



From AI Adoption to AI Governance: Developing an Ethical Governance Framework for Generative AI Integration in Indonesian Madrasahs

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Abstract :

This study aims to examine the transition from Generative Artificial Intelligence (GenAI) adoption toward ethical governance in Indonesian madrasahs and to develop a context-sensitive governance framework for responsible integration. A qualitative case study was conducted at Madrasah Aliyah Nurul Jadid, selected because its educational environment combines technological development, Islamic values, and institutional efforts to guide emerging AI practices. Data were collected through semi-structured interviews, observations, and document analysis involving school leaders, teachers, and students. Data were analyzed through data condensation, data display, and verification, while credibility was strengthened through triangulation, member checking, and prolonged engagement. The findings indicate five interconnected governance dimensions: ethical principles, institutional policy, human oversight, AI literacy, and monitoring-accountability. GenAI was viewed as useful for learning support, but participants also identified risks involving academic integrity, inaccurate outputs, privacy, dependency, and unclear responsibility. The study concludes that responsible adoption requires layered governance rather than unrestricted use or prohibition. The framework offers practical guidance for policy, training, assessment, and monitoring while strengthening human agency, ethical responsibility, and educational trust.

INTRODUCTION

Artificial intelligence (AI), particularly Generative Artificial Intelligence (GenAI), is increasingly transforming how knowledge is produced, accessed, and communicated in education. The widespread availability of tools such as ChatGPT creates opportunities for personalized learning, instructional assistance, content generation, and teacher productivity. However, technological adoption also introduces concerns regarding privacy, academic integrity, bias, misinformation, transparency, and human agency (UNESCO, 2023; Wang et al., 2024). These concerns make AI governance an important societal issue because educational institutions are responsible not only for improving learning efficiency but also for protecting learners and maintaining educational values. In this context, the importance of AI integration cannot be measured solely through adoption rates or technological effectiveness. Rather, responsible integration requires ethical principles, institutional accountability, human oversight, and appropriate

safeguards. Therefore, developing ethical AI governance is essential to ensure that technological innovation contributes positively to educational development.

The general problem emerging in society is the growing gap between the rapid adoption of GenAI and the institutional capacity to govern its use responsibly. Generative AI tools can be accessed easily by teachers and students, whereas many educational institutions are still developing policies concerning acceptable use, data protection, academic integrity, transparency, and accountability. UNESCO (2023) emphasizes that technological development has progressed faster than regulatory and institutional responses, creating challenges for educational systems. Systematic reviews similarly demonstrate that privacy, algorithmic bias, transparency, academic integrity, and human oversight remain major ethical concerns in educational AI (Alshahrani et al., 2024; “Ethics and Governance of Generative AI in Education,” 2025). The problem is therefore not whether educational institutions should use AI, but how they can establish governance mechanisms that balance innovation with responsibility. Without appropriate governance, AI adoption may increase technological dependence while weakening critical thinking, originality, privacy, and institutional accountability.

This problem is particularly relevant in Indonesian madrasahs, where technological innovation intersects with religious values, character education, academic integrity, and institutional responsibility. Generative AI is increasingly available to students and teachers for searching information, translating materials, generating ideas, preparing learning resources, and supporting assignments. Such practices demonstrate the potential of AI to enhance educational processes, but they simultaneously raise questions about authorship, accuracy, student dependency, privacy, and the boundaries between assistance and substitution. Recent research on secondary education indicates that ethical challenges surrounding AI include academic dishonesty, inappropriate dependence, misinformation, privacy risks, and insufficient AI literacy (Hendry & Sumartiningsih, 2026). At the same time, research on GenAI in education remains concentrated on applications and user experiences rather than institutional governance (Yusuf et al., 2024). This phenomenon indicates that AI adoption is occurring faster than the development of comprehensive governance mechanisms within schools and madrasahs.

Previous research has provided substantial evidence concerning the opportunities and risks of GenAI in education. A systematic mapping review of 407 publications found that research has primarily examined applications, impacts, ethical implications, user experiences, and institutional adoption (Yusuf et al., 2024). Similarly, systematic research on K–12 education has identified privacy, bias, transparency, accountability, and academic integrity as important ethical dimensions of AI use (Alshahrani et al., 2024). These studies provide an important foundation for understanding responsible AI integration. Nevertheless, several limitations remain. First, much of the literature focuses on technological applications or individual users rather than institutional governance. Second, empirical evidence from secondary schools remains relatively limited compared with higher education. Third, cultural and religious educational contexts are insufficiently represented. Consequently, existing literature explains the importance of AI ethics but provides less empirical understanding of how educational institutions can transform ethical principles into concrete governance structures, policies, responsibilities, and monitoring practices.

Another important research gap concerns the contextualization of ethical AI

frameworks. Recent studies have begun developing frameworks emphasizing privacy, transparency, bias, academic integrity, and human oversight in educational settings ("Guiding the Future," 2026; "Ethics and Governance of Generative AI in Education," 2025). However, systematic reviews indicate that ethical frameworks remain fragmented and that empirical research on their implementation is still developing. In addition, existing frameworks frequently emphasize universal ethical principles without sufficiently explaining how these principles can be translated into the institutional culture of specific educational communities. This limitation becomes particularly significant in madrasahs, where technological governance is connected with Islamic educational values, character formation, teacher authority, and moral responsibility. Therefore, the present study occupies a distinctive position by investigating how ethical AI governance can be constructed from the practices and perspectives of leaders, teachers, and students. This contextual approach addresses an important gap between abstract ethical principles and institutional implementation.

The novelty of this research lies in shifting the analytical focus from AI adoption to AI governance. Rather than examining only whether GenAI is useful for teaching and learning, this study investigates how its use can be institutionally regulated through ethical principles, policy, human oversight, AI literacy, and monitoring-accountability. This approach responds to the growing recognition that responsible AI requires governance mechanisms rather than technological adoption alone (UNESCO, 2023; "Ethics and Governance of Generative AI in Education," 2025). The study is also significant because Indonesia has begun strengthening national guidance for AI use in education, including the Ministry of Communication and Digital Affairs' 2026 guidance on digital technology and AI in formal, nonformal, and informal education. Thus, investigating governance at the madrasah level provides an important micro-level perspective on how national AI principles can be translated into institutional educational practice. The resulting framework is expected to connect responsible AI principles with the distinctive ethical and educational mission of Indonesian madrasahs.

Based on these issues and gaps, this study addresses the following research problem: How is Generative AI understood, practiced, and governed at Madrasah Aliyah Nurul Jadid, and what ethical governance framework can guide its responsible institutional integration? The study argues that responsible GenAI integration cannot be achieved through either unrestricted adoption or complete prohibition. Instead, effective governance requires a layered approach combining institutional ethical principles, clear policies, human oversight, AI literacy, data protection, academic-integrity safeguards, and continuous monitoring. Such governance enables teachers and students to benefit from AI while retaining human judgment and educational responsibility. The study therefore seeks to develop a contextual ethical governance framework based on empirical evidence from the madrasah setting. Its expected contribution is twofold: theoretically, it extends responsible-AI scholarship by connecting governance with Islamic educational contexts; practically, it provides madrasah leaders and educators with principles and mechanisms for transforming AI adoption into responsible, transparent, and sustainable educational innovation.

RESEARCH METHODS

This study employed a qualitative research approach using a case study design to explore how Generative AI (GenAI) is adopted, interpreted, negotiated, and governed

within the natural institutional context of a madrasah. The case study design was selected because ethical AI governance is closely connected with organizational culture, leadership practices, teacher judgment, student behavior, institutional policies, and educational values. The research was conducted at Madrasah Aliyah Nurul Jadid, purposively selected because it represents an Islamic secondary-school environment where technological development intersects with religious education, character formation, academic integrity, and institutional responsibility. This setting enabled the researcher to examine GenAI governance not merely as a technical regulation but as an integral component of the madrasah's broader educational mission.

Data were collected through semi-structured interviews, participant observation, and document analysis. The informants included the madrasah principal, curriculum or academic coordinator, teachers, and selected students with experience using AI-supported learning. The collected data focused on GenAI adoption, ethical concerns, institutional policies, academic integrity, privacy, human oversight, AI literacy, and monitoring practices. Interviews explored participants' experiences, perceptions, and responsibilities regarding GenAI use; observations examined how AI was incorporated into learning activities; and document analysis identified formal and informal institutional arrangements governing AI use. These techniques were employed to obtain comprehensive evidence and to compare perspectives across different institutional actors and sources.

Data analysis followed an interactive process of data condensation, data display, and verification/conclusion drawing. Interview transcripts, observation records, and documents were first condensed by selecting information relevant to GenAI adoption and ethical governance. The condensed data were then displayed according to emerging categories, including ethical principles, institutional policy, human oversight, AI literacy, privacy, academic integrity, and monitoring-accountability. Patterns and differences were subsequently compared across informants and data sources. The researcher continuously verified interpretations by examining consistency, identifying contradictory evidence, and relating emerging findings to the research questions. Conclusions were developed progressively throughout the analytical process rather than being formulated only at the end of the study.

The trustworthiness of the data was established through source triangulation, technique triangulation, member checking, and prolonged engagement. Source triangulation involved comparing information obtained from school leaders, teachers, and students, while technique triangulation compared interview findings with observations and institutional documents. Member checking was conducted by confirming the interpretation of significant interview statements with relevant informants. Prolonged engagement enabled the researcher to distinguish recurring institutional practices from temporary or incidental activities. In addition, dependability was supported through systematic documentation of the research procedures and analytical decisions, while confirmability was strengthened by maintaining an audit trail linking interpretations and conclusions to the empirical data.

RESULTS AND DISCUSSION

Results

Institutionalization of Ethical Governance for Generative AI

Operationally, ethical GenAI governance in the madrasah refers to the

institutional process of regulating, guiding, supervising, and evaluating the use of generative AI so that technological practices remain consistent with educational objectives, academic integrity, privacy, human responsibility, and Islamic educational values. The findings indicate that governance is not represented merely by the existence of an AI policy. Rather, it consists of interconnected practices involving leadership direction, teacher supervision, student awareness, verification of AI-generated information, responsible disclosure, protection of personal data, and continuous evaluation. The central pattern is a movement from spontaneous AI use toward a more structured model in which the madrasah seeks to determine what AI may be used for, under what conditions, by whom, and with what responsibilities.

An interview with the Madrasah Principal illustrates the importance of institutional direction. The informant explained, *“AI should not simply be prohibited because students are already familiar with it. The school needs to provide boundaries so that students understand which uses support learning and which uses replace their own work.”* This statement indicates that the leadership perspective does not position AI as inherently harmful. Instead, the principal emphasizes the need for differentiated use based on educational purpose. The researcher interprets this statement as evidence of a transition from a prohibition-oriented response toward governance-oriented thinking. Leadership becomes important because ethical AI use requires institutional rules that can be understood consistently by teachers and students.

A teacher similarly emphasized the importance of human verification. The informant stated, *“When students use AI, I ask them to check the answer, compare it with learning materials, and explain the result in their own words. The final responsibility remains with the student and teacher, not with the application.”* This statement demonstrates that AI is positioned as an assisting resource rather than an authoritative source of knowledge. The researcher interprets the practice as a form of human-in-the-loop governance in which AI output remains subject to pedagogical evaluation. The finding is particularly significant because generative AI can produce fluent but inaccurate information. Consequently, verification becomes an everyday governance mechanism that transforms ethical principles into classroom practice.

Documentary and institutional evidence further indicates that governance tends to emerge through a combination of formal and informal mechanisms. Formal mechanisms include school expectations concerning academic honesty, responsible technology use, and teacher supervision, while informal mechanisms are visible in classroom instructions, discussions about AI-generated answers, and teacher reminders concerning originality. The researcher interprets this combination as evidence that governance is still developing as an institutional process. Rather than operating exclusively through a comprehensive written policy, ethical governance is gradually constructed through repeated practices and shared expectations. This condition represents an important transitional stage from AI adoption toward institutional governance.

Observation of classroom activities showed that teachers did not simply allow students to submit AI-generated responses without evaluation. Students were encouraged to compare generated answers with textbooks, teacher explanations, and other learning resources. In several learning interactions, teachers asked students to

explain the reasoning behind an AI-assisted answer rather than merely reproduce its wording. The researcher interprets this pattern as evidence of human oversight and verification. AI was therefore treated as a supplementary learning resource, while responsibility for interpretation remained with students and teachers. The observation also demonstrated that governance becomes visible through routine pedagogical actions: questioning, checking, explaining, disclosing AI assistance, and correcting inaccurate information.

The data can therefore be restated as follows: the madrasah's emerging governance approach is characterized by five mutually reinforcing elements: ethical principles, institutional policy, human oversight, AI literacy, and monitoring-accountability. These elements demonstrate that responsible AI integration cannot depend on technological access alone. Students require knowledge about AI limitations, teachers require competence to supervise AI-mediated learning, and leaders require mechanisms for establishing rules and accountability. The central meaning of the findings is that governance transforms AI from an unrestricted technological resource into a regulated educational instrument. This transformation maintains the benefits of GenAI while placing human judgment, educational purpose, and ethical responsibility at the center of institutional practice.

The overall pattern shows a movement from adoption, awareness, regulation, supervision, accountability. Initially, GenAI is encountered primarily as a convenient learning technology. As its use expands, concerns concerning originality, accuracy, privacy, and dependency become more visible. These concerns stimulate the development of institutional boundaries and teacher supervision. Over time, responsible use becomes associated with verification, disclosure, AI literacy, and accountability. The pattern demonstrates that governance is not a single policy intervention but an iterative institutional process. The madrasah's challenge is therefore to convert emerging practices into a coherent governance framework that remains flexible enough to respond to rapidly changing AI technologies.

Table 1. Indicators of Ideal Generative AI Governance

Informant Position	Interview Excerpt	Indicator
Head of Madrasah	"AI should not simply be prohibited. The school needs to provide clear boundaries so that students understand which uses support learning and which uses replace their own work."	Clear Institutional Policy and Ethical Boundaries
Coordinator/Teacher	"When students use AI, I ask them to check the answer, compare it with learning materials, and explain the result in their own words."	Human Oversight and Output Verification
Teacher	"Students need to understand that an AI answer is not automatically correct and that they remain responsible for the work they submit."	AI Literacy and Academic Responsibility
Student	"I use AI when I do not understand a topic, but I still need to check the explanation and make sure I can explain it myself."	Responsible Use, Disclosure, and Learner Agency

Table 1 demonstrates that ideal AI governance is perceived not as a restrictive mechanism but as a shared responsibility system. The principal's statement establishes

the macro-level dimension of governance through policy and boundaries, while the teacher's statements demonstrate how these principles are operationalized through verification and pedagogical supervision. The student perspective adds the micro-level dimension, showing that governance ultimately depends on whether learners can internalize responsibility. Thus, the indicators form a vertical governance structure: leadership establishes direction, teachers translate policy into practice, and students enact responsibility during AI-mediated learning. This structure indicates that ethical governance is strongest when policy, pedagogy, and learner behavior are mutually reinforcing.

The table also reveals that governance has both preventive and developmental functions. Privacy, academic integrity, and output verification operate preventively by reducing potential harms associated with irresponsible AI use. At the same time, AI literacy and learner agency perform developmental functions by enabling students to critically evaluate information and make responsible decisions. This distinction is important because governance based solely on prohibition may prevent misuse temporarily but does not necessarily develop ethical competence. Conversely, a developmental approach without institutional boundaries may leave users vulnerable to inconsistent practices. The findings therefore support a balanced governance model combining regulation, education, supervision, and accountability.

Discussion

The finding that responsible GenAI integration depends on institutional governance rather than technological availability is consistent with recent scholarship. UNESCO (2023) emphasizes human agency, privacy, safety, and meaningful human oversight in educational AI, while Alfiras et al. (2025) identify privacy, bias, transparency, student well-being, and accountability as the dominant governance concerns. Similarly, Wang et al. (2024) demonstrate that GenAI offers accessibility, personalization, automation, and interactivity but simultaneously creates risks involving academic integrity, misinformation, overdependence, privacy, and security. Zhang and Tur (2024) further argue that K–12 integration requires comprehensive guidelines rather than unrestricted adoption. The present finding extends these studies by demonstrating how governance principles become observable through school policies, teacher supervision, student literacy, and verification routines. Thus, governance represents the institutional mechanism that transforms technological availability into ethically legitimate educational practice.

The emphasis on academic integrity and human verification also corresponds with contemporary research concerning assessment and authorship. Hao et al. (2024) explain that GenAI creates significant challenges for validity, reliability, transparency, fairness, equity, and assessment security. Furze et al. (2024) similarly argue that banning GenAI is insufficient and that educational institutions need structured approaches for distinguishing legitimate AI assistance from inappropriate substitution. Liu (2025) found that teachers facing GenAI-related assessment challenges often had limited institutional guidance and consequently developed individual strategies such as assessment redesign and AI-ethics education. In the present study, however, the madrasah context adds an important dimension: governance is connected with character formation and moral responsibility. Teachers do not merely police misconduct; they cultivate intellectual

honesty by requiring students to verify AI outputs, explain ideas independently, and retain responsibility for submitted work.

The findings further demonstrate that AI governance should be participatory and distributed across institutional actors. Alfiras et al. (2025) emphasize stakeholder involvement as an important component of responsible AI governance, particularly because ethical principles must be translated into practices that users understand and accept. Gouseti et al. (2024) similarly report that AI ethics policies in K–12 education remain less developed and that teachers and students frequently have limited understanding of ethical concerns. Labadze et al. (2023) also show that educational AI can create both pedagogical opportunities and challenges requiring coordinated responses from different stakeholders. The present study extends this literature by identifying differentiated responsibilities within the madrasah: leaders establish policy and accountability, teachers translate policy into pedagogical supervision, and students enact responsible use through disclosure, verification, and self-regulation. Theoretically, this suggests that educational AI governance should be conceptualized as distributed institutional responsibility rather than as a single administrative policy.

Another important contribution concerns AI literacy as a mechanism of governance rather than merely a technological competence. Chiu et al. (2024) argue that AI literacy in K–12 education should encompass technology, societal impact, ethics, collaboration, and self-reflection, while Zhong and Liu (2024) conceptualize secondary-school AI literacy through AI knowledge, affectivity, and AI thinking. Kong et al. (2024) provide empirical evidence that AI-literacy instruction can improve senior secondary students' problem-solving competence and understanding of ethical boundaries. Yim (2024) likewise argues that AI literacy should integrate digital literacy, data literacy, computational thinking, and AI ethics. These studies reinforce the present finding that students need to understand hallucinations, bias, privacy, copyright, and limitations of generated content. Consequently, governance capacity depends partly on user competence: policies become effective only when teachers and students possess the knowledge and reflective capacity to apply them.

Overall, the study contributes a contextual governance perspective connecting ethical principles, institutional policy, human oversight, AI literacy, academic integrity, and monitoring-accountability. This contribution responds directly to Yusuf et al. (2024), who identified limited K–12 research and insufficient attention to cultural dimensions in GenAI scholarship, and to Gouseti et al. (2024), who found that empirical work on AI ethics in compulsory schooling remains geographically and conceptually limited. The finding also complements Zhang and Tur (2024), whose K–12 review calls for comprehensive rules, while extending it by demonstrating how rules can be operationalized through everyday institutional practices. Practically, madrasahs should identify permissible AI uses, protect student data, require appropriate disclosure, verify outputs, redesign assessment, strengthen teacher and student AI literacy, and establish continuous policy review. Theoretically, the study positions ethical AI governance as a bridge between technological adoption and responsible educational transformation.

CONCLUSION

The most important finding of this study is that the central challenge of GenAI integration in madrasahs is no longer technological adoption but the development of ethical governance capable of directing that adoption responsibly. The study

demonstrates that governance is most effective when ethical principles, institutional policy, human oversight, AI literacy, and monitoring-accountability operate as an integrated system. Its main scholarly contribution is the contextualization of responsible AI governance within an Indonesian Islamic secondary-school environment, thereby extending existing AI-in-education literature that has largely emphasized technological applications, individual adoption, and higher education. The study also provides practical implications for madrasah leaders, teachers, and students by emphasizing clear rules, verification, academic integrity, privacy protection, disclosure, and continuous training. However, the single-case design limits transferability, and the findings should be interpreted contextually. Future research should involve comparative multi-madrasah studies, longitudinal designs, and empirical testing of the proposed governance framework to determine its effectiveness across different Islamic educational contexts.

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