

Negotiating Artificial Intelligence in Contemporary Pesantren: Knowledge, Religious Authority, and Islamic Educational Traditions

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ABSTRACT. The growing use of Artificial Intelligence (AI) in education raises important questions for pesantren, where knowledge transmission has historically been grounded in *sanad*, *talaqqi*, and *adab*. This study examines how contemporary pesantren negotiate AI in relation to knowledge, religious authority, and Islamic educational traditions. Employing a qualitative multiple-case study design across three pesantren in West Java, Indonesia, the study involved 60 purposively selected participants: six *kiai*, six institutional administrators, twelve teachers (*ustadz*), twenty-four students (*santri*), six information technology staff, and six alums. Data were collected through semi-structured interviews with all participants, observation of educational practices, and document analysis, and were examined through within-case and cross-case analysis. The findings show that AI primarily supports information seeking, translation, clarification, summarization, and preliminary engagement with learning materials rather than replacing established modes of knowledge transmission. A recurring pattern of AI-assisted exploration followed by teacher-mediated epistemic validation demonstrates that informational accessibility does not automatically confer knowledge legitimacy. *Sanad*, *talaqqi*, and *adab* remain central to knowledge validation, while the growing accessibility of AI-generated religious information produces authority negotiation rather than displacing *kiai* and teachers. Institutionally, the study identified four non-linear and potentially coexisting response patterns: resistance, selective adaptation, integration, and transformation. Building on these findings, the study proposes the Pesantren AI Negotiation Model, which explains AI integration through three interconnected mechanisms (interpretive validation, authority verification, and ethical alignment). The study demonstrates that AI integration in pesantren is an epistemically and institutionally negotiated process in which technological affordances are selectively incorporated through established structures of knowledge, authority, and ethical formation.

Keywords: *Artificial Intelligence, Pesantren, Islamic Education, Religious Authority, Digital Transformation.*

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INTRODUCTION

The rapid advancement of Artificial Intelligence (AI) has fundamentally transformed the ways knowledge is produced, accessed, and disseminated across contemporary societies. As AI-powered technologies become increasingly integrated into everyday life, they are reshaping patterns of information consumption and decision-making in various sectors, including education, business, healthcare, and public administration (Ali et al., 2025; Carayannis & Erokhin, 2025; Jiang et al., 2022; Zgurovsky, 2025). In educational contexts, AI has facilitated personalized learning, intelligent tutoring systems, automated assessment, and real-time access to vast repositories of information, thereby creating new opportunities for improving learning efficiency and accessibility (Hakim et

al., 2026; Kumaresan et al., 2025; Nhan, 2025; Purwanto & Yuliana, 2025). At the same time, the growing reliance on AI-generated content has generated important debates regarding the credibility of information, the changing role of educators, and the future of knowledge transmission in learning environments (Galindo et al., 2025; Hao & Yatong, 2025; Lee et al., 2023).

The influence of AI extends beyond secular educational institutions and increasingly affects religious communities and faith-based learning environments. In many Muslim societies, AI-assisted applications are now used to access religious information, explore Qur'anic interpretations, seek legal opinions, and obtain explanations concerning Islamic teachings (Alam et al., 2025; Faizin et al., 2025; Mubi et al., 2024; Putrawan, 2025; Sabarudin et al., 2023). The emergence of AI-generated religious content has expanded access to Islamic knowledge while simultaneously raising concerns regarding accuracy, authenticity, accountability, and interpretive authority (Yusof et al., 2025). Unlike earlier digital technologies that primarily functioned as repositories of information, contemporary AI systems possess the capacity to generate responses, interpret questions, and simulate educational interactions that have traditionally been mediated by scholars and teachers (Didmanidze et al., 2024). As a result, AI has become not merely a technological tool but an increasingly influential actor in contemporary knowledge ecosystems.

These developments present particular challenges for pesantren, Indonesia's most influential Islamic educational institutions. For centuries, pesantren have played a pivotal role in preserving Islamic intellectual traditions through educational practices rooted in sanad (chains of transmission), talaqqi (direct teacher–student learning), and adab (ethical conduct in learning) (Dianto et al., 2025; Juwaini et al., 2025; Mustapha, 2026; Sadat et al., 2026; Sofi et al., 2025). Within this tradition, knowledge is understood not simply as information that can be independently acquired but as a process of intellectual, moral, and spiritual formation transmitted through recognized scholarly lineages (Cahyani et al., 2026; Ikhwan et al., 2025; Nursyam et al., 2025; Permadi et al., 2025; Rahman & Shohib, 2026). Consequently, the authority of knowledge remains inseparable from the authority of those who teach and transmit it. The growing accessibility of AI-generated information therefore raises important questions concerning the future of traditional Islamic learning, the legitimacy of technologically mediated knowledge, and the sustainability of educational values that have historically defined pesantren.

The encounter between technological innovation and Islamic educational traditions is not entirely new. Previous studies have demonstrated that pesantren have continuously adapted to social, cultural, and technological transformations while maintaining their religious identity and institutional autonomy (Adimayuda et al., 2025; Bukar et al., 2022; Etemi et al., 2024; Fanani & Ma'arif, 2025; Widodo & Husni, 2025). Research on the digital transformation of pesantren has highlighted the adoption of information technology, online learning platforms, digital literacy initiatives, and social media in educational activities (Haryadi et al., 2026; Rahman & Shohib, 2026). More specifically, emerging empirical studies indicate that AI has begun to be incorporated into particular pesantren contexts. Karmi et al. (Karmi et al., 2022), for example, examined the implementation of AI in strengthening the management of Akidah Akhlak learning at Pondok Pesantren Raudhatul Mujawwidin Tebo. Sumarwan (Aziz et al., 2025; Masruddin et al., 2026; Sarbini et al., 2025; Sumarwan, 2025) documented the use of AI in teaching, learning, and institutional management at Pondok Pesantren Nurul Jadid Assallange Bua. Although these studies represent specific institutional contexts rather than the pesantren sector as a whole, they provide empirical evidence that AI adoption has begun to emerge within pesantren education. These developments suggest that the encounter between pesantren and AI is no longer merely prospective but is becoming an observable educational and institutional phenomenon.

Despite these developments, the emerging literature on AI in pesantren has primarily addressed questions of implementation, pedagogical use, learning processes, management, and institutional challenges (Karmi et al., 2022; Sumarwan, 2025; Sya'bani et al., 2026). These studies provide an important foundation for understanding how AI is entering pesantren education. However, comparatively less attention has been devoted to examining how the use of AI intersects

with the epistemological foundations of pesantren education, particularly the processes through which knowledge is validated and transmitted and religious authority is maintained or negotiated. This issue becomes especially relevant in a tradition in which *ilm* is closely connected with *sanad*, *talaqqi*, and *adab*, as well as with established intellectual networks and scholarly authority (Gama et al., 2024; Sa'in et al., 2020). The analytical question, therefore, extends beyond whether pesantren adopt or reject AI to how AI-generated information is interpreted, validated, and positioned within an educational tradition in which legitimate knowledge has historically been mediated through recognized scholars and established modes of transmission. Examining this relationship is particularly important as AI expands access to religious information and may reshape students' knowledge-seeking practices, while the extent to which such changes affect established forms of epistemic and religious authority remains an empirical question.

To examine this problem, the study draws on perspectives from Islamic epistemology, theories of authority, and the Social Construction of Technology (SCOT). Islamic epistemology provides a basis for examining how knowledge is understood, validated, and transmitted within pesantren traditions, while theories of authority help explain how legitimacy and interpretive authority are constituted and maintained. SCOT complements these perspectives by emphasizing that the meanings and uses of technology are shaped through social interpretation and institutional negotiation rather than determined solely by technological capabilities. Together, these perspectives provide an analytical framework for examining how pesantren actors interpret AI and negotiate its use in relation to established epistemological principles, structures of religious authority, and educational values.

Accordingly, this study investigates how contemporary pesantren negotiate knowledge, religious authority, and technology in the age of Artificial Intelligence. Specifically, it examines how pesantren leaders, teachers, and students perceive and utilize AI; how traditional principles such as *sanad*, *talaqqi*, and *adab* are maintained or reinterpreted in AI-mediated learning environments; and how religious authority is negotiated amid the growing accessibility of AI-generated information. By addressing these questions, the study seeks to extend existing discussions of AI in pesantren beyond technological adoption and pedagogical utility toward its epistemological and sociological implications. Drawing on the empirical findings, the study develops a Pesantren AI Negotiation Model to conceptualize how technological innovation is interpreted, evaluated, and integrated through Islamic epistemological principles and structures of religious authority.

METHOD

This study employed a qualitative multiple-case study design to investigate how contemporary pesantren negotiate the relationship between Artificial Intelligence (AI), knowledge transmission, religious authority, and technological adaptation. The study was conducted across three pesantren located in West Java, Indonesia, referred to in this study as Pesantren SK, Pesantren AZ, and Pesantren C to preserve institutional anonymity. A qualitative approach was considered appropriate because the study sought to explore the meanings, perceptions, and experiences of educational actors within their natural educational settings. The multiple-case study design enabled an in-depth examination of a contemporary phenomenon across different institutional contexts while facilitating the identification of shared patterns and contextual variations in responses to emerging technologies (Ebneyamini et al., 2018; Yin, 2018). This approach was particularly relevant for understanding how pesantren interpret and respond to AI while maintaining their distinctive educational traditions and religious values.

Participants were selected through purposive sampling based on their knowledge, experiences, and involvement in educational activities, institutional decision-making, and technological practices within the pesantren. The study involved 60 participants distributed equally across the three research sites, with 20 participants from each pesantren. As presented in Table 1, the participants comprised *kiai* or pesantren leaders, institutional administrators, teachers (*ustadz*), students (*santri*), information technology (IT) staff, and alumni. Data were collected through semi-

structured in-depth interviews, observation, and document analysis. All 60 participants were interviewed to explore their perceptions and experiences of AI, including its opportunities and challenges, its influence on Islamic learning traditions, and its implications for knowledge transmission, religious authority, and educational practices. Each interview lasted approximately 45–90 minutes and was audio-recorded with the participant's consent. Observations focused on educational activities and practices rather than on each participant individually, including learning activities, *kitab* studies, digital learning sessions, and everyday teacher–student interactions relevant to the research questions. Documentary materials available at the research sites were also examined to provide contextual information and complement the interview and observational data. These materials included curricula, policy documents, digital learning guidelines, institutional social media content, and other relevant documents related to educational activities and the use of digital technologies within the pesantren. Documentary analysis provided supplementary evidence for understanding the institutional contexts and technological practices across the three research sites and supported the triangulation of findings derived from interviews and observations.

Tabel 1: Distribution of Research Participants across the Three Pesantren

No.	Participant Category	Pesantren SK	Pesantren AZ	Pesantren C	Total
1.	<i>Kiai</i> / pesantren leaders	2	2	2	6
2.	Institutional administrators	2	2	2	6
3.	Teachers (<i>ustadz</i>)	4	4	4	12
4.	Students (<i>santri</i>)	8	8	8	24
5.	Information technology (IT) staff	2	2	2	6
6.	Alumni	2	2	2	6
	Total	20	20	20	60

Data analysis was conducted iteratively, informed by the qualitative data analysis framework of Miles et al. (Miles et al., 2014). Interview recordings were transcribed and organized together with observational and documentary materials. The analysis involved data familiarization, coding meaningful data segments, grouping related codes into categories, and developing broader themes concerning AI use, knowledge transmission, religious authority, Islamic learning traditions, and technological adaptation. Analysis was conducted at two levels: within-case analysis was first performed to identify the characteristics and patterns emerging within each pesantren, followed by cross-case analysis to examine similarities, differences, and recurring patterns across the three cases. To enhance the rigor and trustworthiness of the study, credibility was strengthened through triangulation across interviews, observations, documentary materials, and participant groups, while member checking was conducted by sharing summaries of the findings with selected participants for verification. Dependability and confirmability were supported through systematic documentation of data collection and analytical procedures and continuous comparison between emerging interpretations and empirical evidence (Maher et al., 2018; Nowell et al., 2017). Participation was voluntary, informed consent was obtained from all participants, and anonymity was maintained throughout data collection, analysis, and reporting.

RESULT AND DISCUSSION

Result

AI as a Learning Support Tool in Pesantren

The findings indicate that Artificial Intelligence (AI) has become a supplementary learning resource within the educational practices of the three pesantren. Interview data from *santri* and teachers showed that AI-based applications were primarily used to search for information, translate Arabic texts, clarify religious terminology, explain concepts in classical Islamic literature (*kitab kuning*), summarize learning materials, and support academic assignments. Although the intensity and institutional acceptance of AI use varied across the three research sites, participants generally perceived AI as providing faster and broader access to information beyond conventional classroom learning. Observations of learning activities and digital learning practices further indicated that AI was used primarily to support, rather than replace, established teacher-mediated learning processes.

Interview data from *santri* revealed that AI was frequently used during the initial stages of learning, particularly when they encountered unfamiliar terms or difficulties in understanding textual materials. Students described AI as a convenient means of obtaining preliminary explanations before seeking further clarification from their teachers. A *santri* from Pesantren AZ explained:

"When I find difficult terms in the kitab, I sometimes ask AI for explanations. It helps me understand the meaning more quickly before discussing it with my teacher." (Santri, Pesantren AZ).

A similar pattern was reported at Pesantren SK, where a participant emphasized both the accessibility of AI-generated information and the continuing importance of teacher verification:

"AI makes learning easier because information can be obtained instantly. However, we still need teachers to determine whether the information is correct." (Santri, Pesantren SK).

These accounts indicate a recurring learning sequence in which AI-assisted exploration precedes teacher consultation that verification. Rather than treating AI-generated responses as definitive knowledge, students generally used them to develop an initial understanding of a topic before engaging with established pedagogical authorities. This pattern was also consistent with observational data showing that direct instruction, *kitab* study, and teacher-student interaction continued to occupy a central position in learning activities across the research sites.

Teachers across the three pesantren similarly acknowledged the practical benefits of AI for improving access to information, facilitating comprehension, and supporting learning efficiency. However, interview data also revealed concerns regarding the accuracy and contextual adequacy of AI-generated responses, particularly in relation to Islamic jurisprudence, theology, and religious interpretation. A teacher from Pesantren C stated:

"AI can provide answers very quickly, but not all answers are accurate. Sometimes students receive information without understanding the context behind it." (Teacher, Pesantren C).

This concern helps explain why AI-generated information was generally subjected to teacher verification rather than accepted independently. Documentary analysis of curricula, digital learning guidelines, policy documents, institutional social media content, and other relevant materials further provided contextual evidence of how digital technologies were positioned within educational activities at the research sites. Taken together, the interview, observational, and documentary data indicate that technological accessibility has expanded the range of resources available to students without eliminating the role of established learning practices.

Cross-case analysis nevertheless revealed variations in how AI use was accommodated institutionally. Pesantren SK showed greater openness to the use of AI under teacher guidance, whereas Pesantren AZ applied a more controlled approach in which AI use was associated with particular learning activities. Pesantren C demonstrated greater caution, emphasizing conventional learning resources and teacher guidance before students relied on AI-generated information. Despite these variations, a common pattern emerged across the three cases: participants distinguished between accessing information and acquiring validated knowledge. AI was considered useful for retrieving information and facilitating preliminary understanding, whereas the validation and contextual interpretation of that information continued to depend on interaction with teachers.

Overall, the findings show that AI has expanded students' access to educational information and introduced a new layer into their knowledge-seeking practices, but its role remains predominantly complementary rather than substitutive. The empirical pattern can be characterized as AI-assisted exploration followed by teacher-mediated verification. This pattern indicates that the growing use of AI has not simply displaced established learning practices; instead, it has been incorporated into an educational process in which technological information is subsequently evaluated through existing pedagogical relationships. The distinction between readily accessible information and validated knowledge therefore emerges as a central feature of AI use across the three pesantren.

Negotiating *Sanad*, *Talaqqi*, and *Adab* in the Digital Age

The findings indicate that *sanad*, *talaqqi*, and *adab* continue to constitute central principles of knowledge transmission and validation across the three pesantren, even as AI becomes increasingly present in students' learning practices. Interview data from *kiai*, teachers, and *santri* consistently showed that Islamic learning was understood as more than the acquisition of information. Participants associated legitimate learning with scholarly guidance, direct pedagogical interaction, ethical formation, and continuity within recognized traditions of knowledge transmission. Consequently, although AI was considered useful for accessing and explaining information, participants did not regard technological accessibility alone as sufficient to establish the legitimacy of religious knowledge.

Among these principles, *sanad* was repeatedly associated with the legitimacy and traceability of knowledge. Interviews with *kiai* and teachers indicated that participants considered the scholarly provenance of religious knowledge important when evaluating information obtained through digital sources. From this perspective, AI-generated responses presented a particular limitation because the information provided did not necessarily make its scholarly lineage or process of transmission visible. A *kiai* from Pesantren SK explained:

"Knowledge in Islam is not merely about obtaining answers. What is important is who teaches the knowledge, how it is transmitted, and whether it can be traced through a reliable chain of scholarship." (*Kiai*, Pesantren SK).

This emphasis on the source and transmission of knowledge was accompanied by concerns among teachers that easy access to instant answers could encourage students to prioritize informational outcomes over sustained learning processes. As one teacher from Pesantren AZ observed:

"Students today can obtain information in seconds. However, pesantren education is not designed to produce students who only know answers. It is designed to cultivate understanding, discipline, and respect for knowledge." (Teacher, Pesantren AZ).

The persistence of *talaqqi* was similarly evident in interview and observational data. Across the three research sites, direct teacher–student interaction remained central, particularly in the study of classical Islamic texts. Observations of *kitab* learning activities showed that teachers continued to provide explanations, clarify textual meanings, and respond directly to students' difficulties. Participants considered this interaction important because it enabled misunderstandings to be identified and corrected in ways that could not be achieved through independent reliance on AI-generated responses. A *santri* from Pesantren C described this distinction:

"AI can explain a text, but it cannot observe whether I understand it correctly. During talaqqi, the teacher immediately corrects our mistakes and explains the deeper meaning of the lesson." (*Santri*, Pesantren C).

Adab constituted another recurring dimension of participants' accounts. Interviews across the research sites indicated that learning in pesantren was closely associated with discipline, humility, respect for teachers, and appropriate conduct in seeking knowledge. These dimensions were regarded as developing through sustained relationships and everyday interaction rather than through information retrieval alone. Observational data on teacher–student interactions provided contextual support for this finding, showing that learning practices involved not only the communication of subject matter but also established forms of interaction between teachers and students. A senior teacher from Pesantren SK emphasized this relational dimension:

"Artificial Intelligence may provide information, but it cannot teach students how to respect knowledge. Adab is learned through relationships, examples, and daily interaction with teachers." (Senior Teacher, Pesantren SK).

Cross-case analysis revealed a common commitment to *sanad*, *talaqqi*, and *adab*, alongside differences in how these principles shaped the accommodation of AI. Pesantren AZ incorporated AI into selected learning activities while emphasizing teacher verification of AI-generated content. Pesantren SK provided guidance for responsible AI use, particularly by requiring religious

information obtained through AI to be checked against recognized scholarly sources and teacher explanations. Pesantren C adopted a more cautious orientation, placing greater emphasis on traditional learning practices and limiting reliance on AI in core religious learning. Documentary materials, including curricula, policy documents, digital learning guidelines, and other relevant institutional materials, provided additional contextual evidence concerning how educational and technological practices were organized within the three research settings.

The findings also reveal the emergence of a hybrid learning pattern rather than a simple replacement of traditional practices by technology. Students could use AI to obtain preliminary explanations or clarify learning materials, but these activities were subsequently connected to direct consultation, *kitab* study, and teacher-mediated learning. In this configuration, *sanad* provided a basis for considering the provenance and legitimacy of knowledge, *talaqqi* maintained direct processes of explanation and correction, and *adab* sustained the ethical and relational dimensions of learning. AI was therefore incorporated within, rather than positioned outside, these established educational principles. The findings suggest that the encounter between pesantren and AI is characterized not simply by acceptance or rejection of technology, but by an ongoing negotiation in which technological assistance is accommodated while established mechanisms of knowledge transmission continue to regulate how information is interpreted and validated.

Religious Authority between *Kiai* and Artificial Intelligence

The findings indicate that the growing use of Artificial Intelligence has introduced new dynamics into how religious information is accessed within the three pesantren, but it has not displaced the central position of *kiai* and teachers as recognized sources of religious interpretation. Interview data from *kiai*, teachers, and *santri* consistently showed that participants distinguished between the ability to provide information and the authority to interpret and validate religious knowledge. Although AI enabled students to obtain rapid explanations concerning Islamic teachings, jurisprudence, and theological concepts, access to such information was not regarded as equivalent to possessing religious authority. Participants instead associated religious authority with scholarly competence, moral integrity, accountability, experience, and recognized educational lineage.

This distinction was particularly evident in interviews with *kiai*. Participants emphasized that religious authority involves responsibility for the interpretation and transmission of knowledge, a dimension they did not attribute to AI-generated responses. A *kiai* from Pesantren SK explained:

"Artificial Intelligence may answer religious questions, but it does not bear responsibility for those answers. A scholar is accountable before Allah, before society, and before the tradition of knowledge that he represents." (*Kiai*, Pesantren SK).

Teachers similarly emphasized the distinction between receiving an immediate answer and obtaining a scholarly judgment grounded in appropriate interpretive methods. Interview data indicated particular concern when AI was used to address questions involving *fiqh*, *aqidah*, or differences of scholarly opinion, where contextual interpretation was considered necessary. A senior teacher from Pesantren C stated:

"The problem is not that AI provides answers. The problem is that students sometimes assume the answer is complete, even though Islamic scholarship requires context, methodology, and consideration of different opinions." (Senior Teacher, Pesantren C).

Student accounts further demonstrate how this distinction operates in everyday knowledge-seeking practices. *Santri* described navigating a dual learning environment in which technological and traditional sources were used for different purposes. AI was frequently employed to obtain preliminary information independently, while direct consultation with teachers remained important when students encountered questions requiring interpretation, certainty, or consideration of different religious opinions. A *santri* from Pesantren AZ described this pattern:

"Usually, I search for information using AI first. However, when the issue concerns religious practice or differences of opinion, I still ask my teacher because I trust his explanation more." (*Santri*, Pesantren AZ).

This pattern was consistent with observational data from learning activities across the research sites, where *kitab* studies, direct instruction, *halaqah*, and teacher consultation continued to provide important settings for the clarification and validation of religious understanding. Thus, increased independent access to information through AI coexisted with established teacher-mediated learning practices. Rather than eliminating consultation with teachers, AI introduced an additional stage into some students' knowledge-seeking processes: initial technological exploration followed by human scholarly verification when questions required contextual or authoritative interpretation.

Interview data also revealed concerns about the consequences of relying on AI-generated religious information without adequate verification. Teachers reported encountering situations in which students brought AI-generated answers into learning interactions, but those answers were considered incomplete, insufficiently contextualized, or disconnected from established methods of Islamic scholarship. Such encounters reinforced the role of teachers not simply as providers of information but as interpreters who contextualized, evaluated, and, where necessary, corrected information obtained through technological sources. Documentary materials concerning educational and digital practices provided additional institutional context for these patterns, particularly regarding the ways technology use was situated within existing learning structures.

Cross-case analysis showed differences in how the three pesantren managed the relationship between AI-based information access and religious authority. Pesantren AZ demonstrated greater openness to critical engagement with AI while maintaining teacher supervision and verification. Pesantren SK emphasized responsible use and the verification of AI-generated religious information through recognized teachers and scholarly sources. Pesantren C adopted a more cautious position, particularly regarding AI use for sensitive religious matters, and placed stronger emphasis on established sources and direct scholarly guidance. Despite these differences, participants across the three sites consistently located final interpretive authority in human scholarship rather than technological capability.

The findings therefore point to a process of authority negotiation rather than authority displacement. AI has altered the conditions under which religious information can be accessed by allowing students to obtain explanations without initially approaching a teacher. However, the increased accessibility of information has not, within the cases studied, translated into equivalent interpretive legitimacy. Instead, the distinction between informational accessibility and religious authority has become more explicit: AI functions primarily as a source of preliminary information, while *kiai* and teachers continue to perform the interpretive, contextual, ethical, and accountability functions associated with authoritative religious knowledge. In this sense, AI does not simply compete with established authority; its use is negotiated within an educational structure that continues to evaluate technological information through recognized forms of scholarly legitimacy.

Models of Pesantren Responses toward Artificial Intelligence

Cross-case analysis revealed that the three pesantren did not respond uniformly to the emergence of Artificial Intelligence. Although all institutions acknowledged the growing presence of AI in educational activities, their responses varied according to leadership perspectives, educational priorities, technological readiness, and interpretations of Islamic educational values. Analysis of interview, observation, and documentary data identified four recurring patterns of institutional response: Resistance, Selective Adaptation, Integration, and Transformation. These patterns should not be understood as rigid categories or mutually exclusive institutional positions. Rather, they represent different modes through which pesantren negotiate the opportunities and challenges associated with AI while maintaining established educational principles and structures of religious authority.

Tabel 2: Patterns of Pesantren Responses toward Artificial Intelligence

Response Pattern	Main Characteristics	Orientation toward AI	Position of Religious Authority
Resistance	Concerns regarding dependency on technology, superficial learning, and weakening of learning discipline	AI is approached cautiously and its use is limited in core religious learning	Teachers and <i>kiai</i> remain the sole authoritative reference for religious knowledge
Selective Adaptation	AI is accepted under supervision and verification procedures	AI may be used as a supplementary learning tool within defined boundaries	AI-generated information must be validated through teachers and recognized scholarly sources
Integration	AI is incorporated into learning activities to support comprehension, access to information, and instructional preparation	AI functions as a complementary educational resource	Teachers retain interpretive authority while utilizing AI to support learning
Transformation	AI is viewed as an opportunity for broader educational innovation and institutional development	AI supports educational management, learning innovation, and technological literacy	Technological innovation is encouraged but remains guided by Islamic educational principles

Resistance Model. The resistance model was characterized by concerns regarding the potential impact of AI on learning discipline, scholarly authority, and the integrity of traditional educational practices. Participants associated with this orientation expressed apprehension that excessive dependence on AI could encourage students to seek instant answers without engaging in the sustained learning processes traditionally emphasized in pesantren education. A teacher from Pesantren C explained:

"We are worried that students may become dependent on instant answers and gradually lose the patience required to study classical texts seriously." (Teacher, Pesantren C).

Participants adopting this position did not reject technology altogether. Rather, their concerns focused on the possibility that unrestricted AI use might weaken the habits of perseverance, reflection, and direct engagement with teachers that have long characterized pesantren learning traditions.

Selective Adaptation Model. The second pattern involved cautious acceptance accompanied by institutional guidance and supervision. Participants associated with this model acknowledged the practical benefits of AI while emphasizing the importance of verification and responsible use. AI-generated information was regarded as useful for supporting learning but was not considered sufficiently reliable to be accepted without scholarly review.

Interview data from Pesantren SK indicated efforts to encourage students to evaluate AI-generated information critically and to verify religious content through teachers and established scholarly sources. As one teacher noted:

"Technology is useful, but students must learn that not everything generated by AI should be accepted without verification." (Teacher, Pesantren SK).

Within this model, AI functioned as a supplementary resource, while established structures of knowledge validation continued to regulate its educational use.

Integration Model. The integration model reflected a more deliberate effort to incorporate AI into educational activities while maintaining the central role of teachers and traditional learning practices. Participants associated with this orientation viewed AI as a resource capable of enhancing learning effectiveness, facilitating access to information, and supporting students' comprehension of complex materials.

Interview data from Pesantren AZ demonstrated several examples of this approach. Teachers reported using AI-assisted tools to support lesson preparation, language learning, and students' preliminary understanding of learning materials. Students were encouraged to utilize AI

during the initial stages of learning before engaging in classroom discussions and teacher consultation. A teacher from Pesantren AZ stated:

"We use AI to support learning, but final explanations and interpretations still come from teachers."
(Teacher, Pesantren AZ).

The integration model therefore reflects an effort to establish a complementary relationship between technological innovation and traditional educational structures rather than replacing one with the other.

Transformation Model. The transformation model represented the most proactive orientation toward AI among the patterns identified. Participants associated with this perspective viewed AI not only as a learning tool but also as a resource capable of supporting broader educational innovation, institutional development, and technological literacy. In this model, AI was understood as part of the changing educational landscape to which pesantren must respond in order to remain relevant within contemporary society.

Several institutional leaders emphasized that technological literacy should be developed alongside religious competence. A *kiai* from Pesantren AZ observed:

"The challenge is not whether AI should be used, but how pesantren can guide its use according to Islamic values." (Kiai, Pesantren AZ).

Despite this openness, participants consistently stressed that technological innovation should remain aligned with the foundational principles of Islamic education. Thus, transformation did not imply abandoning tradition; rather, it involved reinterpreting educational practices in ways that enabled pesantren to engage constructively with emerging technologies while preserving their core epistemological commitments.

Cross-case analysis demonstrates that contemporary pesantren are neither uniformly resistant nor uniformly accepting of Artificial Intelligence. Instead, institutional responses occur along a continuum ranging from caution to proactive engagement. Across all four response patterns, however, a common feature remained evident: technological adoption was consistently evaluated through the lenses of *sanad*, *talaqqi*, *adab*, and religious authority. The findings therefore suggest that the relationship between pesantren and AI is best understood as a process of negotiation in which technological innovation is selectively interpreted, regulated, and integrated according to established educational values and epistemological principles.

Discussion

Artificial Intelligence, Knowledge, and Islamic Epistemic Tradition

Artificial Intelligence is reshaping the conditions under which knowledge is accessed in pesantren, but the findings of this study suggest that increased access to information does not necessarily entail a corresponding transfer of epistemic legitimacy. Across the three cases, AI was predominantly used for preliminary exploration, translation, clarification of religious terminology, and initial engagement with learning materials, while the interpretation and validation of AI-generated information continued to involve teachers and established learning practices. This finding complicates accounts of AI-driven educational transformation that emphasize efficiency, personalization, and expanded access to knowledge resources. Although these affordances are increasingly well documented in AI-in-education research (Ahmad et al., 2024; Kasneci et al., 2023), the pesantren cases demonstrate that technological capacity to generate information and educational legitimacy to validate knowledge constitute analytically distinct processes. AI therefore modifies the route through which learners encounter information without necessarily determining the epistemic status eventually assigned to that information.

This distinction can initially be understood through the differentiation between information and knowledge. Rowley's (Rowley, 2007) discussion of the Data, Information, Knowledge, and Wisdom (DIKW) hierarchy emphasizes that knowledge cannot be reduced to the availability of information because it requires processes of interpretation, contextualization, and judgment. Generative AI intensifies this problem by producing linguistically coherent responses that may

appear authoritative even when their reliability, contextual appropriateness, or underlying reasoning remains uncertain. Kasneci et al. (Kasneci et al., 2023), for example, identify the educational potential of large language models while emphasizing the need for critical thinking, fact-checking, and continued human oversight. More recent research similarly suggests that learners' epistemic beliefs about ChatGPT -including beliefs concerning the source, certainty, justification, and speed of knowledge acquisition- are associated with their willingness to adopt or avoid the technology (Urhahne et al., 2026). The present findings extend this discussion by demonstrating that, within pesantren, the question is not merely whether AI-generated information is accurate, but whether and through what processes such information can acquire the status of legitimate knowledge.

The distinction becomes particularly significant when examined through Islamic epistemic traditions. Within the pesantren contexts studied, *ilm* was not treated simply as decontextualized information available for individual retrieval. Its legitimacy remained connected to *sanad*, *talaqqi*, and *adab*: the provenance of knowledge, direct pedagogical engagement, and the ethical-relational conditions through which learning occurs. This finding resonates with Khuza'i's (Khuza'i et al., 2019) critique of modern knowledge systems in which expanding access to information does not automatically produce epistemic clarity or legitimate intellectual authority. Yet the present study moves beyond a general distinction between information abundance and knowledge by identifying the concrete educational mechanisms through which pesantren regulate that distinction. *Sanad* provides a basis for assessing the provenance and scholarly legitimacy of knowledge; *talaqqi* enables interpretation, correction, and contextualization through direct pedagogical interaction; and *adab* situates knowledge acquisition within ethical relationships and practices of intellectual formation. These mechanisms therefore function not merely as inherited educational customs but as active epistemic resources through which AI-generated information is evaluated.

This interpretation also sharpens the relationship between the present findings and emerging research on AI in Islamic education. Syukur et al. (Syukur et al., 2024), in their comparative study of Islamic higher education in Indonesia and Thailand, demonstrate that AI integration is conditioned by institutional and normative contexts, with differing levels of technological engagement and concern about traditional teachers and Islamic cultural values. The pesantren findings extend this argument in an important direction. Technological integration is not negotiated only at the level of institutional acceptance, pedagogical usefulness, or ethical concern; it is also mediated through historically embedded mechanisms for establishing the legitimacy of knowledge. In other words, the critical issue is not simply whether AI is compatible with Islamic education, but how AI-generated information is epistemically processed before it can be incorporated into an established tradition of learning. This helps explain why students in the present study could use AI intensively for preliminary understanding while continuing to distinguish its outputs from knowledge that had been interpreted and validated through scholarly relationships.

This pattern also qualifies the increasingly common characterization of AI as a cognitive or educational partner. Recent AI-in-education scholarship emphasizes the possibilities of combining human and artificial intelligence rather than conceptualizing the two as simple substitutes. Research on AI literacy, for example, demonstrates the importance of combining technological engagement with human pedagogical processes and critical competencies (Tzirides et al., 2024), while Porayska-Pomsta (Porayska-Pomsta, 2024) argues for proactively responsible AI in education in which educational purposes and human responsibility remain central to the design and use of AI systems. The present findings support the importance of human mediation but add a specifically epistemic dimension: in pesantren, human involvement is not required solely because AI can produce inaccurate information. Teacher mediation also matters because legitimate learning involves forms of interpretation, accountability, ethical formation, and scholarly continuity that cannot be reduced to the computational production of plausible answers. AI can therefore accelerate access and provide cognitive support without independently fulfilling the conditions through which religious knowledge acquires legitimacy.

Accordingly, the epistemic change observed in the three pesantren is better characterized as reconfiguration through mediation rather than displacement. AI introduces an additional informational layer into established knowledge-seeking practices, but this layer is subsequently processed through existing mechanisms of scholarly interpretation and educational validation. This finding both supports and qualifies broader claims about AI-enabled educational transformation. AI may expand informational access and redistribute some cognitive tasks, but within the pesantren it does not automatically redistribute epistemic legitimacy. Instead, the emerging configuration can be understood as AI-assisted exploration followed by epistemic validation, in which technological outputs become educationally meaningful through their interaction with *sanad*, *talaqqi*, and *adab*. This provides an important foundation for understanding why the expansion of algorithmically generated religious information does not necessarily result in the displacement of *kiai* and teachers, an issue examined more directly in the following discussion of religious authority.

Artificial Intelligence and the Negotiation of Religious Authority

The findings demonstrate that the growing accessibility of AI-generated religious information does not automatically translate into a transfer of religious authority within pesantren. Although *santri* increasingly use AI to obtain preliminary explanations of *fiqh*, *aqidah*, religious practices, and other Islamic subjects, interpretive certainty continues to be sought from *kiai* and teachers, particularly when questions involve contextual judgment, differences of scholarly opinion, or implications for religious practice. This finding is consistent with emerging studies showing that AI is expanding access to religious information while simultaneously raising questions concerning authenticity, interpretive legitimacy, and accountability (Alam et al., 2025; Yusof et al., 2025). However, the present study extends this discussion by demonstrating empirically that increased informational accessibility and religious legitimacy operate at different levels within pesantren. AI may influence the point at which students begin their search for religious information, but it does not necessarily determine where that search acquires authoritative closure.

This distinction is important because religious authority in pesantren is constituted through forms of legitimacy that cannot be reduced to informational competence. Weber's (Weber, 1978) theory of authority provides a useful point of departure for understanding authority as a socially recognized relationship of legitimacy rather than simply possession of knowledge or technical capacity. Yet the pesantren findings require a more context-specific interpretation. The authority of *kiai* and teachers is sustained not merely by their ability to provide correct answers, but through scholarly competence, recognized educational lineage, moral credibility, pedagogical relationships, and responsibility for religious interpretation. This relational dimension is consistent with research on digitally mediated religion showing that new media can reconfigure the conditions under which religious authority is communicated and encountered without necessarily eliminating established religious authorities. Campbell and Evolvi (Campbell & Evolvi, 2020), for example, demonstrate that emerging digital technologies need to be examined in relation to the lived religious practices and socio-cultural contexts through which religious communities integrate and negotiate technology in everyday religious life. Earlier empirical research by Cheong et al. (Cheong et al., 2011) similarly demonstrated the continuing importance of religious leaders' epistemic authority within digitally networked faith organizations.

The present findings nevertheless identify an important development beyond earlier forms of digital mediation. AI does not merely circulate or increase the visibility of religious content; generative systems can directly formulate responses to users' religious questions, creating an appearance of dialogical and interpretive competence. This capacity produces what may be described as algorithmic informational authority: the practical capacity of AI to become an immediately accessible and seemingly knowledgeable reference point without possessing equivalent scholarly or religious legitimacy. This distinction is supported by recent scholarship showing that algorithmic systems increasingly participate in the mediation of Islamic religious authority. Lohlker and Wahid (Lohlker & Wahid, 2026), for example, demonstrate that religious authority in digital environments is increasingly shaped through interactions among human actors, digital media, and

algorithmic systems, while still depending on processes through which authority is socially articulated and recognized. The pesantren cases add an educational and epistemic dimension to this argument: algorithmic accessibility may influence students' information-seeking behavior, but recognition of interpretive authority remains attached primarily to human scholars.

A central reason for this differentiation is accountability. Participants did not evaluate religious authority solely according to the speed, comprehensiveness, or linguistic fluency of an answer. Rather, authority was associated with the capacity to assume responsibility for interpretation and to situate religious questions within appropriate scholarly, methodological, and ethical contexts. This is particularly significant because generative AI can produce persuasive religious responses without independently bearing moral responsibility for their consequences. Recent research on AI-generated religious disinformation in Indonesia similarly warns that generative systems can reproduce the symbolic appearance of religious authority while weakening the relationship between religious claims, identifiable sources, and epistemic accountability (Hidayah et al., 2026). The present findings therefore suggest that accountability functions as an important boundary between informational credibility and religious legitimacy in the pesantren context.

This boundary does not mean that religious authority remains unchanged. Rather, the findings indicate a process of authority negotiation rather than authority displacement. Students can now approach religious questions through AI before consulting a teacher, which partially redistributes access to religious information and reduces the teacher's former exclusivity as the initial point of inquiry. At the same time, the need for contextualization, methodological judgment, and verification can reinforce the interpretive role of *kiai* and teachers when AI-generated information becomes uncertain or contested (Ma'arif et al., 2025, 2026; Rofiq, 2025). This finding qualifies deterministic accounts in which digitalization necessarily produces the decline of traditional religious authority. Instead, technological mediation changes the environment in which authority is exercised: *kiai* and teachers increasingly operate not only as transmitters of religious information but also as validators, contextual interpreters, and evaluators of information obtained through algorithmic systems.

The resulting configuration can therefore be understood as a layered authority structure. AI occupies an increasingly visible informational layer by enabling rapid and individualized access to religious explanations, whereas *kiai* and teachers continue to occupy the interpretive and legitimating layer through which religious claims are contextualized and evaluated (Adnan et al., 2026; Amalia, 2026; Yuliana et al., 2025; Zainuddin et al., 2026). The relationship between these layers is not necessarily competitive. Rather, the findings demonstrate that pesantren actors differentiate technological utility from scholarly legitimacy and accommodate AI according to the epistemic functions it is considered capable of performing. Religious authority is consequently neither simply preserved nor technologically replaced; it is reorganized around a clearer differentiation between access to religious information and legitimate interpretation. This negotiated configuration provides the institutional basis for understanding why pesantren respond differently to AI and how those responses can be interpreted through the Social Construction of Technology in the following section.

Institutional Negotiation of AI and the Pesantren AI Negotiation Model

The variation in pesantren responses to Artificial Intelligence demonstrates that technological adoption cannot be explained solely by the functional capabilities of AI. Across the three cases, similar technological possibilities were interpreted and accommodated differently, producing four recurring response patterns: resistance, selective adaptation, integration, and transformation. These patterns are particularly intelligible through the Social Construction of Technology (SCOT), which challenges technological determinism by emphasizing that technological meanings emerge through processes of interpretation and negotiation among relevant social groups (Pinch & Bijker, 1984). Rather than possessing a predetermined educational meaning, AI acquires different meanings according to how pesantren actors evaluate its usefulness,

risks, and compatibility with established educational principles. Resistance, selective adaptation, integration, and transformation should therefore not be understood as sequential stages through which every pesantren must progress, but as forms of interpretative flexibility that reflect different institutional constructions of what AI can and should become within Islamic education.

This interpretation both converges with and extends previous research on AI adoption in Islamic educational institutions. Syukur et al. (Syukur et al., 2024) demonstrate that Islamic higher education institutions in Indonesia and Thailand respond differently to AI according to institutional conditions, technological readiness, and concerns surrounding Islamic educational values. Similarly, earlier studies of AI implementation in pesantren have primarily demonstrated its practical incorporation into learning and educational management (Karmi et al., 2022; Sumarwan, 2025). The present study moves beyond identifying whether and where AI is adopted by demonstrating how different modes of adoption are produced through epistemic and institutional negotiation. The four response patterns identified here are shaped not only by technological readiness or pedagogical utility but also by judgments concerning knowledge legitimacy, teacher mediation, religious authority, and the preservation of *sanad*, *talaqqi*, and *adab*. Consequently, two institutions may recognize similar technological affordances while constructing different boundaries around their legitimate educational use.

The distinction among the four patterns further illustrates this process. Resistance reflects an interpretation of AI in which risks to learning discipline, sustained engagement with classical texts, and established pedagogical relationships outweigh its immediate advantages. Selective adaptation represents conditional acceptance, whereby technological utility is recognized but subjected to supervision and verification. Integration reflects a stronger institutional accommodation in which AI becomes complementary to instructional practices without acquiring independent interpretive authority. Transformation, meanwhile, represents a more proactive orientation in which AI is connected to educational innovation, technological literacy, and institutional development. Importantly, transformation does not constitute the abandonment of Islamic educational traditions, nor should it be interpreted as the inevitable endpoint of technological development. Across these orientations, technological engagement remained conditional upon institutional judgments concerning what forms of AI use could be reconciled with established educational and religious commitments. This finding supports the SCOT proposition that technological trajectories are shaped through social interpretation rather than determined by technological capability itself (Pinch & Bijker, 1984).

At the same time, the findings extend SCOT by demonstrating the particular importance of epistemic and normative structures in the social construction of technology within religious educational institutions. In the pesantren context, relevant social groups do not negotiate AI solely in terms of efficiency or usefulness. *Kiai*, teachers, students, administrators, and other institutional actors encounter AI within a pre-existing epistemic environment in which legitimate knowledge is connected to scholarly lineage, pedagogical relationships, ethical formation, and interpretive accountability. The meaning of AI is consequently constructed within boundaries established by this epistemic order. This helps explain why the same technology can simultaneously be considered useful for translation, preliminary exploration, or instructional preparation and insufficient as an independent source of authoritative religious interpretation. In this respect, the pesantren cases demonstrate that technological meaning is socially constructed and epistemically conditioned.

This conditionality also has implications for the ethical governance of AI. Jobin et al. (Jobin et al., 2019), in their comparative analysis of AI ethics guidelines, identify recurring principles such as transparency, justice and fairness, non-maleficence, responsibility, and privacy, while also showing substantial variation in how such principles are interpreted and implemented. The present findings suggest that AI governance in religious educational environments involves an additional contextual layer: general principles of responsible technology are interpreted through locally embedded conceptions of legitimate knowledge and moral responsibility. In pesantren, responsible AI use therefore cannot be reduced to technical reliability or general ethical compliance. It also

concerns whether AI-generated information is appropriately contextualized, whether its use preserves scholarly accountability, and whether technological practices remain compatible with the ethical relationships through which Islamic learning is traditionally organized.

Taken together, these findings provide the empirical basis for what this study conceptualizes as the Pesantren AI Negotiation Model. The model explains AI integration not as a binary decision between adoption and rejection, but as a mediated process through which technological outputs and practices are evaluated before acquiring educational legitimacy. Three interconnected mechanisms organize this negotiation: interpretive validation, authority verification, and ethical alignment. Interpretive validation concerns whether AI-generated information is contextualized, clarified, and pedagogically assessed, particularly through teacher-mediated processes associated with *talaqqi*. Authority verification concerns the provenance and legitimacy of knowledge claims, linking technological information to recognized scholarly sources, *sanad*, and accountable human interpretation. Ethical alignment concerns whether AI use is consistent with *adab*, educational discipline, moral responsibility, and the broader normative commitments of pesantren education. These mechanisms do not operate independently; together they constitute an epistemic and institutional filtering process through which AI is rendered educationally legitimate and subsequently associated with different institutional responses. Figure 1 visually synthesizes this process by showing how AI-generated information and technological affordances are mediated through these three mechanisms, shaping negotiated educational legitimacy and context-dependent institutional response patterns.

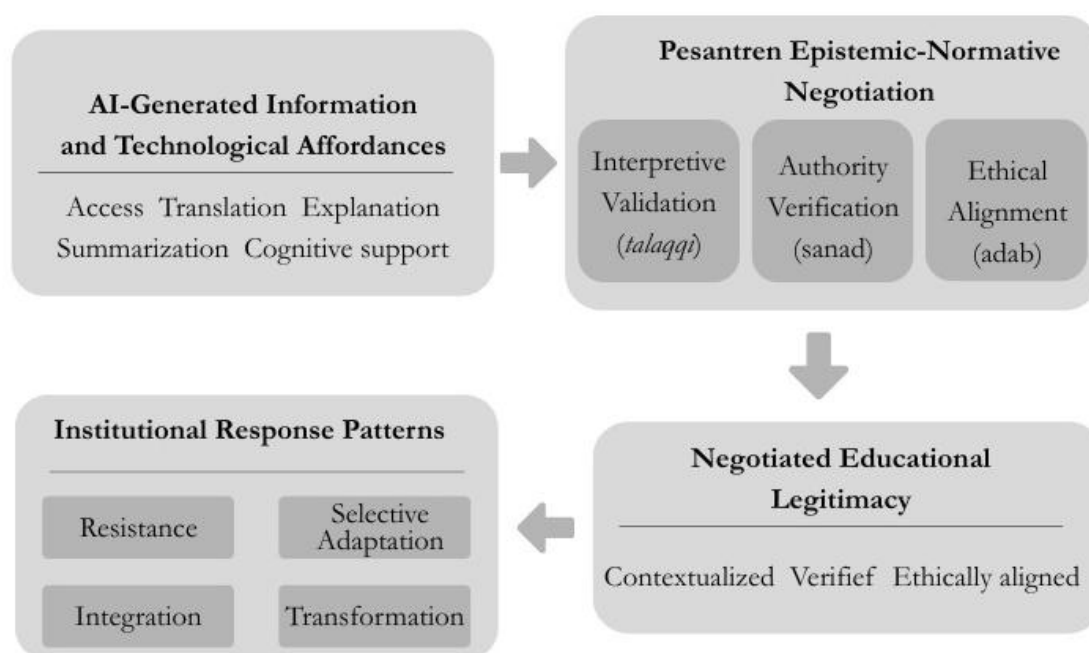


Figure 1: Pesantren AI Negotiation Model

The model therefore connects the principal empirical findings of the study. At the individual learning level, AI introduces AI-assisted exploration followed by epistemic validation. At the level of religious authority, it produces authority negotiation rather than authority displacement, as informational accessibility expands without automatically conferring interpretive legitimacy. At the institutional level, these negotiations generate varying configurations of resistance, selective adaptation, integration, and transformation. The four response patterns are thus better understood as possible institutional outcomes of negotiation rather than fixed categories or linear stages of technological development. This distinction is theoretically important because it explains how the same institution may display more than one response pattern across different educational activities or change its orientation as technological practices and institutional judgments evolve.

Accordingly, the Pesantren AI Negotiation Model challenges deterministic assumptions that the diffusion of advanced technology necessarily displaces traditional knowledge structures.

Instead, the findings reveal a process of mediated technological integration in which technological affordances are selectively incorporated through existing epistemic and normative structures. This does not imply that pesantren traditions remain unchanged. AI alters students' routes to information, introduces new demands for verification, and expands the contexts in which religious authority must be exercised. Yet these changes occur through negotiation rather than simple substitution. The theoretical contribution of the model therefore lies in demonstrating that technological adaptation in religious education depends not only on whether institutions possess or accept a technology, but also on how that technology is epistemically validated, normatively aligned, and institutionally authorized. In this configuration, tradition and technological innovation are not necessarily opposing forces; established epistemic principles become active mechanisms through which technological change itself is interpreted and governed.

CONCLUSION

This study demonstrates that AI integration in contemporary pesantren is characterized by negotiation rather than technological substitution. Across the three cases, AI primarily supported information seeking, translation, clarification, summarization, and preliminary engagement with learning materials, while participants continued to distinguish informational accessibility from epistemically validated knowledge. AI-assisted exploration was therefore followed by teacher-mediated verification and contextualization, with *sanad*, *talaqqi*, and *adab* remaining central to the validation and transmission of Islamic knowledge. Similarly, increased access to AI-generated religious information did not displace the interpretive legitimacy of *kiai* and teachers but contributed to a renegotiation of religious authority. At the institutional level, this negotiation was reflected in four non-linear and potentially coexisting response patterns: resistance, selective adaptation, integration, and transformation.

The study contributes to scholarship on AI and Islamic education by shifting attention from whether pesantren adopt AI to how AI-generated information acquires educational and epistemic legitimacy within an established knowledge tradition. This contribution is conceptualized through the Pesantren AI Negotiation Model, which identifies three interconnected mechanisms (interpretive validation, authority verification, and ethical alignment) through which AI is negotiated in relation to *talaqqi*, *sanad*, and *adab*. The model demonstrates that technological integration in pesantren is neither a straightforward process of replacing traditional educational structures nor one in which those structures remain entirely unchanged; rather, technological innovation is selectively incorporated through existing epistemic, ethical, and authoritative frameworks.

The study is limited to three pesantren in West Java and a qualitative multiple-case design; therefore, its findings are not intended to represent the diversity of pesantren across Indonesia. Future research should examine more diverse geographical and institutional contexts, employ longitudinal designs to investigate changes in AI use and religious authority over time, and explore how AI-generated religious content shapes students' knowledge-seeking and verification practices. Practically, the findings suggest that pesantren leaders and educators should approach AI integration in ways that strengthen critical verification, teacher mediation, and responsible use while maintaining the epistemic and ethical principles of pesantren education.

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