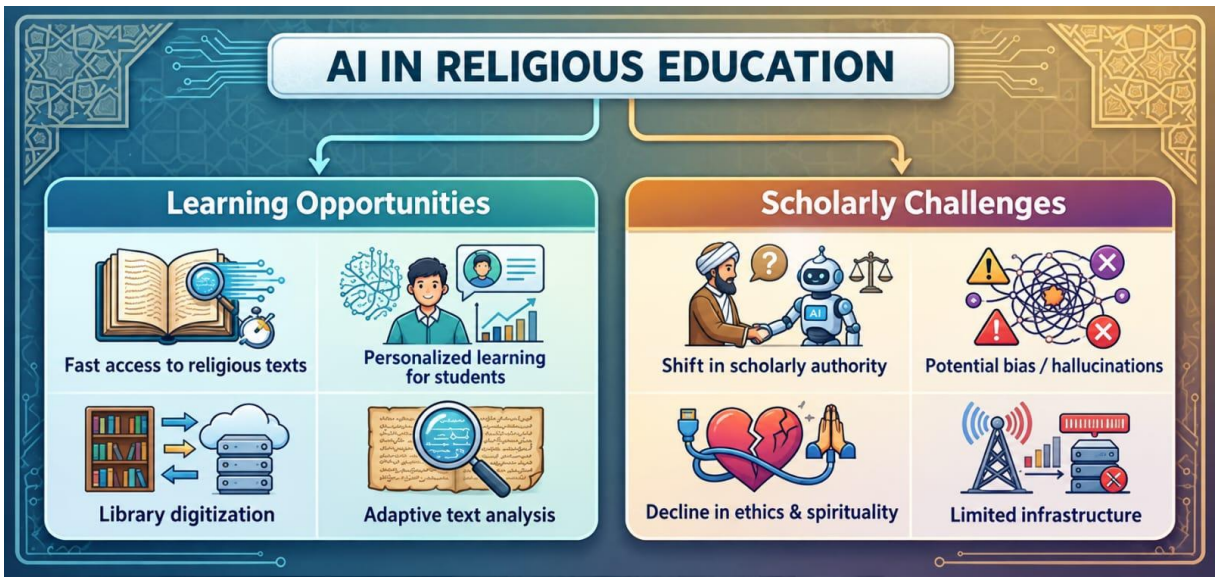


Figure 1. Map of opportunities and challenges in the use of AI in Islamic boarding schools

The use of AI in Islamic boarding schools has two opposing effects. On the one hand, AI accelerates the process of searching for *maraji'* (references to classical Islamic texts) and documenting Islamic knowledge. On the other hand, the use of AI without guidance risks eroding students' critical reading habits and their diligence in delving deeply into the structure of Classical Arabic *(Nahwu and Sharaf).*

Table 1. Comparison of the characteristics of traditional Islamic boarding school learning and AI-based adaptive learning.

Dimensions of Learning	**Traditional Pesantren Learning**	**AI-Based Adaptive Learning**	**Potential for New Curriculum Integration**
Primary Sources	Classical Islamic texts, instructions (teachings) from the Kiai	Data Algorithms, *Large Language Models*	Digitization of texts and AI-based explanations based on sanad
Interaction Methods	*Talaqqi, Bandongan, Sorogan*	*Prompting*, *Chatbot*, Virtual Tutor	Kiai's *Talaqqi* Supported by AI Search Tools
Access Speed	Manual search by book, chapter, or verse.	Quick search in seconds	AI-powered cross-referencing of texts
Character Building	Instilling good manners and the example of a Kiai *(uswah)*	Lacks spiritual and ethical dimensions	Direct mentoring by Kiai for AI ethics training

Epistemological Challenges, Shifts in Authority, and the Preservation of Islamic Scholarly Authority

The primary sources of Islamic knowledge include revelation, reason, empirical experience, and the process of reasoning developed through academic disciplines such as exegesis, hadith studies, Islamic jurisprudence, and Islamic theology. Each discipline has its own methods and principles for evaluating knowledge. On the other hand, AI generates answers based on patterns in data and computational mechanisms.

Research findings indicate that the main weakness of using AI in Islamic education is the absence of scholarly lineage (sanad) and a spiritual dimension in the algorithms. In the pesantren tradition, the validity of religious knowledge depends heavily on the unbroken transmission of the sanad *(ittishal al-sanad)* as well as direct guidance from kiai and ustadz to ensure proper etiquette and sound understanding.



Figure 2. Mechanisms of Epistemological Filtration and Scholarly Authority in AI-Based Learning

The emergence of AI has the potential to distort religious understanding if students rely on digital platforms as a source of legal rulings *(fatwas)* or as the primary authority without seeking confirmation *(tabayyun)* from their religious teachers. Curriculum reform policies must draw a clear line: AI is merely a tool and is not intended to replace the role of teachers or those with authority in Islamic scholarship.

AI Ethical Integrity and Strengthening Students' Digital Literacy

Based on the coding of thematic data, strengthening students' competencies should not only focus on technical *skills* but must also be balanced with digital literacy and ethical use of technology. Many Islamic boarding schools are still constrained by limited infrastructure and low levels of digital literacy among educators, putting students at risk of using technology without a strong ethical foundation.

Table 2. Matrix of the Digital Competency and AI Ethics Framework for Students

Competency Levels	Focus of Technology Assignments	Pesantren Ethical and Spiritual Foundations	*Learning Outcomes*

Basic	Digital media literacy and the use of *AI tools*	Awareness of academic integrity (Amanah)	Students are able to use AI wisely without plagiarism
Intermediate	Formulating *prompts for* book research and text comparison	The principle of *tabayyun* (data verification)	Students are able to validate AI answers by referring to the original texts
Advanced	Introduction to algorithms and religious data analysis	Moral Responsibility and Digital Da'wah *(Maslahah)*	Students are able to produce ethical da'wah and scholarly content

The table above shows that the development of digital literacy in Islamic boarding schools is focused on building technological wisdom. Academic integrity and Islamic ethics serve as the primary bulwarks against the dangers of information manipulation, misinformation, and the commodification of religion in the digital space.

Conceptual Model for the Reconstruction of an AI-Based Islamic Boarding School Curriculum

As the final outcome of this conceptual synthesis, this study formulates a framework for reconstructing the pesantren curriculum that integrates the spiritual values of the pesantren with AI ethics education. This model guides pesantren to transform from a purely traditional textual approach toward an adaptive paradigm without losing their pesantren identity.

Architecture of the Adaptive-Spiritual Pesantren Curriculum Reconstruction Model

The implementation details of the four main components in the AI-based pesantren curriculum reconstruction are as follows:

First, reorganization of learning materials: The curriculum does not eliminate the study of classical Islamic texts. Instead, it adds modules on AI ethics, digital literacy, and technology-based research methods. The goal is for students to understand the limitations of algorithms while also being able to harness them for the advancement of religious knowledge

Second, innovation in teaching methods: the integration of the *talaqqi* method (face-to-face interaction with the kiai) with AI-based adaptive learning. AI is used during the preparatory *(pre-learning)* stage to collect data, while the stages of interpretation and character development are carried out through direct discussion with the kiai.

Third, media and infrastructure development: The provision of digital library resources, a pesantren digital repository, and a locally developed AI platform specifically designed with safeguards *(guardrails)* in accordance with Islamic legal principles.

Fourth, a comprehensive evaluation system: Learning assessments do not merely evaluate memorization or pure textual comprehension. Instead, they measure character, the accuracy of religious data verification, academic integrity, and students' critical thinking skills.

The results of this synthesis demonstrate that curriculum reconstruction can strike a balance between preserving the spiritual values of Islamic boarding schools and adapting to technological disruption in the Society 5.0 era.

Conclusion

Advances in Artificial Intelligence (AI) have had a significant impact on the education system, including Islamic religious education in pesantren. Pesantren institutions face a major challenge in striking a balance between technological disruption and the preservation of pesantren traditions within the realm of Islamic education. Therefore, it is crucial to restructure the pesantren curriculum so that pesantren can maintain their identity while embracing artificial intelligence.

This study concludes that the rapid development of Artificial Intelligence (AI) has a dual impact on Islamic education in pesantren institutions. AI offers opportunities to accelerate the search for references and personalize learning. However, on the other hand, AI poses serious challenges related to the erosion of the scholarly chain of transmission (sanad), a decline in critical thinking skills, a decline in the ability to understand Classical Arabic, the risk of a shift in the role of the kiai, and even the loss of values of etiquette and spirituality.

To respond to technological disruption without eroding the identity of Islamic boarding schools, this study formulates a model for reconstructing the pesantren curriculum through four main pillars. First, reorganizing the curriculum while maintaining the study of classical texts as the foundation, and adding modules on AI ethics, digital literacy, and technology-based research methods. Second, integrating new methods by combining AI-driven adaptive learning in the early stages with the traditional *talaqqi* method for character building. Third, the development of a restricted infrastructure by providing a digital library and a locally designed AI platform equipped with *"guardrails"* aligned with Islamic beliefs and law. Fourth, a comprehensive evaluation system that measures learning not only in terms of textual understanding and memorization but also encompasses moral character, academic integrity *(amanah),* thoroughness in verifying religious information *(tabayyun),* and social responsibility *(maslahah).*

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