

Educational Problems in Indonesian Islamic Boarding School: A Systematic Review of Curriculum Barriers, Digital Obstacles, And Institutional Responses

Revi Permanasari¹, Deny Haryadi², Hedi Herdiana³, Lukman Asha⁴, Ifnaldi⁵,
Dina Hajja Ristianti⁶

¹²³⁴⁵⁶ IAIN Curup, Bengkulu, Indonesia

Corresponding Email: denyllg3@gmail.com

Abstract. This systematic literature review synthesizes empirical findings on educational issues in Indonesian Islamic boarding schools (pesantren), with emphasis on curriculum implementation barriers, digital limitations, and institutional responses. Drawing on peer-reviewed journal articles and using a structured, transparent review process, the study examines the relationship between classroom practices, technological readiness, and institutional governance. The findings show that curriculum barriers arise across several dimensions, including student readiness, teaching approaches, and conceptual understanding, and are often reinforced by the tendency of institutions to prioritize religious subjects over general subjects. Digital transformation offers both opportunities and challenges, as limited resources, weak managerial support, and resistance to technology continue to constrain integration. Quantitative evidence indicates that structured digital literacy management accounts for a substantial share of students' literacy outcomes, underscoring the importance of institutional capacity. Institutional responses generally involve leadership-based modernization, stronger program governance, and teacher professional development through supervision. However, the literature remains constrained by the dominance of case studies, limited contextual scope, and short-term evaluation designs. Overall, the review concludes that sustainable reform in pesantren depends on alignment among curriculum integration, digital readiness, governance strengthening, and preservation of institutional identity, while future research should adopt longer-term and comparative approaches.

Keywords: *Islamic boarding schools; curriculum implementation; digital transformation*

Introduction

Islamic boarding schools (pesantren) are among the oldest and most influential educational institutions in Indonesia. Deeply rooted in classical Islamic educational traditions, they have long played a crucial role in shaping religious knowledge, moral character, and leadership within society. However, in the contemporary Indonesian context, pesantren are no longer isolated from the tides of change. National education reform, state curriculum standards, developments in digital technology, and demands for institutional accountability increasingly influence the direction of their management. As a result, various educational issues in pesantren have become increasingly visible, complex, and multi-layered.

Various empirical studies have shown that Islamic boarding schools (pesantren) in Indonesia face a variety of fundamental problems. At the classroom level, learning management is a major concern. Teachers struggle to encourage students' active participation and maintain their motivation to learn, particularly in English (Habibi et al., 2018). Managing student behavior also presents a challenge, as educators must balance encouragement with discipline, amidst institutional constraints such as low teacher welfare (Habibi et al., 2018). The complexity of language also complicates the learning process, as teachers often have to use three languages simultaneously: Indonesian, Arabic, and English (Habibi et al., 2018). Furthermore, teachers without an English language background are often asked to teach the subject, resulting in suboptimal teaching quality (Habibi et al., 2018). Time management in large classes is also a

challenge, as it limits the effectiveness of material delivery and student engagement (Habibi et al., 2018).

Beyond classroom learning issues, Islamic boarding schools also face equally serious social and institutional challenges. Cases of sexual harassment within Islamic boarding schools have been documented, but cultural, religious, and institutional norms often create a stigma against reporting such cases (Firdaus et al., 2025). This situation results in many cases going unreported and victims not receiving adequate support, impacting the psychological well-being and sense of security of students. Gender discrimination and sexual violence against women within Islamic boarding schools have also been reported to threaten their educational and religious freedoms (Wardana et al., 2023). These findings demonstrate that educational issues in Islamic boarding schools cannot be understood solely as pedagogical issues, but are closely linked to the social, cultural, and governance contexts of the institutions (Apriani et al., 2022).

Another prominent challenge is curriculum integration. Several studies have highlighted the tension between the religious curriculum characteristic of Islamic boarding schools (*pesantren*) and the national curriculum mandated by the state. The implementation of Islamic boarding school-based junior high school programs demonstrates these institutions' efforts to reform the education system without creating open conflict (Zainal et al., 2022). However, general subjects such as science and technology are often positioned as supplementary, resulting in students' motivation in these subjects tending to be lower and academic qualifications less competitive (Zainal et al., 2022). Resistance to the national curriculum also reflects an effort to maintain the curriculum model and distinctive identity of Islamic boarding schools (Hanif et al., 2024). While this step is important for preserving tradition, it can also reinforce the separation between religious and general knowledge.

Efforts to incorporate additional subjects, such as English, into the Islamic boarding school curriculum also raise new issues. The integration of English language materials in the Islamic boarding school context results in a heavier subject load and less than optimal mastery of Islamic material by teachers (Habiburrahim et al., 2022). When teachers lack the adequate competence to integrate various academic disciplines, the quality of learning is impacted. In a broader study of curriculum implementation, (F. A. Yusuf, 2022) identified various dimensions of learning barriers in boarding schools, including barriers related to student readiness, teaching approaches, and conceptual understanding. These barriers are exacerbated by limited facilities and infrastructure, a lack of managerial support, and low trust in the use of information and communication technology (F. A. Yusuf, 2022). This confirms that curriculum issues cannot be separated from structural and institutional conditions.

The development of digital technology presents both new opportunities and challenges for Islamic boarding schools (*pesantren*). The use of technology is seen as crucial for improving the quality of education and maintaining the sustainability of institutions within a development framework oriented toward sharia values (Bashori et al., 2024). However, technology adoption does not occur automatically. Research shows that the successful use of technology in learning depends heavily on teacher competence, the ability to integrate material with technology-based learning methods, and adequate institutional support (Insani, 2026). Limited digital access and a traditional school culture also hinder innovation (Insani, 2026). On the other hand, the management of a structured digital literacy program has been shown to significantly impact student literacy, while emphasizing the importance of ethical technology use (Saepurohman et al., 2025).

The pressures of modernization have reshaped the educational mission and curriculum structure of Islamic boarding schools. The shift from traditional *sorogan* methods to blended and technology-based learning models reflects a shift in learning paradigms (Suresman et al., 2025). Islamic boarding schools strive to align classical traditions with modern educational practices (Sofi et al., 2025), while governance reforms based on the acceleration paradigm demonstrate the adaptive strategies of Islamic boarding school communities in facing change (Thoha et al., 2023). At the same time, resistance to the national curriculum signals an ongoing

negotiation between preserving identity and adapting to external policies (Hanif et al., 2024). These dynamics demonstrate that modernization presents not only opportunities but also tensions.

Institutional capacity is a determining factor in determining the quality of Islamic boarding school education. Visionary leadership based on Islamic spiritual values has been shown to strengthen institutional management and the modernization process (Hamdanah et al., 2025). Innovations in strategic management, including the implementation of integrated quality management and transformational leadership, contribute to improving educational quality and organizational sustainability (Zakaria et al., 2025). Evidence from the higher education context indicates that institutional quality and service quality are closely related to educational outcomes. Cross-national research also confirms that institutional quality significantly influences educational quality through various channels. Thus, educational issues in Islamic boarding schools cannot be resolved solely at the classroom or curriculum level but require comprehensive institutional strengthening.

Overall, the literature indicates that educational issues in Indonesian Islamic boarding schools are complex, encompassing classroom management, psychosocial and gender safety, curriculum integration tensions, digital readiness, and institutional governance capacity. Challenges in curriculum integration impact motivation, learning engagement, and graduate quality, while structural and institutional factors such as teacher qualifications, availability of facilities, management support, and sociocultural norms contribute to the emergence of persistent learning barriers. Amidst the pressures of digital transformation and modernization, Islamic boarding schools are required to adapt without losing their religious identity. Therefore, this systematic review aims to comprehensively synthesize existing empirical evidence to answer the following questions: (1) What are the main educational issues reported in Indonesian Islamic boarding schools? (2) How do challenges in curriculum integration affect learning outcomes? (3) What structural and institutional factors contribute to learning barriers? (4) How does digital transformation shape educational practices in Islamic boarding schools? (5) How are pressures of modernization redefining the mission and structure of Islamic boarding school curricula? and (6) What is the empirical relationship between institutional capacity and educational quality in the Islamic boarding school context? By answering these questions, this study is expected to provide a comprehensive understanding of educational issues in Islamic boarding schools and become a basis for formulating policies and reform strategies that are theoretically and practically relevant.

Material and Method

This systematic literature review is designed to summarize empirical evidence on educational issues in Indonesian Islamic boarding schools (pesantren), with particular attention to barriers to curriculum implementation, digital limitations, and institutional capacity. The methodological design follows standards commonly used in systematic review research in Islamic education and educational studies in general, emphasizing transparency, rigor, and replicability. Furthermore, the methods section explicitly presents the Boolean-based search strategy and the article selection process in the form of a systematic review reporting flowchart.

Research Design and Review Framework

Systematic literature reviews in Islamic education studies generally employ structured and transparent procedures to ensure methodological rigor. One widely used reporting guideline is the Guidelines for Reporting Systematic Reviews and Meta-analyses, which includes a multi-step process of identifying, screening, assessing eligibility, and determining which articles to include (Arar et al., 2022; Gonscherowski & Rott, 2025; Ma'arif et al., 2023; Posso et al., 2025; Pratama et al., 2025; Rante et al., 2020; Said et al., 2023). While originally developed for the health sector, these guidelines have been methodologically adapted to the context of

educational research to accommodate data diversity and institutional complexity (Posso et al., 2025).

In line with these guidelines, this study implemented four main stages, namely: (1) identification of articles through systematic searches in scientific databases; (2) screening of titles and summaries; (3) assessment of eligibility through full-text review; and (4) determination of articles that meet the criteria. This entire process is visualized in the Systematic Review Reporting Flowchart (Figure 1), which shows the number of articles at each stage, starting from identified articles, removal of duplicates, screened articles, articles fully assessed, to the final number of articles analyzed.

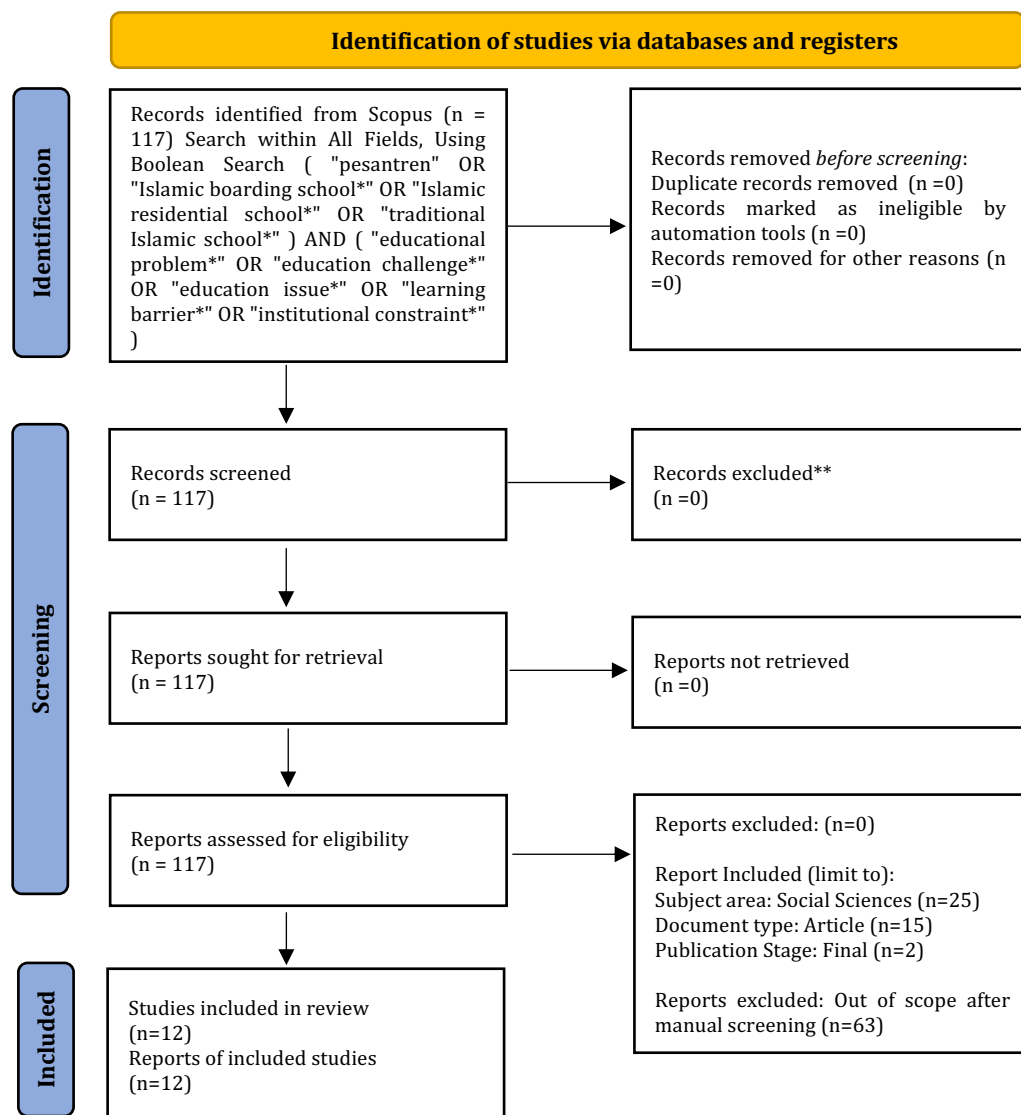


Figure 1. Flowchart of systematic review reporting depicting the stages of article identification, screening, eligibility assessment, and inclusion.

To complement these procedures, thematic analysis was used to summarize findings from various studies. Thematic analysis is widely used in systematic reviews of Islamic education to identify recurring themes, patterns of findings, and conceptual relationships between studies (Ma'arif et al., 2023; Pratama et al., 2025). Furthermore, mapping publication trends and thematic structures also helps understand the development of research in this field (Ma'arif et al., 2023; Pratama et al., 2025). Content analysis techniques were applied to systematically interpret the extracted data and maintain conceptual consistency across studies.

Search Strategy and Data Sources

A literature search was conducted through major scientific databases to ensure comprehensive coverage of peer-reviewed articles relevant to the context of Islamic education and Islamic boarding schools. The search strategy employed a combination of Boolean logic with AND and OR operators to systematically broaden and narrow the results.

The main search formula used is as follows:

Search ("Islamic boarding school" OR "Islamic boarding school*" OR "Islamic residential school*" OR "traditional Islamic school*") AND ("educational problem*" OR "education challenge*" OR "education issue*" OR "learning barrier*" OR "institutional constraint*")

This formula was applied to the title, summary, and keywords columns according to the characteristics of each database. This strategy ensured that the articles retrieved were relevant to the study's focus on curriculum, digitalization, and institutional governance. In accordance with general guidelines for developing literature reviews and formulating research questions (Lane & Kettler, 2019), the search strategy was aligned with the clearly formulated research questions. Inclusion parameters were designed to capture research addressing institutional and curriculum challenges in various educational contexts (Filippou et al., 2025; Paz-Maldonado et al., 2025).

Inclusion and Exclusion Criteria

Establishing clear inclusion and exclusion criteria is crucial to maintaining conceptual focus and methodological rigor in systematic reviews (Carter et al., 2023; Lane & Kettler, 2019). In this study, inclusion criteria included: (1) peer-reviewed journal articles; (2) empirical research or systematic reviews; (3) publications addressing institutional, curriculum, leadership, digital, or governance challenges in the context of Islamic education or comparable educational contexts; and (4) articles published in accessible languages appropriate to the scope of the study.

Exclusion criteria included non-scientific publications, non-peer-reviewed documents, editorials, opinion pieces, and studies lacking methodological clarity. These criteria were designed to ensure that only relevant and high-quality research was included.

Data Quality Assessment and Analysis

Quality assessment was conducted to assess the methodological robustness of included studies. In systematic reviews of educational research, both qualitative and mixed approaches, structured appraisal guidelines were used to assess the rigor, credibility, and relevance of the research (Anazor & Grech, 2025; Griche & Bennis, 2026; Leiviska et al., 2025).

Following the quality assessment process, data extraction was conducted using a structured coding framework that included bibliographic information, research design, institutional context, thematic focus, and key findings. Thematic synthesis then grouped the evidence into interrelated domains: curriculum integration challenges, digital transformation and institutional readiness, and governance and leadership capacity.

By combining structured reporting guidelines, a Boolean logic-based search strategy, visualized flowcharts of article selection, clear inclusion and exclusion criteria, systematic quality assessment, and thematic synthesis, this methodological design aims to strengthen the rigor, credibility, and transparency of the study. This approach ensures that the findings in the following sections are based on evidence identified and critically appraised through a systematic process.

Results and Discussion

Results

Obstacles to Curriculum Implementation in Islamic Boarding Schools

The literature compiled in Theme 1 shows that obstacles to curriculum implementation in Indonesian Islamic boarding schools occur in the realm of the religious curriculum, the

national curriculum, and technology-mediated learning. These obstacles are not simply isolated pedagogical weaknesses, but rather interconnected factors at the student, teacher, classroom, and institutional levels. The evidence summarized in Table 1 reveals a recurring pattern: curriculum pressures intensify when institutional readiness, teacher competency, and student cognitive readiness are not aligned.

Yusuf (2022) presents one of the most comprehensive analyses of learning barriers in boarding school settings. In the religious curriculum, specifically the Quran memorization program, barriers arise from both internal factors within the students and external conditions of the learning environment. Although the study does not present numerical percentages, Yusuf (2022) clearly categorizes barriers at each stage of curriculum implementation, indicating recurring obstacles to achieving religious learning targets. This finding aligns with the debate on the holistic-integrative approach in Section 3, which emphasizes that curriculum burden and structural limitations can hinder effective integration (Mazlan et al., 2025; Shaleh, 2024).

Within the national curriculum, Yusuf (2022) identified measurable learning difficulties, particularly in mathematics. Students exhibited low learning motivation, weak problem-solving skills, communication difficulties, and errors in notation. These obstacles were systematically classified into ontogenic, didactic, and epistemological dimensions, meaning that learning problems stem from cognitive readiness, teaching approaches, and conceptual understanding simultaneously. These findings reinforce the research of Zainal et al. (2022), who found that science and technology subjects are often positioned as supplementary subjects in Islamic boarding school-based secondary school programs, resulting in low academic achievement. Auni & Trisnawati (2022) also showed that the integration of English language materials into the Islamic boarding school curriculum can lead to subject overload and a lack of teacher mastery of the material, thus emphasizing the didactic and epistemological obstacles identified by Yusuf (2022).

The technological dimension further complicates curriculum implementation. Yusuf (2022) explicitly reports three institutional-level obstacles to technology-based learning practices: (1) limited facilities and infrastructure, (2) minimal management support, and (3) low trust and attitudes toward information and communication technology. These structural weaknesses limit the possibility of optimal technology integration in the learning process. The quantitative impact of digital factors is evident in the research of Saepurohman et al. (2025), who reported that structured digital literacy management significantly predicted students' literacy outcomes, with coefficients of determination (R^2) of 0.543 and 0.760, indicating moderate to strong apparent power. These figures confirm that curriculum success is strongly influenced by institutional governance and digital readiness.

Efforts to integrate science education through the Science, Technology, Engineering, and Mathematics approach provide an example of adaptive intervention. Suprpto et al. (2020) reported a positive response from students during a two-month implementation period, indicating that curriculum innovations can help increase motivation in science subjects. However, religious orientation continues to dominate curriculum priorities, resulting in persistent structural inequalities between religious and general subjects. This supports the findings of Hanif et al. (2024) that resistance to national curriculum integration is often framed as an effort to maintain identity, although this can unwittingly deepen the curriculum dichotomy.

At the classroom level, Habibi et al. (2018) uncovered operational barriers to teaching English in Islamic boarding schools. Teachers faced difficulties in increasing student participation, managing behavior, navigating the complexity of multilingualism (Indonesian, Arabic, and English), and managing time in large classes. Teachers who did not have an English language background but were assigned to teach the subject experienced performance constraints that directly impacted the quality of learning. These teacher-level limitations are closely related to the debate on governance and professionalism discussed in Section 3 (Xie et

al., 2026), where institutional climate and professional capacity have been shown to play a significant role in determining educational quality.

Overall, the available evidence suggests that barriers to curriculum implementation in Islamic boarding schools are multi-layered and mutually reinforcing. Students' cognitive readiness (ontogenic), limited teacher teaching strategies (didactic), conceptual misunderstandings (epistemological), infrastructure gaps, weak managerial support, and curriculum priorities driven by identity considerations interact to shape learning outcomes. The presence of coefficients of determination of 0.543 and 0.760 (Saepurohman et al., 2025) indicates that institutional mechanisms have a significant quantitative influence on educational outcomes. Thus, curriculum barriers cannot be understood as solely academic issues, but rather as part of a broader structural and governance ecosystem.

The synthesis in Table 1 summarizes these findings and presents a comparative overview of the curriculum domains, types of barriers, reported impacts, and proposed responses or solutions.

Table 1.

Obstacles to Curriculum Implementation in Islamic Boarding Schools

Reference	Curriculum domain	Type of obstacle (student/teacher/class/system)	Evidence and indicators reported	Impact on learning/implementation	Proposed or observed solutions
(F. A. Yusuf, 2022)	Religious curriculum (e.g. memorizing the Qur'an)	Santri + system/contextual	Learning obstacles in the form of difficulty memorizing the Qur'an stem from internal factors of students and external factors.	Recurring obstacles in achieving religious learning targets at each stage of curriculum implementation.	The need for more targeted support at each stage of curriculum implementation.
(Zainal et al., 2022)	National curriculum (general subjects; emphasis on mathematics)	Students + class/pedagogical	Low learning motivation; weak problem-solving and communication skills; errors in notation; categorized as ontogenic,	Weak learning engagement and measurable learning difficulties in national subjects.	The need for learning supports that are adapted to the type of obstacle.

			didactic, and epistemol ogical barriers.		
(M. Yusuf, 2025)	Technolo gy-based curriculu m / learning practices mediated by informati on and communic ation technolog y	System/institution + attitude	Limited facilities and infrastruct ure; lack of managem ent support; low trust and attitudes towards informatio n and communic ation technolog y.	Limited feasibility and quality of technology-based learning implementation.	Institution al investmen t and strengthen ing manageria l support.
(Supra pto et al., 2020)	Science education (Science, Technolog y, Engineeri ng, and Mathemat ics approach)	Curriculum system/priorities + classroom practices	A religiously oriented local curriculu m; a two- month trial of integratin g Science, Technolog y, Engineeri ng, and Mathemat ics approache s with a positive response from students.	Increased engagement in science lessons, but structural priority inequalities persist.	Learning innovation based on Science, Technolog y, Engineerin g, and Mathemati cs as an adaptive strategy.

The reviewed evidence consistently shows that barriers to curriculum implementation in Islamic boarding schools are structurally embedded, pedagogically mediated, and influenced by institutional conditions. Addressing these barriers requires alignment between curriculum integration models, digital readiness, and strengthening governance capacity.

Digital Limitations and Readiness of Information and Communication Technology in Islamic Boarding Schools

The findings compiled in Theme 2 indicate that digital limitations in Islamic boarding schools are complex. These issues include limited facilities and infrastructure, weak governance, and socio-psychological resistance to technology use. The studies summarized in Table 2 consistently emphasize that digital transformation in Islamic boarding schools is not simply a technical issue, but rather a process that is highly dependent on the quality of governance and alignment of values.

F. A. Yusuf (2022) provides basic evidence that the implementation of technology-based curricula in boarding schools is hampered by three interrelated institutional constraints: limited facilities and infrastructure, minimal management support, and low trust and attitudes toward information and communication technology. These three constraints operate simultaneously at the material, managerial, and attitudinal levels. When infrastructure is inadequate, digital learning is difficult to implement optimally. When leadership support is weak, technology integration efforts tend to be unsustainable. Furthermore, low levels of trust in technology reinforce resistance, thus limiting pedagogical innovation. These findings align with the theoretical discussion in Section 1, which emphasizes that institutional support and perceived usefulness significantly influence technology use behavior.

The governance dimension is more clearly seen in the research of Saepurohman et al. (2025), which examined digital literacy initiatives in two Islamic boarding schools in Tasikmalaya: Darussalam Islamic Boarding School and Riyadlul Ulum wa Da'wah Islamic Boarding School. Using a combined, phased, and exploratory approach, the authors quantitatively demonstrated that digital literacy management significantly influenced students' literacy achievements. The reported coefficient of determination (R^2) values were 0.543 in one institution and 0.760 in the other. These figures indicate moderate to strong explanatory power, meaning that approximately 54.3% to 76.0% of the variation in students' literacy achievements can be explained by structured digital literacy governance mechanisms. This quantitative evidence strengthens the argument that institutional capacity is not a complementary factor, but rather a central element in digital success in Islamic boarding schools.

Saepurohman et al. (2025) also emphasize the importance of program sustainability and the ethical use of technology as an integral part of digital literacy management. This aligns with the definition of digital literacy in Section 3, which emphasizes not only technical skills but also moral responsibility and transformative capabilities. Without a sustainable governance structure, digital programs risk becoming short-term interventions without lasting institutional impact.

A comparison between F. A. Yusuf (2022) and Saepurohman et al. (2025) reveals a fairly clear causal pattern: weak infrastructure and managerial support correlate with implementation barriers, while structured governance and strategic management correlate with measurable literacy gains. The coefficients of determination of 0.543 and 0.760 confirm the significant influence of governance on educational outcomes. Thus, digital limitations in Islamic boarding schools are more accurately understood as issues mediated by governance, rather than solely a lack of technological devices.

Previous findings in Part 1 also indicated that limited facilities and a lack of encouragement from management exacerbated resistance to technology use in curriculum implementation (F. A. Yusuf, 2022). However, when digital literacy initiatives are systematically managed, some of these obstacles can be minimized through targeted leadership interventions (Saepurohman et al., 2025). This interplay between structural barriers and institutional responses reflects the social and technical dynamics of technology adoption.

The synthesis in Table 2 summarizes these findings by grouping digital limitations based on the dimensions of infrastructure, governance, and attitudes, and including quantitative indicators where available.

Table 2.
Digital Limitations and Readiness of Information and Communication Technology in Islamic Boarding Schools

Reference	Types of digital limitations (infrastructure / skills / attitudes / governance)	Context (type of Islamic boarding school; region; level of resources)	Operationalization /measurement (readiness indicators; use of information and communication technology; digital literacy measures)	Key findings (barriers and mechanisms)	Implications (teaching, learning, equity, sustainability)
(F. A. Yusuf, 2022)	Infrastructure + governance + attitude	Case study at an Islamic boarding school; participants included students, parents, teachers, and the principal (participants were selected purposively).	Qualitative case studies through observation, interviews, and documentation; information and communication technology barriers emerged as part of the barriers to technology-based curriculum.	Limited facilities and infrastructure; lack of support from Islamic boarding school management; low trust and attitudes towards information and communication technology.	Digital learning is hampered if infrastructure investment and managerial support are not increased; building trust in the use of technology is necessary.
(Saepurohman et al., 2025)	Program governance / sustainability + institutional capacity	Two case studies of Islamic boarding schools: Darussalam and Riyadlul Ulum wa Da'wah (Tasikmalaya).	A combined stepwise and exploratory approach: qualitative study and quantitative analysis based on a multilevel assessment scale with reliability testing and regression analysis.	Digital literacy management has a significant impact on students' literacy ($R^2 = 0.543$ and 0.760); the importance of sustainability and ethical use of technology is emphasized.	Digital success depends on structured governance and long-term program sustainability; an ethical framework strengthens continued adoption.

Overall, the available evidence suggests that digital readiness in Islamic boarding schools is highly dependent on the quality of institutional governance, the adequacy of infrastructure, and changes in attitudes toward technology. Quantitative findings, particularly the coefficients of

determination of 0.543 and 0.760 reported by Saepurohman et al. (2025), indicating that structured management explains a significant portion of students' literacy achievements. Therefore, digital transformation in Islamic boarding schools cannot be understood simply as a technological upgrade, but rather as a process of institutional renewal rooted in governance capacity and value alignment.

Institutional Response: Leadership, Governance, and Program Management

The literature compiled in Theme 3 shows that institutional responses to educational issues in Islamic boarding schools generally focus on three strategic areas: leadership-driven modernization, structured program governance, and values-based institutional integration. These three responses serve as intermediary mechanisms that help address curriculum barriers and digital limitations, as outlined in Themes 1 and 2. Furthermore, these responses reflect the theoretical perspectives on governance capacity and educational change discussed.

Salim et al. (2024) demonstrated that leadership innovation plays a crucial role in addressing the pressures of modernization in Islamic boarding schools. Through a qualitative case study, this research describes a Kiai leadership model characterized by visionary, democratic, nurturing, and spiritual characteristics. Modernization efforts are carried out through the use of technology, strengthening multilingual education, and integrating Islamic perspectives into science learning. Conflict management is pursued through deliberation. This leadership configuration demonstrates how institutional actors attempt to bridge tradition and modernity. Although this study does not report statistical coefficients, its focus is on the outcomes of institutional transformation, particularly the leadership's ability to align religious identity with the demands of reform (Salim et al., 2024). The absence of quantitative measures in this study indicates limitations in measuring direct impacts on learning outcomes, but changes in institutional structure and direction are positioned as important indicators of reform success.

Saepurohman et al. (2025) present a more measurable picture of institutional responses through strategic digital literacy management in two Islamic boarding schools in Tasikmalaya, namely Darussalam Islamic Boarding School and Riyadlul Ulum wa Da'wah Islamic Boarding School. Using a combined, phased and exploratory approach, this study reports coefficients of determination of 0.543 and 0.760, respectively. These figures indicate that structured digital literacy governance can explain approximately 54.3% to 76.0% of the variation in students' literacy achievement. These findings provide strong empirical evidence that institutional management capacity significantly influences measurable educational performance. The authors also emphasize the importance of program sustainability and the ethical use of technology as part of governance reform, which aligns with the link between adaptive governance and quality improvement (Siti Romlah et al., 2025). Compared with leadership narratives that emphasize symbolic transformation, this study provides quantitative reinforcement of the causal relationship between governance and educational outcomes.

Haryanto & Muslih (2024) complement this perspective by examining the integration of institutional identity at an Islamic boarding school (pesantren)-based university (UNSIQ). Through interviews, participant observation, and document analysis, this study describes efforts to internalize Islamic boarding school values into an integrated scientific paradigm based on Islamic principles. The institutional response focuses on reducing the dichotomy between religious and general knowledge. Although it does not present quantitative data, this study describes the outcomes of graduates as individuals who are intellectually competent, spiritually resilient, and virtuous. This integration model aligns with the knowledge integration framework (Mazlan et al., 2025; Shaleh, 2024) and demonstrates how institutional governance translates epistemological integration into concrete practices.

An additional example of bridging curriculum issues is presented in a study of Bugis local wisdom-based curriculum collaboration (Awaluddin & Riskianti, 2024). This study outlines a five-stage institutional strategy: goal alignment, team formation, curriculum development, teaching materials development, and the pilot and evaluation phase. Although conducted in the

context of Islamic higher education, this structured and participatory process reflects a governance mechanism capable of addressing the challenges of curriculum relevance and contextualization. This step-by-step model emphasizes the importance of stakeholder consultation to strengthen implementation consistency.

Overall, these studies show a consistent pattern: the effectiveness of institutional responses depends heavily on the alignment between leadership vision, governance structure, and program sustainability. Quantitative evidence from Saepurohman et al. (2025), with coefficients of determination of 0.543 and 0.760, respectively, demonstrates that governance reform has a strong explanatory effect on educational outcomes. Meanwhile, qualitative evidence from Salim et al. (2024) and Haryanto & Muslih (2024) demonstrates how leadership and identity integration can serve as transformation mechanisms, even without standardized performance measures.

The synthesis in Table 3 summarizes these various institutional response models and their reported impacts.

Table 3.

Institutional Responses: Leadership, Governance, and Program Management

Reference	Forms of institutional response	How to implement (main features)	Main issues addressed	Reported changes or results	Practical notes (limitations, potential context shift, risks)
(Salim et al., 2024)	Leadership-based modernization (leadership and governance reform)	Qualitative case study. The leadership of the Kiai is characterized by visionary, democratic, nurturing, and spiritual characteristics. Modernization occurs through the use of technology, multilingual education, and the integration of Islamic perspectives into science; conflicts are resolved through deliberation.	Pressure for modernization and curriculum integration (including technology adoption).	Bridging tradition and modernity: a model of institutional transformation in facing the currents of globalization.	Descriptive in nature; does not include standardized learning outcome measures; highly contextual.
(Saepurohman et al., 2025)	Digital literacy program governance (strategic	A combined stepwise and exploratory approach. Two Islamic boarding schools (Darussalam;	Digital limitations and institutional readiness.	Digital literacy management has a significant influence on students'	Limited to two cases; broader academic outcomes require

	managemen t initiative)	Riyadlul Ulum wa Da'wah). Qualitative study and quantitative regression analysis based on a multilevel assessment scale.		literacy (determinati on coefficients of 0.543 and 0.760); sustainabilit y and ethical use of technology are emphasized.	longer-term testing.
(Harya nto & Muslih, 2024)	Value-based institutional integration (governance and identity integration)	Qualitative study (interviews, observations, document analysis). Internalization of Islamic boarding school values within an integrated scientific paradigm at Islamic boarding school-based universities.	Curriculum integration and scientific dichotomy.	Graduates are described as intellectually competent, spiritually resilient, and of noble character.	The context of higher education; implementati on at the Islamic boarding school level requires adjustment.
(Awalu ddin & Riskian ti, 2024)	Inter- institutional collaboratio n strategy	Five stages: goal alignment; team formation; curriculum development; teaching materials development; piloting and evaluation; emphasizing stakeholder consultation.	Curriculum relevance and contextualizati on challenges.	A structured collaboratio n model to improve the quality of curriculum and teaching materials.	Based on higher education; the context shift to Islamic boarding schools needs further evaluation.

In conclusion, institutional responses in Islamic boarding schools demonstrate that leadership innovation, strategic governance, and comprehensive scientific integration are key to overcoming curriculum barriers and digital limitations. Quantitative evidence confirms the strong influence of governance on educational outcomes, while qualitative analysis reveals a profound process of identity transformation. Taken together, these findings strengthen the argument that sustainable educational reform in Islamic boarding schools hinges on strengthening institutional capacity, not simply technical improvements in teaching practices.

Teacher Professionalism and Supervision-Based Improvement

The findings in Theme 4 indicate that teacher professionalism in Islamic boarding schools and similar Islamic schools is primarily strengthened through a structured supervision model and a leadership-driven professional learning system. Unlike curriculum constraints and digital

limitations, which are often perceived as structural obstacles, teacher professionalism emerges as a connecting mechanism capable of translating institutional reforms into tangible improvements in the classroom.

Arifin et al. (2023) demonstrated that clinical supervision based on multicultural values significantly improved teacher competency in four domains: pedagogical, personal, social, and professional competency. The supervision process was conducted through a structured cycle, starting with planning, observing learning and teaching practice, evaluating, and following up with discussions. Although this study did not report numerical effect sizes, the systematic presentation of qualitative evidence demonstrates that repeated supervision cycles contributed to improved teaching readiness and reflective practice among teachers. The emphasis on multicultural values also aligns teacher development with the broader institutional identity. By incorporating values into supervisory practice, this model not only improves the technical aspects of teaching but also shapes teachers' overall ethics and professionalism.

Siagian et al. (2025) complemented these findings by examining principal-led supervision at the Islamic high school level. This study identified three supervisory approaches: direct, indirect, and collaborative, implemented through planning, implementation, and evaluation stages. The results showed that teacher professionalism increased when supervision was conducted systematically and in a collegial atmosphere. Supporting factors included a harmonious relationship between teachers and principals, the existence of a quality assurance team, and the availability of adequate facilities. Conversely, inhibiting factors included time constraints, the principal's external responsibilities, and reluctance to supervise more senior teachers. Although this study did not present statistical coefficients, increased professionalism was understood to result from consistent leadership and a supportive institutional climate.

These findings suggest that instructional leadership and supervision design serve as essential prerequisites for the formation of professional learning communities. Teacher self-efficacy and professional engagement, often referred to as intermediary variables in the leadership literature, are implicitly strengthened through structured supervision cycles. Although quantitative indicators are not explicitly reported in Table 4, the iterative cycle model described by Arifin et al. (2023) and the step-by-step supervision framework outlined by Siagian et al. (2025) demonstrate standardization of procedures, which is an important mechanism for maintaining sustainable quality improvement.

The integration of multicultural or ethical values into supervision (Arifin et al., 2023) also contributes to addressing the sociocultural tensions discussed in Part 1, including gender sensitivity and psychosocial safety. By embedding values in professional development, supervision serves not only as a corrective mechanism but also as a preventative measure against potential problems. Meanwhile, principal-led supervision (Siagian et al., 2025) reflects the principle of distributed leadership, which emphasizes that teacher governance capacity and professionalism are interconnected and mutually reinforcing.

Overall, the available evidence suggests that improving teacher professionalism in Islamic boarding schools relies on three key elements: a structured supervision cycle, value alignment in professional development, and a supportive institutional climate. While large-scale quantitative measures are not yet available to fully confirm causal relationships, the systematic procedural frameworks in both studies provide strong qualitative evidence that a supervision-based improvement model is a viable pathway to improving learning quality. A synthesis of the findings is presented in Table 4.

Table 4.

Teacher Professionalism and Supervision-Based Improvement Mechanisms					
Referen ce	Teacher developm ent approach	Competenci es developed	Methods/devic es used	Reported findings/imp acts	Further development directions/rese arch gaps for systematic

					review synthesis
(Arifin et al., 2023)	A clinical supervision model that integrates multicultural values	Pedagogical, personality, social, and professional competencies	Qualitative design through observation, documentation, interviews, and focused discussions; supervision cycle: planning → teaching practice/observation → evaluation → follow-up; data analysis follows the procedures of Miles and Huberman	Structured supervision cycles enhance teacher competency and reflective readiness; multicultural values frame professional growth	Requires more measurable indicators of classroom learning outcomes and long-term sustainability testing across various types of Islamic boarding schools.
(Siagian et al., 2025)	Principal-led supervision (direct, indirect, collaborative)	Teacher professionalism (in general)	Qualitative approach through observation, interviews, and document analysis; supervision stages: planning → implementation → evaluation; class visits and meetings	Systematic and collegial supervision strengthens professionalism; supported by quality assurance teams and facilities; hampered by time and authority constraints	Measurable indicators of learning quality and long-term sustainability analysis are needed in diverse governance contexts.

In conclusion, teacher professionalism in Islamic boarding schools is not solely an individual attribute, but rather the result of an institutional process shaped by leadership, supervision design, and value integration. The structured supervision cycle documented by Arifin et al. (2023) and the stepwise leadership model described by Siagian et al. (2025) demonstrate that governance mechanisms can directly influence the development of professional competencies. Therefore, strengthening teacher professionalism is a strategic institutional response to mitigate the impact of curriculum barriers and digital limitations identified in the previous sections.

Discussion

The synthesis of the above findings indicates that educational issues in Islamic boarding schools are maintained by interconnected mechanisms between curriculum structure, digital readiness, and institutional governance. At the curriculum level, the barriers identified by F. A. Yusuf (2022), namely ontogenic, didactic, and epistemological barriers, demonstrate how student readiness, learning design, and clarity of conceptual understanding interact to shape learning outcomes. These barriers are further amplified when the religious curriculum is

prioritized over science and general subjects (Hanif et al., 2024; Zainal et al., 2022), creating a structural imbalance in curriculum integration. This imbalance aligns with the governance perspective, which emphasizes that the curriculum is not merely subject matter but also a policy instrument shaped by institutional arrangements (Rezat & Westbury, 2024).

Digital barriers exacerbate tensions within the curriculum. F. A. Yusuf (2022) emphasized that inadequate infrastructure and weak managerial support directly hinder technology-based learning. Silviyanti et al. (2024) also demonstrated that multilingual practices in Islamic boarding schools further complicate learning implementation. Systematic studies of digital barriers confirm that inadequate infrastructure and fragmented implementation strategies undermine the effectiveness of online learning (Murillo-Jiménez et al., 2025; Oulamine et al., 2025). Cross-level interactions arise when governance fails to align technology investments with curriculum needs, creating a gap between the discourse of reform and the reality in the classroom.

Institutional governance plays a crucial role as a mediating mechanism. Strategic management models emphasize the importance of participatory governance, stakeholder engagement, and comprehensive curriculum alignment (Hasan et al., 2025; Kumar et al., 2024). The shift toward collaboration-based governance demonstrates that education in the digital age requires distributed leadership, not centralized control (Manggalasari et al., 2025). Empirical evidence on the sustainability of Islamic boarding schools (*pesantren*) indicates that media literacy, digital exposure, and open governance collectively strengthen institutional trust and long-term sustainability (Bustomi et al., 2025). These findings corroborate previously presented quantitative evidence, such as the coefficients of determination of 0.543 and 0.760 in the digital literacy governance model, which indicate that institutional capacity explains a significant portion of educational outcomes.

Strategic planning and infrastructure development are other cross-level mechanisms. Program evaluation studies in Islamic boarding schools indicate that declining educational quality in the digital era is related to weak policy consistency and inadequate teacher training (Jamil et al., 2025). Comparative research on digital transformation in boarding schools partly indicates that providing inclusive infrastructure and strengthening human resource capacity is necessary to bridge the access gap and support sustainable development (Duong & Khuong, 2026). Socio-technical analysis also confirms that cultural resistance and rigid pedagogical habits can hinder technological innovation, even when hardware is readily available (Wilson, 2019). Therefore, governance reform must address both the provision of facilities and changes in attitudes and work culture.

Modernization and digitalization are simultaneously reshaping the identity and autonomy of religious educational institutions. The transition from traditional to digital-based learning models reflects a process of adaptation (Suresman et al., 2025), but also has the potential to create identity tensions. Studies on the sustainability of Islamic boarding schools (*pesantren*) warn that digital expansion must be balanced with the preservation of values to prevent the erosion of religious identity (Bustomi et al., 2025). A broader analysis of religious awareness in a digital society indicates a tendency toward polarization, where modernization can trigger more open attitudes while strengthening defensive traditionalism (Panaitova & Solovev, 2019). The concept of a scholarly identity crisis in Islamic boarding schools emphasizes the risk of detachment from fundamental epistemological commitments in the digital era (Rosowulan et al., 2025). However, the integrative digital learning model also proves that critical literacy and religiosity can be increased when technology is placed within an ethical framework (Widodo, 2025), in line with the principles of sharia-based transformation (Bashori et al., 2024).

Despite growing empirical attention to this issue, methodological limitations remain evident in Islamic boarding school research. Many studies employ single-case study designs or focus on specific regions, limiting generalizability (Firmansyah, 2025; Suparto et al., 2021). A heavy reliance on qualitative interviews and observations, while contextually rich, limits the

power of broader conclusions (Mustofa & Romadhon, 2025; F. A. Yusuf, 2022). Studies using a mixed approach sometimes include quantitative data, but their sample size and scope are often limited (Dekawati, 2022). Furthermore, a lack of attention to broader legal and policy frameworks can obscure structural factors that influence educational outcomes (Tobroni et al., 2024). These limitations limit the ability to assess the long-term impact of digital reform and governance.

Going forward, research should prioritize long-term designs to assess the sustainability of identity transformation and institutional performance. Comparative studies across multiple locations will enhance generalizability across different types and regions of Islamic boarding schools. An integrated analytical framework that combines political, cultural, and economic perspectives can provide a more comprehensive explanation of the relationship between state governance structures and religious education orientations (Rashimbetov et al., 2025). Furthermore, strategic research on infrastructure planning, teacher professional development, and the integration of digital ethics remains key to understanding how modernization can coexist with authentic religious values.

Overall, this discussion confirms that curriculum barriers, digital limitations, and governance capacity are mutually reinforcing components within a systemic ecosystem. The success of reform in Islamic boarding schools does not depend on isolated curriculum adjustments or technology adoption, but rather on integrated, cross-level alignment encompassing policy consistency, strong leadership, infrastructure readiness, teacher professionalism, and value preservation.

Conclusion

This study aims to summarize the results of empirical research on educational issues in Indonesian Islamic boarding schools (pesantren) and examine how curriculum barriers, digital limitations, and institutional governance interact within a systemic framework. The evidence gathered indicates that challenges to curriculum implementation are not isolated pedagogical issues but rather rooted in multiple barriers, encompassing student readiness, learning design, depth of understanding, and institutional priorities. The tension between the religious curriculum and the national curriculum continues to impact learning motivation and academic achievement.

Digital transformation brings both hope and new pressures. Structured digital literacy management has been shown to impact student learning outcomes, but limited resources, weak management support, and cultural resistance remain key obstacles. These findings emphasize that digital readiness is inseparable from quality governance. Institutional capacity, reflected through visionary leadership, participatory management, and targeted supervision, serves as the primary link between reform initiatives and educational quality improvement.

This study also identified research gaps. Most studies are local and case-based, limiting the reach of their findings. Furthermore, evaluations of the long-term impacts of digital and institutional reforms are still limited. Stronger methodological rigor, broader sample sizes, and long-term research designs are needed to capture the impact of transformation in a sustainable manner.

Ultimately, sustainable improvement in the quality of education in Islamic boarding schools (pesantren) depends heavily on alignment across various levels of policy and practice. Effective reform requires balanced curriculum integration, adequate digital resources, strengthened governance mechanisms, and enhanced teacher professionalism, all while maintaining the distinctive religious identity of Islamic boarding schools. By integrating curriculum, technology, and governance within a unified analytical framework, this study is expected to provide a foundation for policy formulation and further research to strengthen the quality and resilience of Islamic boarding schools.

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