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Managing Digital Adaptation in Islamic Education While Preserving Aswaja Values

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Abstract: Traditional Islamic educational institutions face the challenge of adapting to digital technology without compromising their religious and cultural identity. This study examines how Pondok Pesantren Darul Qur'an in Medan, Indonesia, manages digital integration while preserving Ahlussunnah wal Jama'ah (Aswaja) values. Employing a descriptive qualitative case study approach, data were collected through passive observation, semi-structured interviews with key stakeholders (head of madrasah, teachers, administrative staff), and document analysis. The findings reveal three main strategies: (1) a "Guided Innovation" model integrating technology as an ideological filter, combining strict digital access control with classical Islamic literacy to maintain Aswaja principles; (2) preservation of the ta'dzim (respect) culture through hybrid-traditional learning methods, though students exhibited behavioral shifts when outside the pesantren environment, indicating the need for deeper internalization of digital ethics; and (3) structured administrative policies, including Standard Operating Procedures, digital skills training, and equitable access programs, effectively bridged the digital literacy gap among students from diverse geographical backgrounds. This study contributes to understanding how traditional Islamic institutions can undergo digital transformation while maintaining their spiritual identity through visionary leadership, systematic management, and value-based adaptation. The findings offer practical insights for Islamic educational institutions navigating the tension between modernization and tradition.

Keywords: Digital Era, Digital Literacy, Islamic Boarding School Management

A. Introduction

For traditional religious institutions worldwide, the digital transformation of education presents a profound paradox between embracing technological innovation and preserving the foundational values that define their identity (Fischer & Dobbins, 2024; Singun, 2025). Islamic boarding schools, known as pesantren, in Indonesia represent the world's oldest surviving Islamic educational institutions and exemplify this tension acutely. For centuries, these institutions have preserved Islamic orthodoxy through classical pedagogical methods centered on kitab kuning (classical texts), face-

to-face talaqqi (teacher to student transmission), and the cultivation of ta'dzim (profound respect for teachers), with a long history of shaping the Islamic character of society through traditional education systems. Yet the rapid proliferation of digital technologies, accelerated by the imperatives of Education 4.0 and Society 5.0, now compels these institutions to reconsider their pedagogical and administrative paradigms, requiring adaptation in terms of legality, quality of learning, openness of information, and the provision of modern facilities and infrastructure. This challenge is not merely technical but deeply cultural and spiritual: how can pesantren integrate computers, internet access, and social media into their systems while preserving the Ahlussunnah wal Jama'ah (Aswaja) values that constitute their ideological bedrock?

The development of technology profoundly influences student behaviour, making digital adoption a necessity for Islamic boarding schools. Millennial students encounter internet technology as a double-edged sword; it can become damaging worldly entertainment if not managed wisely, yet it can be utilized effectively for learning, business, and religious propagation (dakwah). The concept of Education 4.0, which positions digital technology at the core of learning strategies, emphasizes that education in the digital era must undergo comprehensive transformation, extending beyond mere technical adaptation (Bonfield et al., 2020; Singun, 2025). In this context, Islamic educational institutions must design curricula that not only focus on religious values but also equip students with digital skills, critical thinking abilities, and adaptability to changing times. The integration of technology in pesantren is not merely a technical issue of learning but also involves questions of values, culture, and character formation.

Students are required not only to be technologically proficient but also to possess digital literacy grounded in Islamic values such as responsibility, discipline, honesty, and proper etiquette in utilizing technology. Contemporary scholarship on religious education and digital transformation has proliferated globally, with studies examining how faith-based schools navigate the integration of technology while maintaining spiritual and ethical commitments (Marshall, 2025). In the Islamic context, researchers have explored the concept of Islamic digital ethics as a framework for reconciling technological utility with religious principles, the reconstruction of Islamic pedagogy for the artificial intelligence era, and the negotiation between digital integration and the preservation of traditional pesantren values.

Within Indonesia, several studies have examined pesantren management in the digital era (Suresman et al., 2025). Hasmiza and Ali Muhtarom, in their article "Kiai and the Development of Pesantren Curriculum in the Era of Digitalization," found that the pesantren curriculum has kept pace with changing times, with kiai facing distinct challenges in formulating policies for students regarding the use of digital media. Similarly, Muid, Arifin, and Karim explored the opportunities and challenges of pesantren education in the digital era through a case study at Pondok Pesantren Al-Islah Bungah Gresik, revealing that the institution has made concerted efforts toward

digitalization to face the Industry 4.0 and Society 5.0 eras, including training students in digital literacy through computer laboratories with internet access. These studies collectively demonstrate that digital transformation in Islamic education is neither inherently threatening nor uniformly beneficial; its outcomes depend critically on how institutions manage the integration process.

Despite this growing body of literature, significant research gaps remain (Enholm et al., 2022; Merone et al., 2022; Odoms-Young et al., 2024). First, most existing research focuses on either the technical aspects of technology adoption or the theological dimensions of value preservation, but few studies examine the managerial and institutional strategies that enable traditional pesantren to systematically navigate digital adaptation while maintaining ideological coherence. There is a notable lack of research analyzing the dynamics of traditional Islamic education comprehensively in the digital era, particularly regarding the implementation of digitalization in preserving local values such as Aswaja within pesantren. Second, although several case studies have documented individual pesantren experiences, there is a scarcity of research exploring how the digitalization of pesantren education in the Society 5.0 era presents both opportunities and challenges across different institutional contexts in Indonesia.

Third, the critical issue of how variations in students' digital skills affect learning effectiveness, autonomy in education, and opportunities for innovation, and the administrative policies required to address this disparity, remains underexplored (Chiu et al., 2024; Ndibalema, 2025; Okada et al., 2025). Most significantly, while existing studies have discussed the role of kiai and the development of pesantren curricula in the digital era, as well as the opportunities and challenges of pesantren education in the digital era at specific institutions, no research to date has specifically examined the management of digital adaptation at Pondok Pesantren Darul Qur'an Medan, North Sumatra, an institution that represents a distinctive case of proactive digital implementation while maintaining steadfast commitment to Aswaja orthodoxy. To address these gaps, this study investigates the digital adaptation strategies of Pondok Pesantren Darul Qur'an in Medan, North Sumatra, an institution that has attempted to implement various modern technologies, including computers, the internet, and social media, in both the learning process and administrative management, aiming to improve educational quality and expand access to information beyond traditional teaching methods.

The research is guided by three specific questions. First, how does the pesantren manage the integration of digital technology to instill and preserve Aswaja principles among students amidst exposure to unmonitored global content? Second, to what extent does technology use affect student-teacher relationships, patterns of face-to-face interaction, and the cultivation of *ta'dzim* culture, specifically examining whether students rely more heavily on online content than direct interaction with *mu'allim* and *mu'allimah*, and what impact this has on character development, obedience, and depth

of understanding? Third, how do variations in students' digital skills affect learning effectiveness, and what administrative policies or guidelines has the institution implemented to address the digital skills gap to ensure every student can benefit from digital technology? By examining these questions through a descriptive qualitative case study approach, this research contributes to the broader discourse on how traditional religious institutions can undergo digital transformation without losing their spiritual identity, offering practical insights for Islamic educational institutions worldwide navigating the tension between modernization and tradition.

B. Methods

The research adopts a descriptive qualitative approach with a single embedded case study design, a methodological choice specifically selected to address the complex, real-life phenomenon of digital adaptation within a traditional Islamic educational framework. This design is particularly appropriate, as it facilitates an in-depth, holistic examination of how and why Pondok Pesantren Darul Qur'an integrates technological innovations while simultaneously safeguarding its Ahlussunnah wal Jama'ah (Aswaja) ideological foundations. By focusing on a bounded system defined by specific institutional boundaries and temporal parameters, the case study allows for the emergence of rich, contextualized patterns that quantitative approaches might overlook, thereby aligning directly with the exploratory nature of the research objectives concerning institutional identity preservation amid modernization pressures.

The research was deliberately situated at MA Pondok Pesantren Darul Qur'an, located at Jl. Dusun 1, Desa Amplas, Kecamatan Percut Sei Tuan, Kabupaten Deli Serdang, North Sumatra. This location was selected through purposive consideration due to its distinctive characteristics as a traditional pesantren that has proactively initiated digital transformation while maintaining a staunch commitment to Aswaja orthodoxy. Furthermore, its geographical position in North Sumatra offers a representative microcosm of the challenges faced by Islamic boarding schools in Indonesia's outer islands, where infrastructural constraints often intersect with strong cultural conservatism. This setting provides a critical case for examining the tension between technological modernization and the preservation of spiritual-cultural identity, making it an ideal site for generating transferable insights applicable to similar institutions across the archipelago (Tsiouvalas & Evans, 2023).

To ensure the collection of comprehensive and multi-faceted data, participants were determined using a purposive sampling technique, intentionally selecting informants who possess the positional authority, experiential knowledge, and operational familiarity necessary to illuminate the research phenomenon from diverse vantage points. The primary key informant was the Head of Madrasah, whose strategic role encompasses policy formulation, visionary leadership, and overarching decision-making regarding institutional digital roadmaps and value preservation frameworks.

Complementing this strategic perspective, subject teachers (referred to locally as mu'allim and mu'allimah) were selected across various disciplines to provide grounded insights into the daily pedagogical implementation of digital tools, classroom management, and the practical instillation of ta'dzim (respect) culture.

Additionally, administrative staff were incorporated to contribute operational knowledge regarding Standard Operating Procedures, infrastructure maintenance, access control systems, and the bureaucratic scaffolding that supports digital integration, ensuring that the data captured strategic, instructional, and administrative layers of the institution. Data collection was executed through three complementary and triangulated techniques, each designed to capture distinct dimensions of the pesantren's adaptation processes. The first technique involved passive observation, wherein the researcher immersed themselves in the natural setting without intervening in ongoing activities, systematically documenting both digital and non-digital routines within the pesantren environment.

Observations focused on the actual utilization of hardware and software during learning sessions, the behavioral manifestations of respect in teacher-student digital interactions, the enforcement of access control mechanisms, and the physical infrastructure supporting connectivity, with detailed field notes maintained chronologically to record both descriptive events and reflective analytical memos. The second technique comprised semi-structured interviews conducted with all categories of informants, utilizing thematic interview guides that were flexibly adapted to each participant's role while ensuring systematic coverage of core themes such as institutional policies, classroom practices, observed behavioral shifts among students, and the challenges encountered during implementation; each interview session lasted between 45 to 90 minutes, was conducted in Bahasa Indonesia to facilitate natural discourse, and was audio-recorded with explicit consent before being transcribed verbatim for rigorous analysis.

The third technique entailed a comprehensive documentation study, which systematically reviewed institutional archives including the official madrasah profile, organizational hierarchy charts, codified pesantren regulations on digital access, Standard Operating Procedures for technology usage, curriculum documents, and records of staff training sessions, thereby providing a documentary trail that corroborated and contextualized the observational and interview data. For the analytical phase, all empirical data were processed using the interactive model advanced by Miles and Huberman, which consists of three concurrent and interrelated flows of activity: data reduction, data presentation, and conclusion drawing with verification (Fitriyah et al., 2026). Data reduction involved the systematic coding of interview transcripts, field notes, and document excerpts, employing a hybrid approach that combined deductive codes derived from the theoretical framework, such as "guided innovation," "digital ethics," and "access control", with inductive codes that emerged organically from the raw data,

subsequently organizing these codes into thematic clusters addressing the research questions.

Data presentation followed through the construction of organized matrices and narrative syntheses that displayed relationships between themes and enabled holistic pattern recognition across informant categories, while the third stream involved continuous iterative interpretation to formulate substantive conclusions, with verification performed persistently by revisiting raw data to confirm emergent meanings and by cross-referencing findings against different data sources. To ensure the trustworthiness and credibility of the findings, the study rigorously employed both method triangulation and source triangulation (Ahmed, 2024). Method triangulation was achieved by cross-verifying evidence obtained from observations, interviews, and document analysis, ensuring that patterns identified in one dataset were consistently supported or nuanced by others, thereby minimizing method-bound biases. Source triangulation was accomplished by systematically juxtaposing and comparing accounts across the Head of Madrasah, teachers, and administrative staff, enabling the researcher to detect convergent and divergent perspectives that enriched interpretive depth.

Additional validity measures included member checking, wherein preliminary findings and interpretations were presented back to key informants for validation and clarification, as well as the maintenance of a comprehensive audit trail documenting all research decisions, analytical procedures, and coding frameworks to ensure transparency and replicability. Ethical protocols were strictly observed throughout the study, with formal institutional permission secured before fieldwork, informed consent obtained from every participant after full disclosure of research purposes, and guarantees of anonymity and confidentiality maintained in all reporting to protect individual and institutional identities.

C. Results and Discussion

1. Result

Digital Technology Integration Strategy for Upholding Aswaja Principles

The findings show that Pondok Pesantren Darul Qur'an applies a selective digital integration strategy in which technology is treated as an educational and administrative instrument rather than as a force that replaces established pesantren traditions. All observed digital policies were directed toward maintaining Ahlussunnah wal Jama'ah (Aswaja) values (Kalsum et al., 2026). The Head of Madrasah, Nuraini Sinaga, S.Pd., summarized this orientation by stating, "We do not reject technology, but we must ensure that every digital tool we adopt serves to strengthen Islamic values, not weaken them. Technology is our servant, not our

master." In practice, modernization is accepted when its use has a clear academic or institutional purpose and remains subject to the pesantren's religious expectations.

This orientation is implemented through controlled access to digital facilities, especially the computer laboratory (Xu et al., 2020). Computer use is restricted to learning and academic administration, applications are limited to lesson-related purposes, and information technology staff monitor student activities (Almusharraf, 2020). CCTV is also used as part of the supervision mechanism. Inappropriate use can result in immediate termination of access and removal from the laboratory (Hill et al., 2022). The control system demonstrates that digital integration is managed through institutional procedures rather than left to individual student discretion (Eklund, 2025; Parker et al., 2025). The kyai and madrasah leadership determine the boundaries of technology adoption, while teachers and administrative staff implement these boundaries in daily educational routines.

Access is also differentiated according to students' educational needs (Goyibova et al., 2025; Lindner & Schwab, 2025; Strogilos et al., 2023). Computer laboratory use is prioritized for final-year Madrasah Aliyah students, particularly when they require digital facilities for examinations and academic preparation. Lower-grade students receive greater emphasis on tahfiz Al-Qur'an and mastery of basic religious sciences before broader digital exposure is introduced. This tiered practice shows that the pesantren does not regard digitalization as a uniform requirement for every student at every stage. Instead, access is calibrated according to academic maturity, learning objectives, and the institution's priority of strengthening religious foundations before expanding technological use (Suwono & Prasetyo, 2026).

The preservation of Aswaja values is further reinforced through classical Islamic literacy. Mu'allimah Irma Suryani, S.Pd., Gr., explained that students are not only restricted in internet use but are also equipped with knowledge from scholars' works so that they can assess information encountered online. She described classical texts as a "fortress" that helps students distinguish information consistent with Ahlussunnah wal Jama'ah teachings from information considered misleading. This approach combines external regulation with internal intellectual preparation (Ghasemi et al., 2024; Li et al., 2024). The institution therefore does not rely exclusively on blocking access; it also attempts to build a knowledge base that students can use to interpret digital content critically.

Classroom observation showed a similar pattern of selective use. Teachers employ projectors and visual media to explain abstract material, including concepts of creed and the chain of knowledge, but classical texts continue to function as the primary learning source. Mu'allim Iswandi Batubara, S.Ag., described multimedia as a tool that makes explanation more accessible without replacing direct teacher guidance. The traditions of talaqqi, bandongan, and classical text study therefore remain central to knowledge transmission. Digital media are used to improve visualization,

attention, and comprehension, while the teacher continues to determine the meaning, context, and religious interpretation of the material presented.

Impact of Digital Media on Interaction Patterns and Ta'dzim Culture

The findings indicate that digital technology has not displaced the culture of ta'dzim within the pesantren environment. Observation showed that students continued to greet teachers respectfully, kiss teachers' hands, use polite language, obey instructions, and comply with institutional rules. These practices were visible during learning activities and daily interactions. The scheduling of computer laboratory use and restrictions on personal digital devices reduce uncontrolled exposure to digital media during learning and residential activities. Technology is therefore positioned as a supporting tool, while adab and direct interpersonal guidance remain central to the educational environment.

The maintenance of ta'dzim is also reflected in students' continued recognition of mu'allim and mu'allimah as primary sources of religious knowledge. Students were observed asking teachers directly when clarification was needed rather than treating online information as an equal substitute for teacher explanation. Personal gadgets are not freely used in classrooms, and projectors are operated as teacher-directed media. Consequently, digital tools change the mode of presentation more than the authority structure of learning. The continuity of talaqqi and the chain of knowledge remains visible because interpretation, correction, and value transmission are still conducted through direct interaction.

A different pattern emerged when students were outside pesantren supervision. The Head of Madrasah reported that during holidays some students showed behavioral changes, including greater interest in digital devices, more intensive social media use, and reduced interaction with parents. She also noted cases of students posting photographs on social media that did not reflect the dress expectations practiced within the pesantren. These observations indicate that behavior maintained under institutional monitoring is not always reproduced consistently in less regulated settings. The contrast reveals a practical limitation of supervision: rules are effective within the institutional space, but students encounter different norms when they return to broader social and digital environments (Tsao, 2025).

The findings also show that students increasingly view digital devices as both learning tools and sources of entertainment when they are outside the pesantren. This change has not eliminated respect for teachers, but it introduces competing habits and sources of attention. Inside the pesantren, the structured schedule, direct guidance, and restricted access reinforce behavioral consistency. Outside the pesantren, students must rely more heavily on personal judgment. The resulting gap between supervised and unsupervised behavior suggests that the preservation of ta'dzim depends not

only on the strength of institutional rules but also on the extent to which students internalize those values as personal principles.

Digital media nevertheless produced positive changes in classroom engagement. Students showed greater enthusiasm when teachers used short educational videos or projectors compared with conventional explanation alone. Mu'allimah Irma Suryani, S.Pd., Gr., explained that short videos can create a new learning atmosphere and help restore attention when students are tired. She also emphasized that respect toward teachers remains present even when digital media are not used. This finding suggests that technology can enhance pedagogical variety without weakening interpersonal relationships. Teacher creativity, direct communication, and classroom guidance continue to determine how effectively digital media contribute to learning (Burbules et al., 2020).

Administrative Policies and the Digital Literacy Gap

The study found clear variation in students' digital skills. Students from urban backgrounds or those who had previously studied at Madrasah Tsanawiyah Darul Qur'an generally possessed basic computer skills, while several students from rural areas required assistance in operating digital devices. The Head of Madrasah explained that some students still needed gradual guidance in basic tasks such as using a mouse and keyboard. The differences were understood as the result of previous educational experience, social background, and familiarity with technology rather than differences in intelligence. This distinction is important because it shaped the type of support provided by teachers (Colognesi et al., 2020).

Teachers respond to these differences through individual guidance. Students who are less familiar with computers receive assistance during laboratory activities so that they can complete the same academic tasks as their peers. The aim is not merely to provide equal access to equipment but to ensure that students can use the available technology effectively. Mu'allimah Irma Suryani, S.Pd., Gr., emphasized that every student is given the same opportunity to learn technology according to their ability level. This differentiated support prevents students with weaker prior exposure from being excluded from technology-supported learning.

Administrative management supports this process through Standard Operating Procedures, laboratory schedules, restrictions on personal gadget use, and internet access management. Administrative staff member Juliana Jumarisari, S.E., explained that Wi-Fi is turned off every evening after learning activities and reactivated before classes begin. The schedule limits non-academic use while ensuring that connectivity is available when needed for instruction and administration. These procedures create clear boundaries regarding when, where, and for what purposes technology may be used. They also reduce dependence on informal individual decisions because expectations are embedded in institutional routines (Constantino et al., 2021).

Beyond supervision, the pesantren implements activities intended to strengthen digital competence. The Digital Skills Enhancement Program provides basic digital literacy training and individual mentoring, while the "Healthy Innovation" program directs internet use toward educational purposes, Islamic studies, and academic administration. The combination of access control and skill development is significant because students are not simply prohibited from using technology; they are taught how to use it within accepted institutional purposes (Walter, 2024). This approach also allows the pesantren to respond to students who enter with different levels of prior experience.

Overall, the administrative response to the digital literacy gap combines infrastructure, regulation, and differentiated assistance. Computer facilities address access, scheduled use and Wi-Fi controls regulate behavior, and mentoring addresses differences in competence. The findings therefore show that digital adaptation at Darul Qur'an is managed as a gradual educational process rather than a one-time technology provision project. Technological competence is developed alongside discipline, religious routines, and institutional expectations, enabling students from different backgrounds to participate in digital learning without separating technology use from the pesantren's broader character-formation goals.

2. Discussion

The findings indicate that digital adaptation at Darul Qur'an is best understood as selective and value-governed adoption rather than unrestricted technological transformation. This pattern is consistent with the broader concern in Islamic education that technology can support learning, communication, and dakwah while also exposing students to content and habits that may conflict with religious formation. It also supports the argument that Education 4.0 in Islamic institutions requires more than providing devices; curriculum, values, critical thinking, and institutional management must develop together. In the Darul Qur'an case, technology is accepted when it has a clear pedagogical or administrative function and is restricted when its use may interfere with the pesantren's formative aims. This pattern helps explain why modernization does not appear as a total institutional shift but as a controlled process embedded in existing educational traditions.

From the perspective of Innovation Diffusion Theory, the institution does not adopt innovation simply because it is available or widely used elsewhere (Oke & Fernandes, 2020). Compatibility with Aswaja values, established learning routines, and teacher authority acts as a decisive filter. The "Guided Innovation" model identified in this study therefore represents a form of selective diffusion: new technology is incorporated into existing structures without requiring the institution to abandon talaqqi, bandongan, classical text study, or the central role of the kyai and teachers. This interpretation extends earlier studies of pesantren digitalization that emphasize curriculum adaptation and the role of kiai in responding to technological change. It

also complements research at Pondok Pesantren Al-Islah Bungah Gresik, where digital literacy was supported through computer laboratories and internet access. Darul Qur'an adds a more explicit ideological and managerial layer by combining access, supervision, classical literacy, and differentiated permission according to students' educational stage.

The findings concerning ta'dzim demonstrate that digital media do not automatically weaken teacher authority. Within the pesantren, respectful interaction remains stable because technology is embedded within a strong organizational culture and mediated by direct teacher guidance. This supports the view that digital transformation in religious education is fundamentally cultural and ethical rather than merely technical. The use of projectors and short videos increased student engagement, but learning authority continued to rest with mu'allim and mu'allimah. In this respect, digital media functioned as pedagogical amplification rather than pedagogical replacement. The pesantren's model therefore shows that teacher-centered religious transmission and selected digital tools can coexist when the boundaries of technology use are institutionally clear. Technology changes how certain content is displayed, but it does not necessarily change who is trusted to interpret religious knowledge (Berger & Golan, 2024).

At the same time, the behavioral differences observed during holidays complicate an overly optimistic interpretation of institutional control. The students' conduct outside the pesantren suggests that compliance under supervision is not identical to value internalization. The concept of Islamic digital ethics is particularly relevant because students need responsibility, discipline, honesty, and appropriate conduct when institutional monitoring is absent. The gap between behavior inside and outside the pesantren indicates that external restrictions can successfully shape routine behavior but may not be sufficient to produce autonomous ethical judgment. This is one of the study's most important analytical findings. Preserving ta'dzim in the digital era requires the movement from control toward internalization: students need opportunities to understand why particular digital behaviors are acceptable or unacceptable and to practice value-consistent decision-making even when teachers and institutional rules are not immediately present.

The digital literacy findings further demonstrate that the digital divide is not limited to physical access. Students who share the same computer laboratory can still differ substantially in their ability to use technology because of previous schooling, social background, and living environment. This is consistent with digital divide literature that distinguishes access from the quality or competence of technology use. Darul Qur'an responds by combining infrastructure with individual mentoring, basic skills training, and scheduled access. This is significant because facility provision alone could reproduce inequality if students with stronger previous experience benefit more quickly than those encountering computers for the first time. Differentiated mentoring

reduces that risk by converting equal access into a more meaningful opportunity to develop competence (Robertson et al., 2020).

The administrative system therefore performs both a controlling and developmental function. Rules determine when and how technology may be used, while mentoring and training ensure that restrictions do not prevent students from acquiring necessary digital competencies. The Wi-Fi schedule, laboratory procedures, and gadget restrictions create predictable boundaries, whereas the Digital Skills Enhancement Program and Healthy Innovation activities build students' capacity within those boundaries. This pattern is consistent with the management principle that control involves monitoring implementation and correcting deviations so activities remain aligned with organizational goals. However, the Darul Qur'an case shows that educational control is more effective when it is paired with capability development. The institution does not merely prevent inappropriate use; it also creates structured opportunities for appropriate use (Sutherland et al., 2020).

This managerial pattern clarifies how strategic leadership directives become operational practices (Tan et al., 2022)e. Earlier research has highlighted the role of kiai in determining the direction of pesantren curriculum and digital policy. The present study shows the next institutional layer: strategic direction is translated into Standard Operating Procedures, Wi-Fi schedules, laboratory monitoring, teacher guidance, differentiated access, and individual digital skills support. Compared with Muid et al., who emphasized the provision of computer laboratories and digital literacy opportunities, the present findings reveal a broader management system in which infrastructure is only one component. The distinctive contribution lies in the integration of ideological filtering, pedagogical continuity, administrative regulation, and equity-oriented support. These elements operate together rather than as separate programs.

The case also highlights the importance of distributed implementation within pesantren leadership. The kyai establishes the strategic boundaries of acceptable technological change, but the sustainability of those decisions depends on the head of madrasah, teachers, and administrative staff translating them into classroom routines and operational controls. This shared implementation helps explain why digital policy is visible not only in formal regulations but also in daily practices such as teacher-directed multimedia use, individual mentoring, and scheduled connectivity. In this sense, value preservation is organizational rather than solely personal: Aswaja identity is maintained because different institutional actors perform complementary roles. The finding strengthens the managerial interpretation of pesantren digitalization by showing that visionary leadership becomes effective only when it is supported by procedures, staff competence, and consistent pedagogical practice.

The findings also refine the assumption that successful digital transformation should be measured by the quantity or intensity of technology adoption. At Darul Qur'an,

extensive unrestricted access would be inconsistent with the institution's educational philosophy. Success is instead defined by whether technology improves learning or administration while preserving Aswaja values, teacher authority, and religious routines. This creates a different criterion for digital maturity from that used in settings where maximum access is treated as inherently desirable. For a traditional pesantren, a selective model may represent a deliberate form of institutional competence rather than technological resistance. The institution's ability to decide what to adopt, what to restrict, and when to introduce particular tools is itself part of digital governance (Tan et al., 2022).

Taken together, the three themes show that the central issue in pesantren digital transformation is not whether technology should be accepted or rejected, but how it should be governed. The study's contribution lies in connecting value preservation, pedagogical interaction, and digital equity within one managerial framework. Previous studies have often emphasized curriculum change, technology opportunities, or laboratory provision separately. The Darul Qur'an case demonstrates that these dimensions are interdependent. Selective access protects institutional values, teacher-guided learning maintains ta'dzim, and differentiated support reduces digital skill disparities. The resulting "Guided Innovation" framework therefore describes digital adaptation as a gradual, supervised, and value-based institutional process in which modernization is judged by its compatibility with the pesantren's educational mission rather than by the quantity of technology adopted.

D. Conclusions

This study concludes that Pondok Pesantren Darul Qur'an manages digital adaptation through a value-based model that enables technological modernization without weakening its Aswaja identity. Three findings answer the research questions. First, digital integration is implemented through guided innovation, in which computer laboratories, internet access, multimedia, and administrative technologies are selectively used under institutional supervision while classical texts, talaqqi, and teacher authority remain central. Second, digital media have not displaced the culture of ta'dzim within the pesantren because access restrictions, direct guidance, and established religious routines continue to shape student behavior. However, behavioral changes observed during holidays indicate that institutional control alone is insufficient and that digital ethics must be internalized more deeply so students can maintain respectful conduct beyond supervised settings. Third, structured administrative policies, including Standard Operating Procedures, scheduled access, digital skills training, individual mentoring, and equitable facility provision, help reduce differences in students' digital literacy and ensure that technology supports academic purposes. Practically, the findings suggest that Islamic educational institutions should treat digital transformation as a managed cultural process rather than simply an infrastructure project. Leaders need to combine clear rules, teacher mentoring, differentiated digital support, and continuous reinforcement of religious values so that technological competence develops alongside moral responsibility. The Guided Innovation model offers a practical framework for pesantren seeking to

modernize gradually while retaining institutional identity and teacher-centered traditions. Nevertheless, this study is limited to a single institutional case and captures practices within a restricted observation period, so the findings should not be generalized to all pesantren. Future research should examine multiple pesantren with different organizational cultures, locations, and levels of technological readiness. Longitudinal studies are also recommended to assess whether digital ethics, ta'dzim, and responsible technology use remain stable after students leave intensive pesantren supervision and enter broader social environments independently over an extended period.

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References

Ahmed, S. K. (2024). The pillars of trustworthiness in qualitative research. *Journal of Medicine, Surgery, and Public Health*, *2*(January), 100051. https://doi.org/10.1016/j.glmedi.2024.100051

Almusharraf, N. (2020). Teachers' perspectives on promoting learner autonomy for vocabulary development: A case study. *Cogent Education*, *7*(1). https://doi.org/10.1080/2331186X.2020.1823154

Berger, A., & Golan, O. (2024). Online religious learning: digital epistemic authority and self-socialization in religious communities. *Learning, Media and Technology*, *49*(2), 274–289. https://doi.org/10.1080/17439884.2023.2169833

Bonfield, C. A., Salter, M., Longmuir, A., Benson, M., & Adachi, C. (2020). Transformation or evolution?: Education 4.0, teaching and learning in the digital age. *Higher Education Pedagogies*, *5*(1), 223–246. https://doi.org/10.1080/23752696.2020.1816847

Burbules, N. C., Fan, G., & Repp, P. (2020). Five trends of education and technology in a sustainable future. *Geography and Sustainability*, *1*(2), 93–97. https://doi.org/10.1016/j.geosus.2020.05.001

Chiu, T. K. F., Falloon, G., Song, Y., Wong, V. W. L., Zhao, L., & Ismailov, M. (2024). A self-determination theory approach to teacher digital competence development. *Computers and Education*, *214*(August 2023), 105017. https://doi.org/10.1016/j.compedu.2024.105017

Colognesi, S., Van Nieuwenhoven, C., & Beausaert, S. (2020). Supporting newly-qualified teachers' professional development and perseverance in secondary education: On the role of informal learning. *European Journal of Teacher Education*,

43(2), 258–276. https://doi.org/10.1080/02619768.2019.1681963

Constantino, S. M., Schlüter, M., Weber, E. U., & Wijermans, N. (2021). Cognition and behavior in context: a framework and theories to explain natural resource use decisions in social-ecological systems. *Sustainability Science*, *16*(5), 1651–1671. https://doi.org/10.1007/s11625-021-00989-w

Eklund, S. (2025). Organizing Digitalization in Schools: Exploring Teachers' Professional Discretion and Control in Local Networks. *Information Polity*, *30*(3), 218–232. https://doi.org/10.1177/15701255251364405

Enholm, I. M., Papagiannidis, E., Mikalef, P., & Krogstie, J. (2022). Artificial Intelligence and Business Value: a Literature Review. *Information Systems Frontiers*, *24*(5), 1709–1734. https://doi.org/10.1007/s10796-021-10186-w

Fischer, I., & Dobbins, K. (2024). Is it Worth it? How Paradoxical Tensions of Identity Shape the Readiness of Management Educators to Embrace Transformative Technologies in their Teaching. *Journal of Management Education*, *48*(4), 829–848. https://doi.org/10.1177/10525629231201843

Fitriyah, I. J., Saputro, S., Muqoyyidin, A. W., Erlangga, S. Y., & Aprilia, S. (2026). Supervisor support as a determinant of mental well-being and academic resilience among doctoral students: a qualitative study in Indonesian higher education. *Discover Psychology*, *6*(1). https://doi.org/10.1007/s44202-025-00563-w

Ghasemi, F., Beversdorf, D. Q., & Herman, K. C. (2024). Stress and stress responses: A narrative literature review from physiological mechanisms to intervention approaches. *Journal of Pacific Rim Psychology*, *18*. https://doi.org/10.1177/18344909241289222

Goyibova, N., Muslimov, N., Sabirova, G., Kadirova, N., & Samatova, B. (2025). Differentiation approach in education: Tailoring instruction for diverse learner needs. *MethodsX*, *14*(December 2024), 103163. https://doi.org/10.1016/j.mex.2025.103163

Hill, D., O'Connor, C. D., & Slane, A. (2022). Police use of facial recognition technology: The potential for engaging the public through co-constructed policy-making. *International Journal of Police Science and Management*, *24*(3), 325–335. https://doi.org/10.1177/14613557221089558

Kalsum, N. U., Abdullah, I., Suprianto, B., & Rachmadini, N. (2026). Digital transformation and co-existence of Malay culture in the new media era. *Cogent Arts and Humanities*, *13*(1). https://doi.org/10.1080/23311983.2025.2606864

Li, N., Geng, S., Dong, Z. Z., Jin, Y., Ying, H., Li, H. W., & Shi, L. (2024). A new era of cancer immunotherapy: combining revolutionary technologies for enhanced CAR-M therapy. *Molecular Cancer*, *23*(1), 1–20. https://doi.org/10.1186/s12943-024-02032-9

Lindner, K. T., & Schwab, S. (2025). Differentiation and individualisation in inclusive education: a systematic review and narrative synthesis. *International Journal of Inclusive Education*, *29*(12), 2199–2219. https://doi.org/10.1080/13603116.2020.1813450

Marshall, H. (2025). Integrating sustainability into religious education. *Journal of Beliefs*

and Values, *00*(00), 1–20. https://doi.org/10.1080/13617672.2025.2504983

Merone, L., Tsey, K., Russell, D., & Nagle, C. (2022). Sex Inequalities in Medical Research: A Systematic Scoping Review of the Literature. *Women's Health Reports*, *3*(1), 49–59. https://doi.org/10.1089/whr.2021.0083

Ndibalema, P. (2025). Digital literacy gaps in promoting 21st century skills among students in higher education institutions in Sub-Saharan Africa: a systematic review. *Cogent Education*, *12*(1). https://doi.org/10.1080/2331186X.2025.2452085

Odoms-Young, A., Brown, A. G. M., Agurs-Collins, T., & Glanz, K. (2024). Food Insecurity, Neighborhood Food Environment, and Health Disparities: State of the Science, Research Gaps and Opportunities. *American Journal of Clinical Nutrition*, *119*(3), 850–861. https://doi.org/10.1016/j.ajcnut.2023.12.019

Okada, A., Sherborne, T., Panselinas, G., & Kolionis, G. (2025). Fostering Transversal Skills Through Open Schooling Supported by the CARE-KNOW-DO Pedagogical Model and the UNESCO AI Competencies Framework. In *International Journal of Artificial Intelligence in Education* (Vol. 35, Number 4). Springer New York. https://doi.org/10.1007/s40593-025-00458-w

Oke, A., & Fernandes, F. A. P. (2020). Innovations in teaching and learning: Exploring the perceptions of the education sector on the 4th industrial revolution (4IR). *Journal of Open Innovation: Technology, Market, and Complexity*, *6*(2), 31. https://doi.org/10.3390/JOITMC6020031

Parker, L., Loper, A. J., Hayes, J., Karakas, A., White, S., & Hallman, H. (2025). Comparative analysis of artificial intelligence policies in universities across five countries. *Discover Computing*, *28*(1). https://doi.org/10.1007/s10791-025-09745-5

Robertson, D. A., Padesky, L. B., Ford-Connors, E., & Paratore, J. R. (2020). What Does It Mean to Say Coaching Is Relational? *Journal of Literacy Research*, *52*(1), 55–78. https://doi.org/10.1177/1086296X19896632

Singun, A. J. (2025). Unveiling the barriers to digital transformation in higher education institutions: a systematic literature review. In *Discover Education* (Vol. 4, Number 1). Springer International Publishing. https://doi.org/10.1007/s44217-025-00430-9

Strogilos, V., Lim, L., & Binte Mohamed Buhari, N. (2023). Differentiated instruction for students with SEN in mainstream classrooms: contextual features and types of curriculum modifications. *Asia Pacific Journal of Education*, *43*(3), 850–866. https://doi.org/10.1080/02188791.2021.1984873

Suresman, E., Faqihuddin, A., Jenuri, & Abdullah, M. (2025). From sorogan to digital learning: a systematic literature network analysis of pesantren learning models. *Cogent Education*, *12*(1). https://doi.org/10.1080/2331186X.2025.2580776

Sutherland, W., Jarrahi, M. H., Dunn, M., & Nelson, S. B. (2020). Work Precarity and Gig Literacies in Online Freelancing. *Work, Employment and Society*, *34*(3), 457–475. https://doi.org/10.1177/0950017019886511

Suwono, H., & Prasetyo, S. D. (2026). Enhancing teacher competencies through innovative professional development practices focusing on sustainable learning environments. *Discover Education*, *5*(1). https://doi.org/10.1007/s44217-026-

01451-8

Tan, E., Mahula, S., & Crompvoets, J. (2022). Blockchain governance in the public sector: A conceptual framework for public management. *Government Information Quarterly*, *39*(1), 101625. https://doi.org/10.1016/j.giq.2021.101625

Tsao, J. (2025). Trajectories of AI policy in higher education: Interpretations, discourses, and enactments of students and teachers. *Computers and Education: Artificial Intelligence*, *9*(May), 100496. https://doi.org/10.1016/j.caeai.2025.100496

Tsiouvalas, A., & Evans, J. (2023). From "Common Pools" to "Fish Pools": Shifting Property Institutions in Traditional Waters of Norway and Canada. *Ocean Development and International Law*, *54*(2), 135–162. https://doi.org/10.1080/00908320.2023.2200218

Walter, Y. (2024). Embracing the future of Artificial Intelligence in the classroom: the relevance of AI literacy, prompt engineering, and critical thinking in modern education. *International Journal of Educational Technology in Higher Education*, *21*(1). https://doi.org/10.1186/s41239-024-00448-3

Xu, B., Shen, J., Liu, S., Su, Q., & Zhang, J. (2020). Research and Development of Electro-hydraulic Control Valves Oriented to Industry 4.0: A Review. *Chinese Journal of Mechanical Engineering (English Edition)*, *33*(1). https://doi.org/10.1186/s10033-020-00446-2