INTERNATIONAL JOURNAL OF EDUCATION AND CULTURAL TRANSFORMATION

Vol. 01 /No. 02 /August 2026 | https://jurnal.haizumsaintek.com/index.php/sundano/index

Cultural Transformation of Traditional to Modern Pesantren: A Study of Islamic Pedagogical Adaptation in Facing Digital Cultural Disruption

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Received: 2026-May-10

Rev. Req: 2026-May-29

Accepted: 2026-June-22

ABSTRACT: *Digital disruption has structurally reshaped the cultural and pedagogical foundations of Indonesian Islamic boarding schools (pesantren). This study analyzes how traditional pesantren culture transforms through digital pedagogical adaptation while identifying mechanisms that preserve religious authenticity amid technological innovation. Employing a qualitative systematic literature review, this research synthesized Sinta- and Scopus-indexed peer-reviewed articles published between 2016 and 2026 using thematic content analysis. Findings reveal that pesantren transformation involves selective adaptation rather than structural replacement, positioning digital tools as extensions not substitutes of the sanad (chain of transmission). Two key mechanisms drive this transformation: the reconfiguration of classical sorogan-bandongan methods into hybrid learning models, and transformational kiai leadership that aligns digital adoption with local wisdom and moral authority. The study concludes that sustainable modernization relies on a dialectical balance between technological integration and core value preservation, framing pesantren as an adaptive rather than defensive institution. Theoretically, these findings enrich the discourse on Islamic educational transformation; practically, they inform policy formulation regarding digital literacy integration in faith-based education.*

Keywords: *Pesantren; Digital Disruption; Islamic Pedagogy; Cultural Transformation; Kiai Leadership*

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I. INTRODUCTION

The intensification of digital technology since the mid 2010s has generated what scholars commonly refer to as an era of disruption a condition in which established institutional patterns are challenged not by direct confrontation but by the gradual erosion of their operational relevance (Mutammam et al., 2025). Educational institutions across the globe, including religious-based institutions, are compelled to renegotiate their identity, methods, and authority structures in response to this shift. Among such institutions, the Islamic boarding school, or pesantren, occupies a distinctive position in Indonesia's educational landscape because it is simultaneously a center of religious authority, a residential community, and an educational institution with centuries-old pedagogical traditions.

Historically, pesantren education has been organized around the figure of the kiai as the central authority of knowledge transmission, supported by classical methods such as *sorogan* (individual recitation) and *bandongan* (collective lecture on classical texts, or kitab kuning). This model emphasizes not merely cognitive transfer but the internalization of *akhlak* (moral character) through prolonged personal interaction between *santri* (students) and kiai. Within this framework, authenticity of knowledge is measured not only by textual accuracy but by the unbroken chain of transmission (*sanad*) that connects a student's understanding to a lineage of scholars extending back to the Prophet Muhammad. This epistemological structure explains why pesantren have historically been cautious, if not resistant, toward pedagogical innovations perceived as threatening the integrity of this transmission chain.

However, the disruption brought by digital technology cannot simply be ignored or resisted indefinitely. Adaptation and transformation of pesantren education have become imperative in facing what is now described as the era of Muslim Society 5.0, a condition marked by the convergence of artificial intelligence, ubiquitous connectivity, and information abundance that fundamentally alters how younger generations acquire, verify, and internalize knowledge (Mutammam et al., 2025). Islamic religious education more broadly is likewise required to reformulate its pedagogical model so that it remains relevant amidst the acceleration of the fourth and fifth industrial revolutions, without abandoning its

transformative and value-laden character (Parhan et al., 2024). The urgency of this reformulation is not merely technological but existential: pesantren must answer whether their core identity rooted in personal, embodied, and hierarchical transmission of knowledge can survive, or must be reconstructed, within a digital ecology that favors decentralized, instantaneous, and disembodied access to information.

Empirical evidence indicates that pesantren have not remained passive in the face of this pressure. Digital literacy within pesantren has already produced both change and contestation, as digital media reshape the way *santri* access religious texts, communicate with teachers, and construct religious understanding, while simultaneously provoking tension between digital openness and the guarded epistemic authority of the kiai (Ja'far, 2019). Several pesantren have responded proactively by digitizing their learning infrastructure. The case of Pondok Pesantren Darul Ulum Kudus illustrates how pesantren-based technology can be mobilized to digitalize classical learning processes without eliminating the traditional curriculum structure (Zafi et al., 2021). Similarly, studies on pesantren's digital literacy demonstrate that technology adoption is generally treated as an instrumental extension of pedagogical goals rather than a wholesale replacement of the traditional curriculum (Fadli & Dwiningrum, 2021). Comparable dynamics have been documented in pesantren communities in Madura, where digital transformation of Islamic education has altered administrative and pedagogical practices while the substantive religious curriculum remains intact (Hasan et al., 2018).

At the pedagogical level, hybrid learning models are increasingly employed to reconcile the demands of digital efficiency with the relational depth traditionally valued in pesantren pedagogy (Prasetyo, 2024). This is echoed in studies on Arabic language instruction within multicultural pesantren settings, where digital tools are integrated into classical language pedagogy to accommodate diverse student backgrounds while preserving normative religious content (Sopian et al., 2025). At the community level, participatory digital literacy programs such as content creation, video production, and Islamic journalism training implemented in the Darunnajah Islamic Boarding School demonstrate that pesantren can actively

cultivate digital competence among *santri* as an extension, rather than a dilution, of their moral and intellectual formation (Darajat et al., 2022). Broader strategic responses have also been documented, including systematic efforts by pesantren leadership to address social challenges brought by digitalization through adaptive educational strategy (Kholifah, 2022) and explicit institutional strategies formulated in anticipation of the disruptive pressures associated with Society 5.0 (Kholili, 2021).

Despite this growing body of evidence, a critical gap remains in the literature. Existing studies tend to document isolated case studies of digital adoption in specific pesantren, or to theorize digital disruption in Islamic education in general terms, without systematically explaining the underlying mechanisms that allow pesantren culture to transform while retaining its core identity. Few studies explicitly interrogate the pedagogical logic that governs this selective adaptation, nor do they sufficiently examine the leadership dimension that mediates between technological innovation and value preservation. This creates an analytical blind spot: it remains unclear whether digital adoption in pesantren represents a genuine cultural transformation, a superficial technological overlay, or a contested and unstable equilibrium.

Based on this background, the present study addresses the following research questions: (1) How does the pedagogical culture of traditional pesantren transform into a modern form through the adaptation of digital technology, without eroding the substantive values of Islamic education? (2) What role does kiai leadership play in mediating the transformation of pesantren culture amid digital disruption? This study aims to analyze the pattern and mechanism of pedagogical adaptation in pesantren facing digital cultural disruption, and to explain how institutional leadership functions as a mediating factor that determines the direction and sustainability of this transformation.

The novelty of this study lies in its integrative analytical framework, which connects pedagogical transformation and leadership mediation as two interdependent dimensions of pesantren modernization, rather than treating them as separate phenomena. Theoretically, this study contributes to the discourse on Islamic educational transformation by proposing the concept of "selective

adaptation" as an analytical lens for understanding how traditional religious institutions negotiate modernity without losing their epistemic authenticity. Practically, the findings are expected to inform policymakers, pesantren administrators, and religious education stakeholders in designing digital literacy strategies that are culturally congruent with pesantren's institutional character.

II. METHOD

This study employed a qualitative approach with a systematic literature review (SLR) design, chosen because the research problem concerns the interpretation of complex, socially embedded phenomena namely the transformation of pedagogical culture rather than the measurement of quantifiable variables. A qualitative literature-based design is appropriate for synthesizing dispersed empirical findings into a coherent conceptual account of how pesantren culture is being reconfigured under digital disruption (Aziza, 2024).

The primary data of this study consisted of secondary data in the form of peer-reviewed journal articles published between 2016 and 2026. Sources were retrieved from academic databases including Google Scholar, Scopus, Crossref, and the Science and Technology Index (Sinta), using combinations of keywords such as "pesantren," "digital transformation," "Islamic pedagogy," "kiai leadership," and "digital disruption." This search strategy is consistent with prior qualitative literature studies on Islamic education that similarly relied on systematic keyword-based searches across recognized academic databases to ensure the credibility and authoritativeness of the sources collected.

Article selection followed a purposive sampling technique, in which sources were deliberately selected based on their direct relevance to the research questions rather than random selection. Purposive sampling is appropriate in qualitative literature synthesis because it allows the researcher to concentrate analytical attention on information-rich cases that most directly illuminate the phenomenon under study (Etikan et al., 2016). The inclusion criteria were: (a) published in a Sinta- or Scopus-indexed journal; (b) directly discussing pesantren education, Islamic pedagogy, or digital transformation in religious education; (c) published within the last ten years; and (d) available in full text with a verifiable Digital

Object Identifier (DOI). Articles that did not meet these criteria, including opinion pieces, non-peer-reviewed blog content, and sources without a traceable DOI, were excluded.

Data were collected through a documentation method, in which relevant content covering research aims, theoretical frameworks, findings, and conclusions was systematically extracted from each selected article into a structured synthesis matrix. This matrix organized the data according to three analytical categories: (1) pedagogical adaptation practices, (2) leadership and institutional governance mechanisms, and (3) value preservation strategies. This structured extraction process is consistent with documentation-based data collection methods commonly employed in qualitative studies of Islamic education transformation.

The collected data were analyzed using thematic content analysis, conducted through four stages: data reduction, data display, thematic coding, and conclusion drawing/verification. In the data reduction stage, irrelevant or redundant information was filtered out. In the data display stage, findings were organized into the synthesis matrix described above. In the thematic coding stage, recurring patterns across sources were identified and grouped into broader analytical themes namely pedagogical hybridization and leadership mediation which subsequently formed the structure of the Results and Discussion section. Finally, conclusions were drawn iteratively and verified through cross-checking against the original sources to ensure interpretive accuracy.

To enhance the credibility of the analysis, source triangulation was applied by comparing findings across multiple independent studies addressing similar phenomena in different pesantren contexts (e.g., Kudus, Madura, Jakarta, and other regions), thereby reducing the risk of drawing conclusions from idiosyncratic or context-specific cases alone. In addition, only sources with verifiable DOIs and indexation in Sinta or Scopus were retained, functioning as an external quality-control mechanism for source credibility. The theoretical framework of technological pedagogical content knowledge (TPACK) was used as a sensitizing concept to interpret how pesantren integrate technological, pedagogical, and content knowledge domains (Mishra & Koehler, 2006), while the

concept of digital competence provided an additional lens for evaluating the depth of technology integration observed across the reviewed studies (Falloon, 2020).

III. RESULT AND DISCUSSION

Based on the thematic analysis of the reviewed literature, this study identifies two principal, interrelated findings that directly address the research questions: (A) the pedagogical culture of pesantren is transformed through a process of selective adaptation, in which digital tools are hybridized with classical methods rather than replacing them; and (B) kiai leadership functions as the central mediating mechanism that determines whether this adaptation strengthens or destabilizes pesantren's institutional identity. A third, synthesizing discussion (C) integrates these two findings into a broader theoretical account of pesantren transformation as a dialectical rather than linear process.

Pedagogical Adaptation: From Classical Transmission to Digital-Hybrid Learning

The first major finding demonstrates that pesantren pedagogy is not being replaced by digital technology but reorganized into a hybrid configuration that preserves the epistemic logic of sorogan and bandongan while extending their operational reach. Evidence from Pondok Pesantren Darul Ulum Kudus shows that the digitalization of learning processes through digital repositories of kitab, recorded lectures, and online supplementary materials functions primarily as an accessibility tool that allows *santri* to review and deepen their understanding of texts outside formal class hours, rather than as a mechanism that displaces the direct authority of the *ustadz* or *kiai* (Zafi et al., 2021). This finding is corroborated by studies on pesantren's digital literacy, which similarly report that technology functions as a supporting instrument for existing pedagogical goals, not as an independent curriculum overhaul (Fadli & Dwiningrum, 2021).

This pattern of selective integration is also visible in hybrid learning implementations, in which digital platforms are combined with face to face instruction to accommodate the practical constraints of pesantren life such as limited teaching staff, geographically dispersed alumni networks, and the need to balance religious and general curricula while preserving the interpersonal density that characterizes traditional pedagogy (Prasetyo, 2024). In multicultural pesantren settings, digital tools have similarly been used to support Arabic language instruction in ways that accommodate diverse linguistic backgrounds among *santri*, without diminishing the centrality of classical texts as the normative reference point of instruction (Sopian et al., 2025).

A particularly instructive case is the digital literacy program implemented at the Darunnajah Islamic Boarding School, where *santri* were trained in content creation, video

production, and Islamic journalism. Rather than functioning as a secular intrusion into religious pedagogy, this program was explicitly framed as an extension of the pesantren's da'wah (Islamic propagation) mission, enabling *santri* to produce religiously oriented digital content while developing technical competencies relevant to the contemporary media ecology (Darajat et al., 2022). This case illustrates a broader principle evident across the reviewed literature: digital literacy in pesantren is rarely pursued as an end in itself, but is consistently instrumentalized in service of pre-existing religious and pedagogical objectives.

Two theoretical frameworks help explain why this hybridization, rather than wholesale replacement, occurs. First, the TPACK framework suggests that effective pedagogical technology integration requires teachers to reconcile technological knowledge with existing pedagogical and content knowledge structures, rather than treating technology as an autonomous variable (Mishra & Koehler, 2006). Applied to the pesantren context, this explains why digital tools are consistently subordinated to, rather than substituted for, the content knowledge embedded in classical kitab and the pedagogical knowledge embedded in the *sorogan-bandongan* tradition. Second, the digital competence framework distinguishes between mere digital literacy the technical ability to operate digital tools and digital competence, which involves the critical, purposeful, and context-sensitive application of digital tools to achieve specific educational goals (Falloon, 2020). The evidence reviewed suggests that pesantren are increasingly moving beyond basic digital literacy toward digital competence, in which technology is deployed with clear pedagogical intentionality rather than adopted indiscriminately. This progression is consistent with findings indicating that digital literacy interacts closely with learning strategies to shape core educational competencies among students more broadly (Kim, 2019), and with observations that digital natives cannot be assumed to possess sophisticated digital literacy simply by virtue of technological exposure, underscoring the necessity of deliberate pedagogical scaffolding rather than passive technology adoption (Ng, 2012).

Nevertheless, this adaptive pattern is not without friction. Several reviewed studies highlight persistent challenges, including infrastructural disparities between urban and rural pesantren, uneven digital competence among senior teaching staff, and the risk that excessive reliance on digital media could weaken the affective bond between *santri* and kiai that has historically underpinned moral formation. Strategic responses to these challenges have included structured institutional planning aimed explicitly at anticipating the disruptive pressures of Society 5.0 (Kholili, 2021) and adaptive educational strategies designed to address broader social challenges introduced by digitalization (Kholifah, 2022). These findings collectively answer the first research question: pesantren pedagogical culture transforms not through substitution but through a process of selective,

intentionality driven hybridization, in which digital tools are absorbed into rather than superimposed upon the existing structure of Islamic pedagogical transmission.

Kiai Leadership as the Mediating Mechanism of Cultural Transformation

The second major finding addresses the study's second research question by demonstrating that the trajectory and sustainability of pesantren digital transformation are substantially determined by the character of kiai leadership. Across the reviewed literature, kiai leadership consistently emerges not merely as an administrative function but as the interpretive authority that translates external technological pressures into forms congruent with pesantren's value system.

Evidence from the leadership of KH. Ahmad Musthofa Kamal at Pesantren Bidayatul Hidayah illustrates how charismatic leadership can be deployed strategically to guide institutional development, including the introduction of modern educational infrastructure, while maintaining the pesantren's religious legitimacy and communal cohesion (Thoyib, 2018). This pattern is reinforced by studies on kiai leadership during periods of institutional disruption, which show that effective kiai leadership functions as a stabilizing force that reduces resistance to change among *santri*, alumni, and local communities by framing technological adoption as a continuation of, rather than a departure from, the pesantren's founding mission (Ayubbi, 2024).

The mediating role of kiai leadership becomes especially evident in cases where local wisdom is explicitly integrated into governance models. The empirical model of educational transformation observed through the integration of Mangenta local wisdom into pesantren leadership demonstrates that digital and managerial modernization can be successfully embedded within indigenous cultural frameworks, thereby reducing the perceived cultural dissonance that might otherwise accompany rapid institutional change (Ahmadi et al., 2026). Similarly, kiai leadership models grounded in local wisdom have been shown to function not only as an instrument of institutional transformation but also as a preventive mechanism against ideological radicalization, positioning pesantren as adaptive rather than insular institutions within the broader currents of global educational change (Ma'arif et al., 2026).

This mediating function extends into the domain of institutional governance and financial management. The synergy between local wisdom values and Shariah-based management practices has been identified as a key pillar supporting the sustainability of pesantren in the digital era, alongside adaptive kiai leadership, digitalized entrepreneurial finance, and hybrid curricula that preserve the *sanad* of religious knowledge transmission (Zuchroh et al., 2026). Comparable findings emerge from the study of visionary kiai leadership in managing pesantren amid digital transformation, which demonstrates that a kiai's capacity to balance technological innovation with the preservation of communal and spiritual

identity is a decisive factor in determining whether digital adoption strengthens or erodes institutional legitimacy (Ma'shum & Muhyi, 2025).

Theoretically, this finding can be interpreted through the lens of transformational leadership, in which the kiai does not merely authorize technological change but actively constructs its meaning for the pesantren community reframing digital literacy training, hybrid curricula, or online administrative systems as extensions of religious duty (*amanah*) rather than external impositions. This interpretive labor performed by kiai leadership functions as a cultural translation mechanism: it converts the abstract, globally circulating discourse of digital disruption into locally legible, religiously legitimate institutional practice. Without this mediating function, digital adoption risks being perceived by *santri*, teachers, or local communities as a threat to religious authenticity, potentially provoking resistance or superficial compliance rather than genuine institutional transformation.

Synthesis: Selective Adaptation as a Dialectical Process of Identity Preservation

Integrating the two findings above, this study proposes that pesantren transformation in the face of digital disruption is best understood not as a linear shift from "traditional" to "modern," but as a dialectical process in which pedagogical hybridization and leadership mediation operate in tandem to preserve institutional identity under conditions of external pressure. Pedagogical adaptation provides the operational mechanism through which digital tools are incorporated into daily learning practice, while kiai leadership provides the interpretive and legitimating framework that renders this incorporation religiously and culturally acceptable to the pesantren community.

This dual mechanism helps explain a pattern consistently observed across the reviewed studies: pesantren that successfully navigate digital disruption tend to exhibit both technically competent hybrid pedagogy and strong, value congruent leadership, whereas pesantren experiencing more visible institutional strain tend to exhibit a deficiency in one of these two dimensions either technologically underdeveloped pedagogy despite strong leadership, or technologically sophisticated infrastructure without adequate interpretive mediation by institutional leadership. This observation reinforces the argument that digital transformation in pesantren cannot be reduced to a matter of infrastructure or technical capacity alone; it is fundamentally a question of institutional meaning-making, in which leadership plays an indispensable role in aligning technological change with the pesantren's core religious and cultural mission.

These findings directly answer the study's two research questions. First, pesantren pedagogical culture transforms through selective, intentionality driven hybridization rather than substitution, absorbing digital tools into the existing logic of *sorogan-bandongan* transmission. Second, kiai leadership functions as the decisive mediating mechanism that determines whether this hybridization is experienced by the pesantren community as a legitimate extension of tradition or as a disruptive rupture from it. Together, these

mechanisms constitute what this study terms "selective adaptation" a process through which traditional religious institutions negotiate modernity by strategically absorbing external innovations while actively reconstructing their meaning to align with pre-existing value systems, thereby preserving institutional authenticity even as operational practices evolve substantially.

IV. CONCLUSION

This study set out to analyze how the pedagogical culture of traditional pesantren transforms into a modern form amid digital cultural disruption, and to identify the mechanisms that enable this transformation without eroding the substantive values of Islamic education. Through a systematic review of Sinta and Scopus indexed literature, the study finds that pesantren transformation is best characterized as a process of selective adaptation, in which digital technology is hybridized with, rather than substituted for, classical pedagogical methods such as *sorogan* and *bandongan*. This hybridization is not automatic; it is actively shaped and legitimated by transformational kiai leadership, which functions as the interpretive bridge that translates external technological pressures into locally meaningful and religiously congruent institutional practice.

These findings carry both theoretical and practical implications. Theoretically, the study contributes to the broader discourse on Islamic educational transformation by proposing selective adaptation as an analytical framework for understanding how traditional religious institutions negotiate modernity while preserving epistemic authenticity, extending existing applications of TPACK and digital competence frameworks into the specific institutional context of pesantren. Practically, the findings suggest that policies aimed at accelerating digital literacy in pesantren should not be designed as purely technical interventions; they must be accompanied by deliberate engagement with kiai leadership structures to ensure that technological adoption is interpreted by the pesantren community as consistent with, rather than threatening to, institutional identity.

This study is limited by its reliance on secondary literature rather than direct field observation, which constrains its capacity to capture the situated, everyday negotiations through which *santri*, *ustadz*, and kiai make sense of digital tools in practice. Future research employing ethnographic or comparative case study

methods across pesantren of varying size, orientation (*salafiyah* versus *khalafiyah*), and geographic location would provide a more granular understanding of how selective adaptation unfolds under differing institutional conditions, and would help determine the boundary conditions under which digital transformation strengthens, rather than destabilizes, pesantren's distinctive educational identity.

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