

Islamic Ethical Values as The Foundation for The Use of Artificial Intelligence in Islamic Boarding School Education

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Abstract

The growing use of Artificial Intelligence in education presents both opportunities and ethical challenges for Islamic boarding school (pesantren) education. While Artificial Intelligence may enhance learning efficiency and institutional management, its integration within pesantren must be guided by ethical principles rooted in Islamic values. This article examines the use of Artificial Intelligence in pesantren education through the framework of Islamic ethics, emphasizing trust (amanah), justice ('adl), responsibility (mas'uliyah), and ethical conduct (adab) as foundational principles. Using a qualitative conceptual approach, the study analyzes Islamic ethical perspectives as a normative foundation for evaluating and guiding the adoption of Artificial Intelligence in pesantren education. The findings indicate that Artificial Intelligence should not be treated as a neutral or autonomous technology, but as a moral instrument that remains under human authority and ethical accountability. The article also identifies key ethical challenges, including algorithmic bias, the erosion of human responsibility, data privacy concerns, and the tendency toward instrumental approaches to education. Furthermore, the study highlights the pedagogical, institutional, and moral implications of Artificial Intelligence use in pesantren education, particularly in preserving educators' roles, ensuring ethical governance, and supporting students' moral and character development. The article concludes that a human-centered and value-oriented approach is essential to ensure that Artificial Intelligence contributes positively to pesantren education without compromising its moral and spiritual mission.

Keywords: Artificial Intelligence, Islamic Ethics, Pesantren Education, Ethical value, Character Development

Introduction Section

The rapid development of Artificial Intelligence (AI) in the twenty-first century has significantly transformed educational practices across various levels and contexts. Advances in machine learning, data analytics, and computational power have enabled AI systems to support learning through adaptive learning platforms, intelligent tutoring systems, learning analytics, automated assessment, and academic management tools. These technologies offer opportunities to improve learning effectiveness, personalize instruction, and support data-driven decision-making in education (Wang et al., 2024; Zawacki-Richter et al., 2019). Recent studies further highlight AI's transformative role in creating personalized, engaging, and data-informed learning environments that enhance student participation and performance (Fakhra Aslam et al., 2025; Ifraheem et al., 2024; Kovalchuk et al., 2025). As a result, AI has become an increasingly influential component of contemporary educational systems.

Despite these potential benefits, the widespread use of AI in education also raises serious ethical concerns. AI systems are not value-neutral technologies; rather, they embed assumptions, norms, and power relations within algorithmic processes. One of the main ethical challenges is algorithmic bias, whereby AI systems may reproduce or amplify social inequalities due to biased data or flawed design (Baker & Hawn, 2022; Long & Magerko, 2020; Mittelstadt et al., 2016; Roy, 2017). In educational settings, such bias can affect student assessment, placement, and access to learning opportunities (Marín et al., 2025), thereby undermining principles of fairness and justice.

Another significant ethical issue relates to transparency, explainability, and accountability in AI-driven decision-making. Many AI systems function as "black boxes," making it difficult for users to understand how decisions are generated or to challenge unfair outcomes. Floridi et al. (2018) emphasize that the lack of transparency and explainability in algorithmic systems poses ethical risks, particularly when AI decisions have direct consequences for human lives. In education, opaque algorithmic decisions may influence students' learning trajectories and academic futures without adequate mechanisms for ethical oversight (Floridi et al., 2018).

Concerns regarding data privacy and surveillance further complicate the ethical landscape of AI in education (Fouad Larhizer et al., 2025). AI-based educational technologies rely heavily on the collection and analysis of students' personal data, including learning behaviors and academic performance. Without strong ethical governance, such practices may infringe upon students' rights to privacy and autonomy (Williamson & Eynon, 2020). Moreover, excessive reliance on AI technologies risks reducing education to technical processes, potentially marginalizing the human, moral, and relational

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dimensions of teaching and learning. Scholars have warned that over-automation may weaken the role of educators as moral guides and character educators (Dignum, 2019; Selwyn, 2019).

These ethical challenges become more complex within the context of Islamic education. Islamic education is not solely oriented toward the transmission of knowledge but also emphasizes the formation of moral character, ethical conduct (adab), and spiritual awareness. The ultimate goal of Islamic education is to develop individuals who are knowledgeable, morally upright, and conscious of their responsibilities toward Allah, fellow human beings, and the environment. Therefore, the integration of AI in Islamic education cannot be assessed merely in terms of efficiency and effectiveness, but must also be evaluated based on Islamic ethical values.

Islamic ethics is grounded in the Qur'an, the Sunnah, and the scholarly interpretations of Muslim scholars. Core ethical values such as trust (amanah), justice ('adl), responsibility (mas'uliyah), and beneficence (maslahah) (Hashi, 2011) function as normative principles guiding human actions, including the use of technology (Elmahjub, 2023). Within this ethical framework, technology is viewed as a tool entrusted to humans, who remain morally accountable for its use and impact. A central concept in Islamic educational ethics is adab, which refers to ethical conduct and moral discipline that guide behavior and character formation. Knowledge without adab is considered incomplete and potentially harmful, highlighting the inseparable relationship between intellectual development and ethical formation in Islamic education (Ajizah et al., 2025; Alif Auladi & Muwahid, 2025). A central concept in Islamic educational ethics is adab, which refers to ethical conduct and moral discipline that guide behavior and character formation. Knowledge without adab is considered incomplete and potentially harmful, highlighting the inseparable relationship between intellectual development and ethical formation in Islamic education.

Islamic boarding schools (pesantren) represent a distinctive educational context where ethical and moral education is deeply embedded in daily life. Pesantren education emphasizes close teacher–student relationships, moral exemplarity, discipline, and spiritual development. The integration of AI into pesantren education therefore presents both opportunities and ethical challenges. While AI may support learning activities and institutional management, its uncritical adoption risks undermining the relational and moral foundations of pesantren education.

Previous studies on AI in Islamic education have begun to explore these issues. Mukarom et al. (2023) discuss ethical challenges in AI integration within Islamic education, emphasizing the need for value-based frameworks. Yazid (2024) highlights challenges related to institutional readiness and cultural compatibility in pesantren (Yazid, 2024), while Suncaka (2024) stresses the importance of integrating technology and spirituality to preserve Islamic identity (Suncaka, 2024). Other studies suggest that AI can support learning in pesantren if implemented ethically and contextually in accordance with Islamic values (Sumarwan, 2025).

However, most existing studies focus on technical implementation and practical challenges, with limited attention to Islamic ethical values as a comprehensive normative foundation for AI use in pesantren education. This gap indicates the need for a conceptual study that systematically examines Islamic ethical values as the basis for guiding the ethical integration of AI in Islamic boarding schools. Accordingly, this article aims to analyze Islamic ethical values as a normative framework for the use of Artificial Intelligence in pesantren education, with a particular focus on trust (amanah), justice, responsibility, and adab. By doing so, this study seeks to contribute to the discourse on AI ethics in education by offering an Islamic ethical perspective that enables pesantren to adapt to technological developments without compromising their moral and spiritual identity..

RESEARCH METHODS

The research method used in this article is a qualitative approach with a type of literature review. This approach was chosen because the focus of the research is directed at the study of Islamic ethical concepts, principles, and values related to the use of Artificial Intelligence in Islamic boarding school education, not on the collection of empirical data through field research.

The source of research data consists of primary sources and secondary sources. Primary sources include articles in national and international scientific journals that discuss Artificial Intelligence ethics, Islamic ethics, and the use of artificial intelligence technology in the context of education, especially Islamic education and Islamic boarding schools. Secondary sources include proceedings of scientific conferences, academic books, as well as other scientific publications relevant to the focus of the study. The selection of sources was carried out selectively by considering the relevance of the substance, the credibility of the publication, and the contribution of the literature to the strengthening of the conceptual framework of the research.

Data collection was carried out through systematic literature search using academic databases and reference management tools. Literature search uses keywords such as artificial intelligence, ethics of artificial intelligence, Islamic ethics, Islamic education, and pesantren education. The literature obtained was then selected to ensure its suitability with the research focus and its relevance to the discussion of Islamic ethical values in the use of Artificial Intelligence in the pesantren education environment.

Data analysis was carried out using content analysis techniques. Each literature source is examined in depth to identify the main ideas, ethical principles, and conceptual views related to the ethics of Artificial Intelligence and Islamic ethical values. The data that has been analyzed is then classified into relevant discussion themes, such as the ethical principles of

Artificial Intelligence, Islamic ethical values, and its implications for pesantren education practices. The final stage of analysis is carried out through a synthesis process to formulate a conceptual understanding of Islamic ethical values as the basis for the use of Artificial Intelligence in pesantren education.

ARTIFICIAL INTELLIGENCE IN EDUCATION

Artificial Intelligence is one of the technological innovations that is growing rapidly and has a significant impact on various sectors of life, including the field of education. Artificial Intelligence is generally understood as a system or machine designed to mimic human cognitive abilities, such as learning from data, conducting analysis, and generating recommendations or decisions automatically. The development of modern AI is characterized by its ability to process large amounts of data and produce increasingly accurate predictions, so that this technology is increasingly widely applied in various social contexts, including education (Garzón et al., 2025; Wang et al., 2024).

In the context of education, Artificial Intelligence is used to support the learning process through various applications, such as adaptive learning systems, learning outcome analysis, learning material recommendations, and the use of artificial intelligence-based software that assists students and educators in managing academic activities. The application of AI allows the learning process to be more personalized, because learning materials and strategies can be adjusted to the needs, abilities, and characteristics of learners. A number of studies show that the use of AI in education has the potential to improve learning efficiency and support data-driven decision-making in modern educational practices (Zawacki-Richter et al., 2019).

In addition to these opportunities, the presence of Artificial Intelligence in education also raises various challenges, especially related to ethical aspects. AI systems work based on algorithms and data that are not always neutral, so they have the potential to cause bias, injustice, and lack of transparency in the decision-making process. Mittelstadt et al. (2016) assert that algorithms have significant ethical implications because they can influence human behavior and decisions unknowingly (Mittelstadt et al., 2016). In the context of education, this condition can have an impact on the assessment process, mapping students' abilities, and pedagogical relationships between educators and students.

In addition to the issue of bias and transparency, the excessive use of Artificial Intelligence also has the potential to reduce the role of humans in the education process. Selwyn (2019) reminded that dependence on artificial intelligence technology can shift the role of educators from mentors, character educators, and moral role models to mere technology operators (Selwyn, 2019). This condition becomes a serious problem if the use of AI is not balanced with ethical awareness and the strengthening of educational values that place humans as the main subjects in the learning process. Therefore, the discourse on Artificial Intelligence in education cannot be separated from the discussion of ethics and the values underlying its use.

In the perspective of Islamic education, these challenges are becoming increasingly complex. Islamic education is not only oriented to the transfer of knowledge, but also aims to shape the character, morals, and ethical conduct of students. Thus, the use of Artificial Intelligence in Islamic education must be placed as a means of supporting learning, not as a substitute for the role of humans in the educational process (Abdurrahman, 2025). Elmahjub (2023) emphasized that Islamic ethics views technology as a tool that must be directed to realize benefits and does not contradict the moral and spiritual values that are the foundation of the life of Muslims (Elmahjub, 2023).

The use of Artificial Intelligence in Islamic boarding school education needs to be understood within this framework. Pesantren as an Islamic educational institution has the peculiarity of an education system that emphasizes a balance between mastery of knowledge, moral development, and the formation of ethical conduct in daily life. Therefore, the integration of AI in pesantren education cannot be fully equated with general education. The use of AI in Islamic boarding schools requires a strong ethical foundation so that the technology does not shift the main goal of Islamic boarding school education, but rather supports the learning process wisely, proportionately, and responsibly.

Therefore, the discussion about Artificial Intelligence in education cannot stop at technical aspects, effectiveness, or pedagogical innovation alone. The use of AI also has significant moral implications, especially related to human roles, decision-making, and character formation of students. In the context of Islamic education, the need for an ethical foundation is becoming increasingly urgent, considering that the purpose of education is not only oriented to the transfer of knowledge, but also to the development of morals and ethical conduct. Thus, the discourse on the use of Artificial Intelligence in pesantren education needs to be directed to Islamic ethical values as the main normative foothold, so that the integration of technology remains in harmony with the goals of Islamic education and does not shift the essence of pesantren education as an institution for the formation of knowledgeable and moral people

Islamic Ethical Framework as the Foundation for the Use of Artificial Intelligence in Islamic Boarding School Education

Islamic ethical values such as trust, justice, responsibility, and ethical conduct not only function as normative moral principles, but can also be formulated as an operational ethical framework in the use of Artificial Intelligence in the pesantren education environment. This framework is needed so that the use of AI is not purely pragmatic, but directed and

in line with the educational goals of Islamic boarding schools that emphasize the formation of morals and ethical conduct of students.

First, the principle of trust requires the responsible management of AI technology by pesantren managers and educators. In practice, the mandate is reflected in the ethical use of student data, privacy protection, and the selection of AI technology that truly supports the learning process. Amanah also emphasized that AI must be positioned as an educational tool, not as a substitute for the role of educators in guiding and fostering the character of students (Elmahjub, 2023).

Second, the principle of fairness is an important foundation in ensuring that the use of AI does not cause discrimination or inequality in the educational process. AI systems used in learning, assessment, and academic management must be designed and implemented fairly so as not to harm certain groups. This is in line with the findings of Jobin et al. (2019) who emphasize that fairness is one of the key principles in global AI ethics, especially in the context of algorithm-based decision-making. From the perspective of pesantren, justice also means maintaining equal learning opportunities for all students (Jobin et al., 2019).

Third, the principle of responsibility emphasizes that humans remain the main subject in every decision involving the use of Artificial Intelligence. Educators and managers of Islamic boarding schools cannot completely leave the pedagogical process to the AI system, because the moral and educational responsibility remains with humans. The human-centered perspective of artificial intelligence emphasizes that technology should be designed and used to support human roles, not replace them, so that AI-generated decisions remain in human control (Yang et al., 2021). In line with that, Mittelstadt et al. (2016) assert that responsibility for the impact of algorithmic systems cannot be transferred to the technology itself, but rather remains attached to the designer and its users (Mittelstadt et al., 2016). In the context of pesantren education, this principle strengthens the position of educators as moral examples and spiritual guides in the learning process.

Fourth, the value of ethical conduct is a characteristic that distinguishes pesantren education from other education systems. The integration of Artificial Intelligence in Islamic boarding schools must pay attention to ethical conduct in interaction, both between educators and students as well as between students and technology. The use of AI should reinforce *tawadhu'*, discipline, and politeness, not encourage instantaneous, individualistic attitudes, or over-reliance on technology. Suncaka (2024) emphasized that the integration of technology in Islamic boarding schools must remain based on spirituality and Islamic values so as not to erode the identity of Islamic boarding schools.

Fifth, the integration of these ethical principles necessitates a human-centered and moral-centered approach to Artificial Intelligence in pesantren education. While the principles of trust, justice, responsibility, and ethical conduct provide the normative foundation, a human-centered framework ensures that these values are operationalized in educational practice by maintaining human authority and moral accountability in the use of AI technologies.

From a human-centered perspective, Artificial Intelligence must be positioned as a supportive educational tool rather than an autonomous decision-maker. This approach reinforces the third principle of responsibility by ensuring that pedagogical authority remains with educators and pesantren leaders. AI systems may assist in learning analytics, administrative processes, and instructional planning; however, decisions affecting students' intellectual, moral, and spiritual development must remain under human control. As Yang et al. (2021) argue, human-centered AI in education is designed to enhance transparency and support informed human judgment, not to replace educators' roles in decision-making.

In the pesantren context, this human-centered orientation is particularly significant because education is fundamentally relational and value-based. The close interaction between educators and students plays a central role in shaping character and moral discipline. Excessive reliance on AI risks weakening this relationship by prioritizing efficiency over ethical formation. Selwyn (2019) and Dignum (2019) caution that over-automation in educational settings may marginalize educators' roles as moral guides, reducing teaching to technical supervision. Such a shift would contradict the core objectives of pesantren education, which emphasize the integration of knowledge, character, and spirituality.

In addition to being human-centered, the ethical use of Artificial Intelligence in pesantren education must also be moral-centered. This orientation aligns closely with the fourth principle of ethical conduct (*adab*), which regulates attitudes, intentions, and behavior in the pursuit of knowledge. AI applications that encourage instant gratification, dependency, or superficial engagement with learning materials may undermine *adab* by weakening perseverance, humility, and discipline. Therefore, AI technologies must be evaluated not only in terms of efficiency and performance, but also in terms of their moral and spiritual implications.

Accordingly, the ethical legitimacy of AI in pesantren education depends on its alignment with moral cultivation and spiritual objectives rather than mere technological advancement. As Suncaka (2024) emphasizes, the integration of technology in Islamic boarding schools must remain grounded in spirituality and Islamic values in order to preserve institutional identity. This perspective is also consistent with Islamic ethical views that regard technology as a moral trust (*amanah*) entrusted to humans, not as an independent authority (Elmahjub, 2023).

Taken together, the principles of trust (*amanah*), justice (*'adl*), responsibility (*mas'uliyah*), and ethical conduct (*adab*), complemented by a human-centered orientation, constitute an integrated ethical foundation for the use of Artificial Intelligence in pesantren education. These principles operate in a mutually reinforcing manner to ensure that AI remains ethically bounded, pedagogically supportive, and morally accountable. Within this framework, Artificial Intelligence is not understood as a neutral or autonomous system, but as a moral instrument whose legitimacy depends on

human intention, ethical governance, and alignment with the spiritual objectives of Islamic education (Elmahjub, 2023; Jobin et al., 2019).

By emphasizing a human-centered and moral-centered approach, this ethical framework ensures that technological efficiency does not overshadow moral formation, spiritual awareness, and character development. In pesantren education, where educators function as moral exemplars and spiritual guides, Artificial Intelligence must enhance transparency and support informed human judgment rather than replace pedagogical authority (Yang et al., 2021). Excessive automation risks marginalizing the moral and relational dimensions of education, contradicting the centrality of *adab* as a guiding principle in the pursuit of knowledge (Selwyn, 2019; Dignum, 2019). Accordingly, the discussion of human-centered and moral-centered AI reveals an important limitation of principle-based ethics when applied in isolation. Ethical principles provide direction, but they require moral agents who are capable of embodying and sustaining them in practice. This insight points to the need for a deeper ethical foundation that explains how moral dispositions are cultivated and how ethical conduct becomes habitual in technological engagement. In the context of Islamic education, this foundation is provided by Islamic virtue ethics, which emphasizes character formation, moral habituation, and spiritual consciousness as the basis of ethical action (Raquib et al., 2022).

For this reason, the ethical integration of Artificial Intelligence in pesantren education cannot be fully understood without engaging with the perspective of Islamic virtue ethics. By focusing on the cultivation of virtues rather than solely on compliance with ethical norms, virtue ethics offers a more sustainable and holistic framework for guiding technology use in Islamic educational institutions. This perspective is examined further in the following subsection.

Ethical Challenges and Risks of Artificial Intelligence in Pesantren Education

Despite its potential benefits, the integration of Artificial Intelligence in pesantren education presents a range of ethical challenges and risks that require careful and critical consideration. From an Islamic ethical perspective, these challenges are not merely technical or operational issues, but are deeply connected to moral responsibility, human dignity, and the preservation of educational values. Without adequate ethical guidance, the use of AI risks undermining the fundamental objectives of Islamic education, which emphasize character formation, spiritual awareness, and ethical discipline alongside intellectual development (Chamsi-Pasha et al., 2016).

One of the most prominent ethical challenges involves the issue of algorithmic bias and injustice. Artificial Intelligence systems rely on data sets and algorithmic models that may reflect existing social inequalities, incomplete representations, or embedded assumptions. In educational contexts, biased algorithms can influence student assessment, learning recommendations, and academic decision-making in ways that disadvantage certain individuals or groups. Baker and Hawn (2022) demonstrate that algorithmic bias in education can reproduce and even amplify structural inequalities when ethical oversight is insufficient. From the standpoint of Islamic ethics, such outcomes directly contradict the principle of justice (*'adl*), which demands fairness, balance, and equal treatment in educational processes (Jobin et al., 2019). In pesantren education, where moral fairness is integral to educational legitimacy, algorithmic injustice poses a serious ethical concern.

Another significant ethical risk relates to the erosion of human agency and moral responsibility. The increasing reliance on AI-driven systems may encourage educators and institutions to delegate pedagogical judgment to algorithms, thereby weakening the role of educators as moral guides and character educators. Selwyn (2019) warns that over-automation in education risks reducing teachers to technical supervisors rather than reflective practitioners who exercise ethical judgment. In pesantren education, where educators function as spiritual mentors and moral exemplars, the displacement of human authority by algorithmic systems threatens the ethical foundation of the educational process. Islamic ethics firmly maintains that responsibility (*mas'uliyah*) cannot be transferred to technology, as humans remain morally accountable for all decisions and their consequences (Mittelstadt et al., 2016).

Concerns related to data privacy and surveillance further constitute critical ethical challenges in the use of Artificial Intelligence in pesantren education. AI-based educational technologies often depend on extensive data collection, including students' learning behaviors, academic performance, and personal information. Without strong ethical governance, such practices risk violating students' privacy, autonomy, and dignity. Williamson and Eynon (2020) argue that data-driven educational systems may introduce new forms of surveillance that alter power relations between institutions and learners. From an Islamic ethical perspective, the protection of personal data represents an extension of trust (*amanah*) and respect for human dignity, rendering data misuse not only a legal concern but also a serious moral violation.

In addition to these risks, the use of Artificial Intelligence may encourage instrumental and utilitarian approaches to education that prioritize efficiency, optimization, and measurable outcomes over moral and spiritual development (Arianto, 2025). Such approaches risk reducing education to technical performance while marginalizing ethical reflection, moral struggle, and character formation. Dignum (2019) emphasizes that responsible AI must be aligned with human values and social goals rather than narrow performance metrics alone. In the context of pesantren education, where learning is inseparable from ethical discipline (*adab*) and spiritual intention, this instrumental orientation represents a profound ethical risk.

Taken together, these ethical challenges underscore the necessity of a cautious, reflective, and value-oriented approach to the integration of Artificial Intelligence in pesantren education. Recognizing these risks does not imply rejecting technological innovation but rather highlights the importance of grounding AI use firmly within Islamic ethical principles.

By critically addressing issues of justice, responsibility, privacy, and moral purpose, pesantren can engage with Artificial Intelligence in a manner that is ethically informed and educationally meaningful, ensuring that technological advancement supports rather than undermines the moral and spiritual aims of Islamic education.

Implications of Islamic Ethics in the Use of Artificial Intelligence in Islamic Boarding School Education

The Islamic ethical framework grounded in the values of trust (*amanah*), justice (*'adl*), responsibility (*mas'uliyah*), and ethical conduct (*adab*) generates far-reaching implications for the use of Artificial Intelligence in Islamic boarding school education. These implications are not limited to technical efficiency or digital innovation but extend to the pedagogical orientation of teaching and learning, the governance of educational institutions, and the moral and character development of students (Ajizah et al., 2025). Accordingly, the ethical integration of AI in pesantren education must be understood as a comprehensive process that aligns technological practices with the moral and spiritual objectives of Islamic education (Elmahjub, 2023; Floridi et al., 2018).

From a pedagogical perspective, Islamic ethics requires that Artificial Intelligence be positioned as a supportive instrument that enhances the quality of teaching and learning without diminishing the central role of educators. In pesantren education, educators are not merely transmitters of knowledge, but moral exemplars and spiritual mentors whose authority cannot be delegated to technological systems. Therefore, AI must function as an assistive tool that supports instructional planning, learning personalization, and formative assessment, while pedagogical judgment and ethical guidance remain firmly in human hands. Research on AI in education emphasizes that human-centered use of AI can contribute positively to learning outcomes when educators retain control over instructional decisions and interpret AI-generated insights critically (Zawacki-Richter et al., 2019; Yang et al., 2021).

Furthermore, pedagogical practice in pesantren is deeply relational and value oriented. Learning is shaped through daily interaction, dialogue, discipline, and moral habituation. The use of AI in this context must therefore preserve direct engagement between educators and students, ensuring that technology does not replace interpersonal relationships that are essential for ethical formation. AI-supported learning activities should be integrated selectively to complement traditional pedagogical practices, such as *halaqah*, mentoring, and character-based instruction. Excessive automation or reliance on AI-driven instruction risks weakening these relational dimensions and reducing education to technical optimization, which contradicts the ethical foundations of pesantren pedagogy (Selwyn, 2019).

In addition, Islamic ethics emphasizes that pedagogical decisions involving AI remain subject to human responsibility and moral accountability. Educators are required to evaluate AI-generated recommendations critically, taking into account students' spiritual conditions, moral development, and individual learning contexts. As Dignum (2019) argues, responsible AI in education depends on maintaining human agency in instructional design and classroom practice. Within pesantren education, this principle ensures that AI enhances pedagogical effectiveness while remaining aligned with Islamic values and educational purposes.

Beyond pedagogical implications, Islamic ethics also has significant consequences for the institutional governance of Artificial Intelligence in pesantren education (Ferdiansyah et al., 2025). The principle of trust (*amanah*) obliges pesantren leaders and administrators to manage AI systems transparently and responsibly, particularly in relation to data collection, system selection, and algorithmic decision-making. Educational AI systems often rely on large volumes of student data, raising ethical concerns regarding privacy, consent, and accountability. Scholars have identified data governance as a central ethical challenge in AI-based education, especially in contexts where power asymmetries between institutions and learners may emerge (Williamson & Eynon, 2020; Floridi et al., 2018).

Justice (*'adl*) further requires that the adoption of AI does not result in discrimination, unequal access to learning opportunities, or biased assessment practices. Empirical studies on algorithmic bias demonstrate that AI systems may unintentionally reproduce social inequalities if training data and evaluation mechanisms are not ethically governed (Baker & Hawn, 2022; Jobin et al., 2019). For pesantren institutions, this implies the necessity of careful evaluation, ethical oversight, and continuous monitoring of AI systems to ensure that technological innovation supports fairness and inclusivity rather than undermining them.

In terms of students' moral and character development, Islamic ethics places *adab* at the center of educational practice. Students' interaction with Artificial Intelligence must therefore be guided by ethical discipline, responsibility, humility, and respect for knowledge. The uncritical use of AI risks fostering dependency, instant gratification, and superficial engagement with learning if ethical guidance is absent. Scholars have warned that educational technologies, when adopted without moral framing, may weaken students' reflective capacities and moral engagement (Selwyn, 2019; Dignum, 2019). From an Islamic perspective, technology must remain subordinate to moral and spiritual values, serving to support ethical formation rather than replacing ethical struggle and discipline.

Taken together, these pedagogical, institutional, and moral implications demonstrate that the integration of Artificial Intelligence in pesantren education must be carried out selectively, proportionally, and in a benefit-oriented manner. Islamic ethics functions as a moral compass that directs the use of AI to remain aligned with the fundamental goals of pesantren

education, namely the formation of knowledgeable, morally upright, and spiritually grounded individuals who are capable of engaging responsibly with contemporary technological developments. By grounding AI adoption in Islamic ethical principles, pesantren can respond to technological change without compromising their educational identity and moral-spiritual mission.

Future Directions of Ethical Artificial Intelligence in Pesantren Education

Looking forward, the ethical integration of Artificial Intelligence in pesantren education requires sustained reflection, institutional commitment, and continuous adaptation to technological developments. While Islamic ethical principles provide a strong normative foundation, future efforts must focus on translating these values into long-term strategies that ensure ethical consistency, educational relevance, and institutional sustainability.

One important future direction involves the development of context-sensitive ethical frameworks for AI use in pesantren. General AI ethics guidelines often fail to account for the unique educational culture, spiritual objectives, and relational dynamics of Islamic boarding schools. Therefore, pesantren institutions are encouraged to formulate localized ethical guidelines that integrate Islamic values with practical considerations of technology use. Such frameworks would help bridge the gap between universal AI ethics principles and the specific moral ecology of pesantren education (Floridi et al., 2018; Jobin et al., 2019).

Another crucial direction concerns capacity building for educators and institutional leaders. As AI technologies continue to evolve, educators must be equipped not only with technical skills but also with ethical competence to critically assess and responsibly use AI systems. Research on AI in education highlights the importance of professional development programs that emphasize ethical awareness, human-centered decision-making, and reflective practice (Yang et al., 2021; Zawacki-Richter et al., 2019). In pesantren contexts, such capacity building should be grounded in Islamic moral education, reinforcing the role of educators as moral exemplars and ethical decision-makers.

Future efforts should also prioritize the integration of ethical reflection into curriculum and daily educational practices. Rather than treating AI ethics as an abstract topic, pesantren can incorporate discussions on technology, ethics, and responsibility into relevant subjects and learning activities. This approach supports the internalization of ethical values among students and fosters critical awareness of technology's moral implications. Scholars argue that ethical literacy and moral reflection are essential for preparing learners to engage responsibly with emerging technologies (Long & Magerko, 2020; Selwyn, 2019).

In addition, the future development of ethical AI in pesantren education requires ongoing research and evaluation. Empirical studies examining how AI affects learning behavior, teacher-student relationships, and moral development are still limited, particularly in Islamic educational settings. Continuous evaluation allows institutions to identify unintended consequences, ethical risks, and areas for improvement. Such research-based approaches align with responsible AI principles that emphasize accountability, transparency, and continuous ethical oversight (Dignum, 2019).

Overall, future directions for ethical Artificial Intelligence in pesantren education point toward a balanced integration of technological innovation and Islamic ethical values. By investing in ethical frameworks, human capacity, curriculum integration, and empirical evaluation, pesantren can remain adaptive to technological change while preserving their distinctive educational identity. In this way, Artificial Intelligence can contribute positively to the mission of pesantren education without compromising its moral and spiritual foundations.

Conclusion

This article has examined the use of Artificial Intelligence in pesantren education through the lens of Islamic ethical values, positioning trust (*amanah*), justice (*'adl*), responsibility (*mas'uliyah*), and ethical conduct (*adab*) as the foundational principles guiding technological integration. Rather than approaching AI solely as a technical innovation, the study emphasizes that its legitimacy within Islamic boarding school education depends on ethical alignment with the moral, spiritual, and educational objectives of pesantren.

The discussion of the Islamic ethical framework demonstrates that AI cannot be treated as a neutral or autonomous system in educational settings. Instead, it must be understood as a moral instrument whose use is inseparable from human intention, ethical governance, and accountability. The analysis further highlights that a human-centered and moral-centered approach is essential to ensure that Artificial Intelligence supports, rather than replaces, the pedagogical and moral roles of educators. This perspective is particularly relevant in pesantren education, where learning is deeply relational and oriented toward character formation.

Furthermore, the article identifies a range of ethical challenges and risks associated with the use of Artificial Intelligence in pesantren education, including algorithmic bias, the erosion of human agency, data privacy concerns, and the instrumentalization of educational processes. These challenges illustrate the potential consequences of adopting AI without sufficient ethical reflection and oversight. From an Islamic ethical standpoint, such risks directly contradict the principles of justice, trust, and moral responsibility that underpin Islamic education.

The implications discussed in this study show that Islamic ethics provides concrete guidance for addressing these challenges at pedagogical, institutional, and moral levels. Pedagogically, AI must function as a supportive tool that enhances learning while preserving the authority and ethical responsibility of educators. Institutionally, pesantren must adopt transparent and accountable governance practices, particularly in relation to data management and algorithmic

decision-making. In terms of character development, the use of AI must reinforce ethical discipline and spiritual awareness, ensuring that technology remains subordinate to moral values rather than shaping them.

Finally, this article underscores that the future integration of Artificial Intelligence in pesantren education requires continuous ethical reflection, capacity building, and context-sensitive adaptation. By grounding AI adoption in Islamic ethical principles, pesantren can respond constructively to technological developments without compromising their educational identity and moral–spiritual mission. In this way, Islamic ethics functions not only as a normative framework but also as a practical compass for navigating the ethical complexities of Artificial Intelligence in contemporary Islamic education.

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