Competencies of Madrasah Tsanawiyah Teachers in Islamic Boarding Schools in Utilizing Generative Artificial Intelligence Based on Islamic Education Values

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Abstract

The development of Generative Artificial Intelligence (GenAI) has brought transformative changes to educational practices, including learning processes in madrasahs located within Islamic boarding schools. This technology offers significant opportunities for teachers to design instructional materials, facilitate learning activities, access information, and enrich assessments. However, utilizing GenAI requires comprehensive competencies spanning digital skills, pedagogical capability, critical evaluation of AI outputs, and ethical awareness. This qualitative study aims to analyze the competencies of Madrasah Tsanawiyah (MTs) teachers in utilizing GenAI, identify patterns of AI integration in classroom practice, evaluate teachers' pedagogical and AI literacy skills, and examine how Islamic educational values frame technological adoption. Data were collected through in-depth interviews with MTs teachers and stakeholders, classroom observations, and document analysis across selected Islamic boarding schools in Central Java. Data analysis followed interactive condensation, presentation, and verification, supported by source and technique triangulation. Findings indicate that while teachers display basic operational AI literacy, pedagogical integration remains predominantly administrative. Crucially, Islamic educational values—specifically honesty (siddiq), trustworthiness (amanah), propriety (adab), and educational benefit (maslahah)—serve as essential moral filters preventing ethical risks such as plagiarism and over-reliance on automated outputs. The study concludes that integrating GenAI within Islamic education requires a balanced framework combining technical mastery with character-building values. These insights provide practical guidance for madrasah directors and policymakers to formulate ethical GenAI professional development programs.

***Keywords*:** teacher competence, generative artificial intelligence, ai literacy, islamic education, madrasah tsanawiyah, islamic boarding school

Introduction

The rapid acceleration of Artificial Intelligence (AI), particularly Generative AI tools in education, has fundamentally reshaped contemporary educational paradigms globally (UNESCO, 2023). Within the context of Indonesian Islamic education, madrasahs operating under the ecosystem of Islamic boarding schools (pesantren) occupy a uniquely pivotal position. These institutions are mandated not only to deliver rigorous national academic standards but also to preserve Islamic religious scholarship and instill ethical character grounded in Islamic values (Azra, 2019; Zubaedi, 2021).

Previous research has extensively highlighted the transformative benefits of Generative AI in accelerating lesson plan preparation, generating interactive quiz formats, and offering customized learning paths for diverse student abilities (Holmes et al., 2022; Luckin & Cukurova, 2019). However, empirical literature also underscores persistent limitations and

ethical vulnerabilities. Studies by Selwyn (2020) and Zawacki-Richter et al. (2019) reveal that uncritical adoption of AI in classrooms can foster passive learning, hallucinated factual inaccuracies, algorithmic bias, and academic dishonesty. In the specific setting of Madrasah Tsanawiyah (MTs) within Islamic boarding schools, these challenges acquire heightened significance. Education in pesantren relies heavily on the spiritual authority and moral modeling of teachers (ustadz/ustadzah) and traditional learning ethics (adab al-'alim wa al-muta'allim) (Niam, 2020; Fatkhuniam & Rahmawati, 2023).

Despite growing institutional enthusiasm for digital transformation in madrasahs (Kemenag RI, 2022), a significant research gap remains regarding how MTs teachers in pesantren synthesize technical GenAI capabilities with pedagogical readiness and Islamic ethics. Most existing studies focus on higher education or general urban schools, largely ignoring the normative cultural dynamics of Islamic boarding schools. Consequently, the problem addressed in this study is the gap between the rapid technological availability of GenAI and the structured competencies required by madrasah teachers to utilize these tools effectively and ethically.

The primary purpose of this research is to analyze the competencies of MTs teachers in Islamic boarding schools in utilizing Generative AI through the lens of Islamic educational values. Specifically, the research objectives are: (1) to identify the concrete forms of GenAI utilization in MTs instructional practices, (2) to evaluate teachers' pedagogical competence and AI literacy levels, and (3) to examine the integration of Islamic educational values—such as honesty (siddiq), trustworthiness (amanah), propriety (adab), and educational benefit (maslahah)—in governing AI usage. It was hypothesized that while technical usage of GenAI is increasing among MTs teachers, pedagogical and ethical competencies are significantly enhanced when anchored in Islamic educational values.

Methods

Research Design

This study employed a qualitative research approach with a descriptive case study design (Creswell & Poth, 2018). A qualitative design was selected because it enables an in-depth, nuanced exploration of human experiences, pedagogical behaviors, and moral reasoning within the natural social environment of Islamic boarding school madrasahs.

Participants

The research participants comprised 18 Madrasah Tsanawiyah (MTs) teachers, 3 madrasah headmasters, and 3 curriculum coordinators selected through purposive sampling across three accredited pesantren-based MTs in Central Java, Indonesia. Selection criteria included: (a) active teaching status in Islamic studies or general subjects, (b) minimum of one year experience utilizing digital technology in instruction, and (c) formal affiliation with an Islamic boarding school environment.

Research Procedures

Research execution proceeded through four sequential phases between January and June 2024: (1) preliminary field reconnaissance and institutional consent acquisition, (2) development and expert validation of qualitative interview protocols and observation rubrics, (3) field data collection involving interviews, observations, and document retrieval, and (4) data synthesis, cross-case comparison, and member checking with key informants.

Data Collection Technique(s)

Data collection utilized three primary qualitative techniques: semi-structured in-depth interviews (45–60 minutes per participant), direct non-participant classroom observations of GenAI-supported lesson delivery, and documentation review (lesson plans/RPP, teaching materials, assessment sheets, and institutional ICT guidelines).

Data Analysis Technique

Qualitative data were systematically analyzed using the interactive model proposed by Miles, Huberman, and Saldana (2014), consisting of data condensation, data display (structured narrative matrices and summary tables), and conclusion drawing/verification. Data credibility and trustworthiness were rigorously established through source and methodological triangulation alongside peer debriefing.

Results

The empirical findings of this study are presented systematically according to the three core thematic domains outlined in the methodological framework.

Outcome 1: Patterns and Forms of GenAI Utilization in MTs Learning

Field findings indicate that 77.8% of participating MTs teachers actively utilize GenAI tools in their professional routines. The dominant platforms identified include conversational AI assistants and content generation tools. However, the primary focus of utilization remains concentrated on preparatory administrative tasks rather than interactive classroom instruction.

Table 1. Distribution of Generative AI Utilization Forms among MTs Pesantren Teachers

No	Utilization Domain	Primary GenAI Tools	Frequency (%)
1	Lesson Plan & Module Drafting (RPP/Modul Ajar)	AI Writing Assistants	88.9%
2	Assessment & Quiz Item Generation	AI Quiz Generator	72.2%
3	Searching & Summarizing Islamic Texts	AI Search Assistants	55.6%
4	Direct Interactive Student Learning in Class	Interactive AI Tools	27.8%

Note: Data summarized from teacher interviews and artifact analysis (N = 18).

Outcome 2: Evaluation of Pedagogical Competence and AI Literacy

Analysis of teacher competencies revealed a structural asymmetry between technical operation and critical evaluation. While teachers demonstrated moderate operational literacy (prompting and output generation), critical evaluation literacy—specifically recognizing AI hallucinations, bias, and Islamic textual context—remained lower.

Table 2. Assessment Scores of Teacher Competency Components in GenAI Utilization

No	Competency Component	Mean Score (1-5)	Category
1	Basic Operational AI Literacy (Prompt Engineering)	3.82	Moderate-High
2	Pedagogical Content Integration (TPACK-AI)	3.24	Moderate
3	Critical Evaluation of AI Output & Hallucinations	2.75	Low-Moderate
4	Ethical Awareness & Islamic Value Filtering	4.45	Very High

Note: Evaluated across 18 MTs teachers using structured rubric indicators.

Outcome 3: Integration of Islamic Educational Values as Moral Filters

Significantly, the research identified four essential Islamic educational values that function as normative guidelines for MTs teachers when adopting GenAI: (1) Siddiq

(Truthfulness/Honesty)—ensuring generated educational content is verified against authentic religious sources (Turats) and empirical facts; (2) Amanah (Trustworthiness/Responsibility)—maintaining professional academic integrity and avoiding academic misrepresentation; (3) Adab (Propriety/Ethics)—preserving respectful teacher-student spiritual relationships and etiquette in knowledge seeking; and (4) Maslahah (Educational Benefit)—prioritizing AI tools that genuinely enhance student learning outcomes while mitigating intellectual passivity.

Discussion

The empirical findings strongly support the initial hypothesis: while technical GenAI integration is accelerating, pedagogical effectiveness and ethical integrity depend critically on grounding technology in Islamic educational values. The high score observed in Ethical Awareness (Mean = 4.45) confirms that pesantren-based teachers possess a robust moral compass shaped by traditional religious culture, which acts as a protective buffer against technological misuse.

These results align with and expand upon prior theoretical models such as the TPACK framework (Mishra & Koehler, 2006) and UNESCO's AI Competency Framework for Teachers (2023). However, our findings extend existing models by demonstrating that in Islamic educational contexts, ethical competence cannot be treated merely as a secular legal compliance check. Instead, ethics operates as an active epistemological filter rooted in Islamic values like siddiq and amanah (Zubaedi, 2021; Fatkhuniam & Rahmawati, 2023). When teachers cross-check AI-generated religious explanations against classical Islamic texts, they operationalize siddiq as a mechanism for quality control.

Nevertheless, the study highlights a critical vulnerability in teachers' critical evaluation literacy (Mean = 2.75). Uncritical reliance on AI for religious curriculum content carries severe risks of unverified theology or decontextualized rulings, as standard GenAI models are primarily trained on secular corpora (Zawacki-Richter et al., 2019). This limitation underscores the urgent necessity for targeted professional development that combines prompt engineering with Islamic source verification protocols.

Regarding study limitations, the sample was confined to 18 MTs teachers across three boarding schools in Central Java. While qualitative depth was achieved, external generalizability to non-pesantren madrasahs or other geographical regions should be approached cautiously. Future research should expand quantitative survey validation across broader national samples.

Conclusion

This study concludes that MTs teachers in Islamic boarding schools exhibit promising operational engagement with Generative AI, particularly in administrative and module design tasks. However, achieving meaningful pedagogical transformation requires bridging the gap between basic technical usage and critical AI evaluation literacy. Islamic educational values—siddiq, amanah, adab, and maslahah—provide a powerful, culturally resonant ethical framework that ensures AI adoption enhances educational quality without compromising moral and spiritual foundations.

Practically and pedagogically, madrasah directors, pesantren leaders, and the Ministry of Religious Affairs (Kemenag) are recommended to establish specialized professional

development modules that train teachers in prompt engineering, hallucination verification, and value-based technology integration.

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Conflict of interests

The authors declare that they have no conflict of interest.

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