

## **Artificial Intelligence–Based Administration and Students’ Spirituality in Islamic Education: A Tarbiyah-Oriented Pedagogical Ecology**

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Received December 22, 2025; Revised June 20, 2026;  
Accepted June 29, 2026; Available Online June 30, 2026

### **Abstract:**

The rapid integration of Artificial Intelligence (AI) into educational administration and learning has created both opportunities and challenges for Islamic education, particularly regarding students’ cognitive engagement and spiritual development. While AI-supported administration enhances efficiency and data-driven decision-making, its implications for students’ spirituality and moral formation remain underexplored. This study investigates how AI-enabled administrative practices shape learning environments and students’ spiritual development in Islamic secondary schools. Employing a qualitative case study design, data were collected through in-depth interviews, classroom observations, and document analysis involving school leaders, Islamic education teachers, students, and parents. Thematic analysis was conducted using socio-cognitive and ecological perspectives to examine the interplay between AI-supported administration, pedagogical practices, and students’ spiritual experiences. The findings indicate that AI improves administrative efficiency, transparency, and instructional management. However, excessive reliance on digital systems may increase cognitive load, reduce opportunities for reflective learning, and weaken students’ spiritual engagement when implemented without pedagogical and ethical guidance. Conversely, when embedded within a values-oriented learning ecology characterized by teacher mediation, reflective pedagogy, and spiritually supportive environments, AI fosters students’ self-regulation, moral awareness, and sense of responsibility. The study proposes a conceptual framework that positions AI as an integral component of a spiritually informed learning ecology, emphasizing that technological innovation should reinforce rather than diminish the core aims of Islamic education: spiritual growth, ethical development, and holistic learning.

### **Abstrak:**

Integrasi cepat Kecerdasan Buatan (AI) dalam administrasi pendidikan dan pembelajaran menghadirkan peluang sekaligus tantangan bagi pendidikan Islam, khususnya terkait keterlibatan kognitif serta perkembangan spiritual dan moral peserta didik. Meskipun administrasi berbasis AI mampu meningkatkan efisiensi dan mendukung pengambilan keputusan berbasis data, implikasinya terhadap pembentukan spiritualitas siswa masih belum banyak dikaji. Penelitian ini bertujuan menganalisis pengaruh praktik administrasi berbasis AI terhadap lingkungan belajar dan perkembangan spiritual siswa di sekolah menengah Islam. Penelitian menggunakan pendekatan studi kasus kualitatif melalui wawancara mendalam, observasi kelas, dan analisis dokumen yang melibatkan kepala sekolah, guru pendidikan Islam, siswa, dan orang tua. Data dianalisis secara tematik dengan perspektif sosio-kognitif dan ekologis. Hasil penelitian menunjukkan bahwa AI meningkatkan efektivitas, transparansi, dan efisiensi administrasi pembelajaran.

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Namun, penggunaan yang berlebihan berpotensi meningkatkan beban kognitif, mengurangi refleksi, dan melemahkan keterlibatan spiritual apabila tidak disertai pertimbangan pedagogis dan etis. Sebaliknya, integrasi AI dalam ekologi pembelajaran yang berorientasi pada nilai, melalui bimbingan guru dan praktik reflektif, mampu memperkuat pengaturan diri, kesadaran moral, dan tanggung jawab siswa. Studi ini mengusulkan kerangka konseptual yang memosisikan AI sebagai bagian dari ekologi pembelajaran spiritual yang harus dikelola secara pedagogis untuk mendukung tujuan utama pendidikan Islam, yaitu pembentukan karakter, spiritualitas, dan pembelajaran holistik.

**Keywords :**

Artificial Intelligence, Islamic Education, Learning Administration, Spirituality, Pedagogical Ecology.

**How to Cite:** Zain, J. M. & Shodiq, S. F. (2026). Artificial Intelligence-Based Administration and Students' Spirituality in Islamic Education: A Tarbiyah-Oriented Pedagogical Ecology. *Lentera Pendidikan : Jurnal Ilmu Tarbiyah dan Keguruan*, 29(1), 151-163. <https://doi.org/10.24252/lp.2026v29n1i10>.

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## Introduction

The rapid advancement of digital technology has significantly transformed educational governance and learning practices across the globe. In recent years, Artificial Intelligence (AI) has increasingly been integrated into educational administration, enabling automated data processing, real-time monitoring, and data-driven decision-making (Hutami, Danim, Hamzah, & Kristiawan, 2024). In many educational systems, including Islamic schools, AI-based administration is promoted as a solution to improve efficiency, transparency, and accountability in managing learning processes (Anggraini, 2024). However, alongside these opportunities, critical questions have emerged regarding the pedagogical and ethical implications of AI for learning, particularly in relation to students' spiritual and moral development. Within the field of Islamic education, learning is not merely oriented toward academic achievement or technical efficiency. Islamic education is fundamentally concerned with the holistic development of learners, encompassing spiritual awareness, moral conduct, and social responsibility (Misrawati & Fadriati, 2025).

This orientation distinguishes Islamic education from purely instrumental models of schooling, as it places ethical and spiritual objectives at the center of pedagogical practice. Consequently, the adoption of AI-based systems in educational administration within Islamic schools cannot be approached solely as a technical innovation; rather, it must be

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examined through the lens of tarbiyah and ta'dib, which define the core aims of Islamic pedagogy.

Tarbiyah refers to the gradual and continuous nurturing of learners' spiritual, intellectual, emotional, and social potential through intentional educational processes (Hesya & Yuliani, 2026). Meanwhile, ta'dib emphasizes the formation of adab, moral consciousness, and ethical responsibility, ensuring that knowledge is internalized and manifested in virtuous behavior (Hidayat & Mulyanto, 2023). Together, these concepts underscore that Islamic education seeks to develop not only knowledgeable individuals but also morally grounded and spiritually aware human beings. Any technological innovation introduced into Islamic educational settings must therefore be evaluated based on its alignment with these foundational objectives. At the same time, contemporary Islamic education faces growing challenges in maintaining spiritual depth and moral formation amid increasing digitalization. Students today are immersed in data-saturated environments characterized by constant information flow, algorithmic systems, and digital monitoring (Suhendi, 2023). While AI-based administration can enhance learning organization, it may also unintentionally contribute to cognitive overload, reduced opportunities for reflective learning, and diminished spiritual engagement if not implemented with appropriate pedagogical regulation (Zaini, Iskandar, & Gina, 2025). These concerns resonate with broader debates in educational research regarding the tension between technological efficiency and humanistic education.

Recent studies on AI and data-driven education have predominantly focused on learning analytics, automation, and performance optimization (Latifah, Yulistiana, Putri, Hindriana, & Supiani, 2026). Although these studies provide valuable insights into the managerial benefits of AI, they often neglect the normative dimensions of education, particularly those related to spirituality and moral development (Soepriyanto, Nugroho, Hilman, & Nahri, 2025). In contrast, research on Islamic education has traditionally emphasized curriculum content, pedagogical strategies, and teachers' beliefs in fostering religiosity and character. Comparatively little attention has been paid to how administrative technologies themselves shape learning environments, teacher practices, and students' spiritual experiences. This gap is particularly significant given the central role of teachers in Islamic education. Teachers are not only transmitters of knowledge but also moral exemplars and spiritual guides who model values and shape students' religious understanding (Hidayat & Wibowo, 2024). In pedagogical practice, teachers mediate learning experiences, interpret institutional policies, and create environments conducive to reflection and spiritual growth. When AI-based administration becomes embedded in learning governance, teachers inevitably interact with these systems by interpreting data, responding to algorithmic feedback, and adjusting instructional decisions. Thus, the influence of AI on students' spirituality is not direct but is mediated through teacher agency and pedagogical judgment (Borges, Sebastião, Caridade, & Pereira, 2026).

From a pedagogical standpoint, this interaction can be understood through the concept of pedagogical ecology, which views learning as the outcome of dynamic interactions among learners, teachers, tools, and environments (Hidayat, Ramli, & Guntara,

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2025). Within this framework, AI-based administration constitutes one element of a broader educational ecosystem. Its impact on students depends on how it interacts with instructional practices, school culture, and ethical norms. A pedagogical ecology that prioritizes *tarbiyah* and *ta'dib* may harness AI to support reflective learning and moral development, whereas a purely technocratic ecology may marginalize spiritual aims in favor of measurable performance indicators (Fikriansyah & Andika, 2026). The issue of students' spirituality is particularly salient in contemporary Islamic education. Spirituality in this context does not merely refer to ritual practice but also to students' inner awareness, moral sensitivity, and sense of responsibility toward God, others, and society (Pujianti, 2024). Developing such spirituality requires learning environments that encourage reflection, dialogue, and meaningful teacher–student interaction. If AI-based administration dominates learning governance without pedagogical balance, it risks reducing education to procedural compliance and undermining these essential dimensions of Islamic pedagogy (Kahfi, Reyza, Arrosikha, & Nasrullah, 2025).

Furthermore, concerns about spiritual erosion in digitally mediated education have been echoed in broader educational discourse. Scholars argue that excessive reliance on digital systems may shift educational authority from teachers to algorithms, potentially weakening moral agency and learner autonomy (Ahmad, Firdaus, Rochimah, Wulandari, 2026). In Islamic education, this shift raises ethical questions regarding the role of technology in shaping values and behavior. Addressing these questions requires a pedagogical framework that situates AI within the moral and educational responsibilities of teachers rather than treating it as a neutral administrative solution (Ubaidah & Haris, 2026). Despite the growing relevance of these issues, empirical studies examining the intersection of AI-based administration, pedagogical practice, and students' spirituality in Islamic education remain limited. Existing research often treats AI as an external variable, overlooking its integration into everyday learning governance and teacher decision-making (Taufiqi & Sholehudin, 2026). At SMA Muhammadiyah 5 Yogyakarta, AI-based administration refers to the use of digital systems, such as learning management systems (LMSs) and data-based academic reporting systems, that assist teachers in recording attendance, assessing student performance, and monitoring student development automatically. Therefore, there is a need for research that explores how these AI-based administrative systems interact with pedagogical processes and how these interactions influence students' spiritual development from a *tarbiyah*-oriented perspective.

In response to this gap, this study examines how AI-based administration shapes the learning environment and students' spirituality in Islamic secondary education, with a particular focus on teacher mediation and pedagogical ecology at SMA Muhammadiyah 5 Yogyakarta. Using a qualitative case study approach, this study aims to capture the lived experiences of teachers, students, principals, and parents in navigating AI-powered administrative practices within the school context. Rather than evaluating AI solely in terms of technical efficiency, this study highlights its pedagogical and spiritual implications within the framework of *tarbiyah* and *ta'dib*, thereby providing a more contextual understanding of how the technology interacts with the values of Islamic education

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embedded in the school environment. This study contributes to the fields of Islamic education (*tarbiyah*) and teacher education in two important ways. Theoretically, it develops a *tarbiyah*-oriented pedagogical ecology framework that reconceptualizes AI-based administration as an ethical and educational concern rather than merely a technical reform (Masuroh & Mardani, 2025). Practically, it offers insights for teachers and school leaders on how to regulate the use of AI in ways that support students' spiritual development and moral formation. Ultimately, the study argues that the sustainability of AI integration in Islamic education depends not on technological sophistication but on educators' ability to align innovation with the enduring goals of *tarbiyah* and *ta'dib*.

### Research Method

This study employed a qualitative case study design to explore how Artificial Intelligence (AI)-based administration affects students' learning environments and spirituality in Islamic education. A qualitative approach was chosen to capture pedagogical experiences, teacher mediation processes, and students' spiritual responses, which cannot be adequately examined through quantitative measurement alone. The study is grounded in a *tarbiyah*-oriented pedagogical ecology perspective, which conceptualizes learning as an interaction among technological systems, teachers, students, and the educational environment. This research was conducted at SMA Muhammadiyah 5 Yogyakarta, which has implemented an AI-based administrative system for learning management and academic services. Participants were purposively selected to represent the key educational stakeholders involved in the learning process. The participants consisted of one principal, nine teachers, and fifteen students, for a total of twenty-five informants. This selection enabled the study to examine AI integration from both managerial and pedagogical perspectives, as well as its perceived impact on students' spiritual development.

Data were collected through semi-structured interviews, classroom observations, and document analysis. The interviews focused on participants' experiences with AI-based administration, their perceptions of its impact on learning practices, and its implications for students' spirituality and moral development. Classroom observations were conducted to examine instructional interactions, learning dynamics, and students' engagement in reflective and spiritual learning activities. Document analysis included school policies, lesson plans, and administrative records related to AI implementation. These multiple data sources provided a comprehensive understanding of the phenomenon under investigation. Then, data analysis was conducted concurrently with data collection. All interview recordings were first transcribed and then repeatedly reviewed alongside observation notes and supporting documents to develop a comprehensive understanding of AI use within the school environment. Repeated reading enabled the researchers to identify emerging patterns and understand the context of each participant's experiences. After familiarization with the data, an initial coding process was undertaken by identifying segments relevant to the research focus. Initial codes were generated from recurring issues, including the use of AI in school administration, AI-supported learning activities,

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teachers' roles in mediating technology use, and the influence of AI on students' character and spiritual development. Related codes were subsequently grouped into broader categories.

The next stage involved identifying overarching themes by examining relationships among these categories. Findings from different data sources were compared to identify similarities, differences, and recurring patterns. This process generated themes explaining how AI was implemented in the educational environment, how teachers mediated its use in teaching and learning, and how technology influenced the achievement of the goals of *tarbiyah* and *ta'dib*. To enhance the trustworthiness of the findings, source triangulation was conducted by comparing information obtained from the principal, teachers, and students. In addition, interview data were corroborated with classroom observations and documentary evidence. The final results were presented as a descriptive narrative illustrating the relationships among AI use, educational practices, and students' spiritual development. This study applied the criteria of credibility, transferability, dependability, and confirmability. Credibility was enhanced through both source and methodological triangulation. Source triangulation involved comparing information obtained from principals, teachers, and students. For example, information regarding the use of AI in the learning process was collected not only from teachers but also verified through students' perspectives as users and the principal's perspective as the policy-maker. These comparisons enabled the researchers to identify consistencies and discrepancies across participants' accounts.

Methodological triangulation was achieved by comparing data obtained from interviews, classroom observations, and document analysis. Findings from interviews were verified through observations of school activities and documents related to AI policies and practices. For example, participants' statements regarding the use of AI in school administration were compared with relevant school documents and direct observations of administrative practices. This process ensured that the findings did not rely solely on a single data source or data collection method. Transferability was supported through detailed descriptions of the school context, participant characteristics, and research procedures, enabling readers to assess the applicability of the findings to similar contexts. Dependability was maintained by systematically documenting the entire research process, including data collection, coding, theme development, and interpretation. Confirmability was established by maintaining a clear audit trail linking the raw data, coding process, and final interpretations, thereby ensuring that the findings were grounded in the data rather than the researchers' assumptions.

## **Result and Discussion**

### **AI-Based Administration and Learning Environment in Islamic Education**

The findings indicate that the implementation of Artificial Intelligence (AI)-based administration has significantly transformed the learning environment in Islamic secondary education, particularly in academic administration, student monitoring, and learning management. Based on interviews with teachers and school administrators, AI-

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supported systems have simplified administrative tasks and improved access to students' academic information. One teacher explained:

"Since the implementation of the AI-based administrative system, I can monitor students' attendance, assignment submissions, and learning progress more efficiently. Previously, these tasks required manual documentation, but now the information is available instantly." (Teacher 2)

Similarly, the school principal emphasized that AI-supported administration has enhanced institutional transparency and decision-making:

"The digital system enables us to monitor students' academic development continuously. It also helps teachers identify students who require additional academic or personal guidance." (Principal)

Classroom observations also revealed that teachers frequently accessed the learning management system before and during classroom activities to review attendance records, assignment completion, and students' learning progress. These observations indicate that AI has become an integral component of everyday educational administration rather than merely a supporting technological tool. However, despite these administrative advantages, interview data revealed that some students experienced the learning environment differently. Several students admitted that they became more focused on completing digital tasks than on developing a deeper understanding of the learning materials. One student commented:

"Sometimes I only focus on submitting assignments before the deadline because everything is recorded by the system. I do not always have enough time to reflect on what I have learned." (Student 5)

These findings suggest that although AI-based administration improves organizational efficiency, excessive reliance on digital systems may unintentionally encourage instrumental learning behavior. Therefore, the effectiveness of AI depends not only on technological sophistication but also on teachers' pedagogical mediation to sustain meaningful learning experiences.

### **Teacher Mediation as the Core of Tarbiyah-Based Learning Practices**

Interview findings consistently demonstrate that teachers play a central role in determining how AI influences students' learning experiences and spiritual development. Rather than relying solely on AI-generated data, teachers interpret the information pedagogically and use it to provide individualized guidance. As one Islamic Education teacher explained:

"AI only provides information. As teachers, we still have to understand students' personal circumstances, motivate them, and remind them of their religious responsibilities. Technology cannot replace this role." (Teacher 4)

Another teacher added:

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“When the system identifies students with declining academic performance, I do not immediately judge them based on the data. Instead, I invite them to have personal discussions to understand the real problems they are facing.”  
(Teacher 1)

Classroom observations further confirmed that teachers frequently combined AI-generated information with reflective classroom discussions, moral guidance, and religious reminders. During several observed lessons, teachers encouraged students to evaluate not only their academic performance but also their attitudes, honesty, discipline, and sense of responsibility. These findings indicate that AI functions primarily as an administrative support system, while teachers remain the key pedagogical mediators who transform digital information into meaningful educational experiences consistent with the principles of *tarbiyah* and *ta’dib*.

### **AI, Moral Construction, and Ta’dib**

In terms of character formation, the findings show that AI systems indirectly contribute to the development of students’ discipline and sense of responsibility through a more transparent monitoring and evaluation system. Some students admitted that they had become more organized in submitting assignments because of the digital tracking system. One student stated:

“Since all the tasks are recorded in the system, I am more disciplined about submitting them on time.” (Student)

However, the findings also indicate that when digital monitoring becomes overly dominant, students may become more oriented toward complying with the system than developing internal moral awareness. This suggests that moral formation cannot be achieved through digital control systems alone but requires the internalization of values through teachers’ guidance and the school’s culture.

### **Spirituality and Pedagogical Ecology**

The findings further show that the influence of AI on students’ spirituality is not direct but is mediated by the pedagogical environment in which the technology is used. In schools characterized by a reflective culture and strong teacher–student interactions, AI can support students’ spiritual awareness by facilitating more systematic learning and monitoring. In contrast, in more technically oriented environments, some students reported that opportunities for reflection and meaningful interaction with teachers were reduced. These findings suggest that the impact of AI depends largely on the learning ecology established within the school rather than on the technology itself.



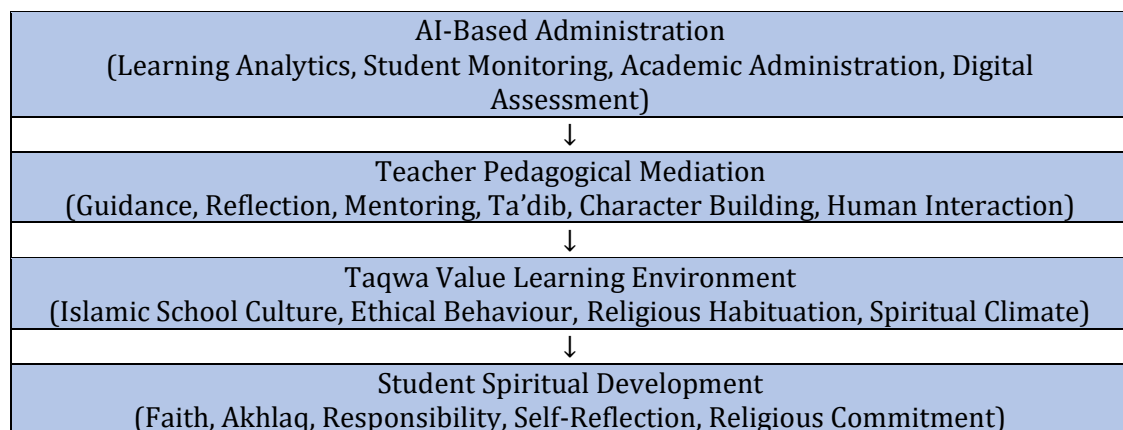


Figure 1. Proposed Tarbiyah-Oriented Pedagogical Ecology Framework

Source: Developed by the authors based on research findings.

Figure 2 presents the proposed Tarbiyah-Oriented Pedagogical Ecology framework developed from the findings of this study. The framework demonstrates that Artificial Intelligence (AI)-based administration primarily functions as an enabling technological infrastructure that supports educational management through learning analytics, student monitoring, academic administration, and digital assessment. Although AI improves administrative efficiency and provides comprehensive educational data, it does not directly shape students' spiritual development. Instead, teachers remain the central pedagogical agents who interpret AI-generated information and transform it into meaningful educational experiences. Through guidance, mentoring, reflection, and values-oriented instruction, teachers ensure that technological innovation is consistently aligned with the principles of tarbiyah and ta'dib. In this process, AI serves as a supporting instrument rather than replacing the essential human role of educators.

Teacher mediation subsequently cultivates a Taqwa-Based Learning Environment characterized by an Islamic school culture, ethical interactions, religious habituation, and continuous moral reinforcement. Within this educational ecology, students experience not only academic development but also the internalization of Islamic values that strengthen faith, responsibility, honesty, self-discipline, and spiritual awareness. The proposed framework therefore illustrates that students' spirituality emerges from the dynamic interaction among AI-supported educational administration, teacher pedagogical mediation, and a values-based learning environment. This finding highlights that successful digital transformation in Islamic education depends on balancing technological innovation with humanistic and spiritual educational values.

### **Integrative Discussion: Towards a Tarbiyah-Oriented Pedagogical Ecology**

Integratively, the findings of this study suggest that the implementation of AI-based administration in Islamic education cannot be understood simply as a stand-alone technological innovation but should instead be viewed as part of a broader pedagogical ecology. This ecology encompasses the interaction among digital systems, teachers' pedagogical practices, school culture, and students' learning experiences. In this context,

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AI serves as a supporting infrastructure that influences the flow of educational information, while its meaning and impact are largely determined by how teachers and institutions manage it in everyday practice. The findings reveal a consistent pattern: the impact of AI is positive when teachers assume an active role as pedagogical mediators rather than merely users of the administrative system. Under these conditions, data generated by AI systems do not remain as numbers or reports but are transformed into a basis for instructional decision-making that considers students' cognitive, emotional, and spiritual development. In this way, technology strengthens the process of *tarbiyah*, understood as the gradual and holistic development of learners.

Conversely, when AI is used primarily to enhance administrative efficiency without accompanying pedagogical reflection, learning tends to become more mechanical. In such circumstances, students interact more with the system than with opportunities for reflection on the meaning of learning itself. This suggests that AI has an inherently ambivalent potential: it can enhance meaningful learning, but it can also diminish the quality of the learning experience if it is not guided by sound pedagogical principles. The findings further demonstrate that students' spirituality is not shaped directly by technology but by the way technology is integrated into the learning environment. A pedagogical ecology that promotes dialogue, teacher role modelling, and a culture of reflection strengthens the role of AI in supporting students' spiritual and moral development. In contrast, an overly technocratic environment tends to reduce learning to an administrative process, thereby diminishing its reflective and spiritual dimensions. Thus, the primary contribution of this study is to demonstrate that the successful implementation of AI in Islamic education depends not only on the sophistication of the technology but also on the quality of the pedagogical ecology within which it is embedded. Within this framework, *tarbiyah* and *ta'dib* serve as guiding principles that ensure technology remains aligned with a humanistic, reflective, and character-oriented vision of education. This study extends existing perspectives by arguing that AI should be understood as a pedagogical tool guided by educational values rather than as a substitute for the indispensable role of educators in the teaching and learning process.

## **Conclusion**

Based on the results of the analysis and discussion, this study concludes that the implementation of Artificial Intelligence (AI)-based administration does not directly affect students' spirituality in Islamic education but is significantly mediated by the pedagogical ecology established within the school environment. On the one hand, the integration of AI systems optimizes the efficiency, accountability, and transparency of academic data management and student monitoring. On the other hand, the dominance of digital control without alignment with appropriate instructional strategies has the potential to increase cognitive load, reduce opportunities for student reflection, and encourage mechanical procedural compliance, resulting in instrumental learning. Viewed through the lens of *tarbiyah* and *ta'dib*, the active role of teachers as pedagogical mediators is a key factor in transforming the capabilities of AI technology into opportunities to strengthen students'

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moral awareness, sense of responsibility, and learning autonomy. When technology is guided by Islamic values of spirituality and exemplary conduct, AI can function as a supporting infrastructure for a holistic and adaptive learning ecology in the digital age. Theoretically, this study contributes to the fields of tarbiyah and teacher education by extending the concept of AI–Spiritual Ecology, which positions technology as an ethical entity requiring pedagogical governance rather than merely a technocratic administrative instrument. Practically, the study recommends AI governance that places teachers at the center of decision-making (AI teacher-centered governance) and advocates the development of hybrid learning environments and curricula that balance students’ cognitive and spiritual well-being. Nevertheless, this study is limited by its focus on a single case study at SMA Muhammadiyah 5 Yogyakarta and its evaluation of the short-term implementation of AI. Future research should test this tarbiyah-oriented pedagogical ecology framework across diverse Islamic educational institutions and examine the long-term effects of AI integration on the development of students’ character and spirituality through longitudinal research.

### **Ethical Statement**

This study was conducted in accordance with established ethical principles for research involving human participants. Ethical approval was obtained from the relevant institutional ethics committee prior to data collection. All participants voluntarily agreed to participate and provided informed consent after receiving clear information about the study’s purpose, procedures, potential risks, and their right to withdraw at any time without penalty. For student participants under the age of 18, informed consent was obtained from their parents or legal guardians, and assent was obtained from the students themselves. Participants’ confidentiality and anonymity were strictly maintained by removing all personally identifiable information from the data and reporting the findings using pseudonyms or participant codes. All research data were securely stored and used solely for academic research purposes.

### **CRediT Authorship Contribution Statement**

- **Author 1:** Conceptualization; Methodology; Investigation; Writing – Original Draft.
- **Author 2:** Conceptualization; Supervision; Review & Editing; Formal Analysis.

### **Conflict of Interest**

The authors declare that there are no competing financial interests or personal relationships that could have influenced the work reported in this article.

### **Data Availability**

The datasets generated and analyzed during the current study are available upon reasonable request

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