Jurnal Sustainable

Volume 9 Number 2 2026, pp 1-12
E-ISSN: 2655-0695
DOI: https://doi.org/10.32923/2br4mg47

Digital Transformation in Islamic Religious Education: Opportunities, Challenges, and Strategic Solutions

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Abstract

The rapid advancement of digital technologies has fundamentally transformed educational practices, particularly in Islamic Religious Education (PAI), where technology integration must balance pedagogical innovation with moral and spiritual values. This study explores digital transformation in PAI learning by reviewing and synthesizing relevant scholarly literature published between 2020 and 2025. Drawing on peer-reviewed journal articles, conference proceedings, and academic publications sourced from Google Scholar and nationally accredited journals, the review focuses on themes of digital pedagogy, teacher competence, ethical considerations, and the application of the TPACK framework in value-based education. The synthesis highlights three key dimensions: (1) opportunities, where technology enhances learning accessibility, student engagement, and instructional personalization through interactive media and digital platforms; (2) challenges, including infrastructural limitations, varying levels of teacher digital competence, and ethical concerns regarding content authenticity and data privacy in religious contexts; and (3) strategic solutions, emphasizing continuous TPACK-based professional development, the creation of religiously aligned digital content, and supportive institutional policies. This review contributes a conceptual understanding of how digital transformation can be sustainably integrated into PAI, underscoring that successful implementation requires holistic alignment of technology, pedagogical competence, ethical governance, and systemic support. The findings offer practical recommendations for educators

Keywords: digital transformation, Islamic education, technology integration

History:
Received : 08 April 2026
Revised : 02 May 2026
Accepted : 12 May 2026
Published : 12 Mei 2026

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Publishers: LPM IAIN Syaikh Abdurrahman Siddik Bangka Belitung, Indonesia

Introduction

The transformation of education in the digital era represents a fundamental response to the rapid advancement of information and communication technology (ICT), which has permeated nearly all aspects of educational systems. This transformation requires a shift from conventional, teacher-centered approaches toward more adaptive and technology-integrated learning models that align with the demands of 21st-century education. Digital literacy, ICT-based learning, expanded access to education, and improved instructional quality through digital platforms have become central priorities (Baskoro et al., 2023; Juwita et al., 2025). Importantly, this transformation is not merely technical but also involves paradigm shifts, enhancement of teacher competencies, and the provision of adequate infrastructure (Adeline & Irwansyah, 2022; Hasrianti & Hidayati, 2023; Verawati et al., 2023).

ICT plays a crucial role as an enabler of educational transformation by functioning as a source of information, a learning system, and an infrastructure that supports online and distance learning environments. The adoption of technologies such as Learning Management Systems (LMS), video conferencing tools, and digital learning platforms has become essential in facilitating flexible and interactive learning experiences. Furthermore, e-learning has expanded educational access, reduced costs, and enabled personalized learning, although challenges related to internet

accessibility, device availability, and user readiness remain significant concerns (A'la & Makhshun, 2022; Misriani et al., 2022; Pondaag et al., 2021; Verawati et al., 2023).

Beyond basic ICT integration, emerging technologies such as artificial intelligence (AI), the Internet of Things (IoT), and virtual reality have further enriched the digital learning ecosystem. These technologies contribute to increased student engagement, personalized learning experiences, and enhanced instructional effectiveness. However, their implementation also raises critical issues related to ethics, data privacy, and digital literacy, which must be carefully addressed to ensure responsible and meaningful use in educational contexts (Kisno et al., 2023; Yazid et al., 2023; Yusuf et al., 2023).

From a policy perspective, digital transformation has become a strategic priority in many educational systems, including the integration of digital learning into curricula, institutional infrastructure, and national programs such as "Merdeka Belajar." These policies aim to strengthen digital literacy, promote online learning ecosystems, and provide technological infrastructure that supports sustainable educational innovation. Theoretically, frameworks such as digital literacy and technological determinism help explain how technology influences learning processes, while emphasizing that human factors—such as teacher readiness and organizational culture—remain decisive for successful implementation (Adeline & Irwansyah, 2022; Azizah & Subiyantoro, 2023; Mahardini et al., 2025).

Despite these opportunities, significant challenges persist in the implementation of digital transformation in education. Unequal access to technology, limited infrastructure, and disparities in internet connectivity continue to hinder the effectiveness of digital learning, particularly in remote or underdeveloped areas. Additionally, many educators still lack sufficient digital competence, highlighting the need for continuous professional development in ICT integration, instructional design, and digital literacy. Without these efforts, the potential of digital transformation cannot be fully realized (Hardiyanti & Alwi, 2022; Muskania & Ms, 2021; Verawati et al., 2023).

In the context of Islamic Religious Education (PAI), the urgency of technology integration becomes even more critical, as PAI learning aims not only to deliver knowledge but also to cultivate moral values, character, and spiritual understanding. The integration of technology offers opportunities to enhance learning through interactive media, personalized instruction, and real-time feedback while maintaining religious values. The Technological Pedagogical Content Knowledge (TPACK) framework is particularly relevant in this context, as it emphasizes the integration of content, pedagogy, and technology to create meaningful and student-centered learning experiences (Astutik et al., 2023; Nasar & Daud, 2020; Satir et al., 2024). However, current practices in PAI learning still face several challenges, including the dominance of lecture-based methods, low student participation, and limited use of interactive learning media.

Despite the growing body of literature on digital learning, a clear research gap remains. Previous studies have largely focused on fragmented aspects of technology integration—such as the adoption of specific digital tools (Sofiah, 2024; Wola, 2023), isolated assessments of teacher digital literacy (Hardiyanti & Alwi, 2022), or general e-learning implementation in secular subjects (Verawati et al., 2023). Few studies have comprehensively synthesized how technological innovation, pedagogical readiness, and ethical governance intersect within the unique value-based context of PAI. Moreover, there is a lack of integrated conceptual frameworks that explicitly map the opportunities, systemic challenges, and strategic solutions necessary for sustainable digital transformation in Islamic education. To address this gap, this study employs a narrative literature review to critically analyze and synthesize recent scholarly works on digital transformation in PAI learning. Specifically, it aims to identify key opportunities for technology integration, examine persistent implementation challenges, and propose strategic, value-aligned solutions that can guide educators, institutions, and policymakers in fostering sustainable and ethically grounded digital innovation in Islamic Religious Education. Based on the identified gap, this review is guided by three core

research questions: 1) What are the key opportunities and pedagogical benefits of digital transformation in Islamic Religious Education (PAI) learning? 2) What are the primary challenges and systemic barriers to implementing technology integration in PAI? and 3) What strategic solutions and pedagogical-policy interventions are recommended to ensure sustainable, value-aligned digital transformation in PAI?

Method

This study employs a qualitative narrative literature review approach to explore and synthesize scholarly insights on the digital transformation of Islamic Religious Education (PAI). The review focuses on how technology integration creates new pedagogical opportunities, addresses systemic challenges, and informs strategic solutions in value-based religious education. Literature was sourced from academic databases including Google Scholar, Scopus-indexed journals, and nationally accredited Indonesian journals. The search covered peer-reviewed articles, conference proceedings, and academic publications from 2020 to 2025 to ensure relevance to current educational policies and digital learning trends. Keywords used in the search included digital transformation in education, technology integration in Islamic education, TPACK, digital pedagogy, and e-learning in religious education.

The article selection process followed a structured thematic screening. Initially, 128 articles were identified across the selected databases. After removing duplicates and screening titles and abstracts for contextual relevance, 62 full-text articles were assessed. Ultimately, 37 articles met the inclusion criteria and were selected for in-depth review. The inclusion criteria emphasized studies that: (1) explicitly address digital transformation, pedagogical innovation, or ethical considerations in Islamic/PAI education; (2) provide empirical evidence, conceptual discussions, or policy analyses; and (3) are available in full text in English or Indonesian. Studies focusing solely on technical ICT implementation without pedagogical, ethical, or value-based educational context, as well as non-peer-reviewed sources, were excluded.

The selected literature was analyzed using a thematic synthesis approach, which involves identifying, categorizing, and interpreting recurring patterns across the studies. Themes were organized around three core dimensions aligned with the study's focus: (1) opportunities and pedagogical benefits of technology integration, (2) structural, competency, and ethical challenges in implementation, and (3) strategic solutions involving teacher development, content design, and institutional policy support. Through this process, the review constructs a conceptual understanding of sustainable digital transformation in PAI, offering evidence-based insights for educators and policymakers.

Results and Discussion

Results

This review synthesized findings from 37 peer-reviewed articles published between 2020 and 2025. The analysis is structured around three guiding research questions: (1) What are the conceptual foundations and opportunities of digital transformation in PAI? (2) What systemic, pedagogical, and ethical challenges hinder implementation? (3) What strategic solutions and innovation pathways are recommended for sustainable integration? The following sections present the thematic findings, indicating the frequency of reported insights across the literature and highlighting areas of scholarly consensus and divergence.

1. Digital Transformation in Education: Conceptual Trends and Theoretical Foundations

The findings of this literature-based study indicate that digital transformation in education is a multidimensional process involving technological, pedagogical, and institutional changes. Of the 37 articles reviewed, 32 studies consistently emphasize that the integration of ICT has shifted educational paradigms from traditional, teacher-centered approaches to more flexible, student-

centered learning environments (Adeline & Irwansyah, 2022; Verawati et al., 2023). These studies highlight that digital transformation extends beyond technology adoption to include changes in instructional design, curriculum structure, and learning culture, with particular emphasis on digital literacy, equitable access, and 21st-century pedagogical innovation.

Furthermore, the literature confirms that ICT serves as a catalyst for educational innovation by enabling new forms of interaction, collaboration, and knowledge construction. A total of 26 studies report that digital tools such as Learning Management Systems (LMS), multimedia platforms, and virtual classrooms significantly enhance learning accessibility and instructional effectiveness (Hasrianti & Hidayati, 2023; Yusuf et al., 2023). However, a notable divergence exists in how success factors are framed: while 21 studies attribute successful implementation primarily to infrastructure and technical readiness, a smaller but critical subset of 11 studies argues that human factors, particularly teacher competence, organizational culture, and pedagogical adaptability, play a more decisive role than technology itself (Azizah & Subiyantoro, 2023; Pujiati & Yulianto, 2021). This contrast suggests a scholarly shift from techno-centric models toward human-centered pedagogical frameworks in understanding educational transformation.

From a theoretical perspective, frameworks such as digital literacy and technological determinism provide foundational explanations for how technology influences educational practices. Digital literacy encompasses both technical and cognitive skills required to effectively use digital tools, while technological determinism positions technology as a primary driver of educational change. However, recent literature increasingly critiques purely deterministic views, emphasizing the co-constructive relationship between technology, pedagogy, and contextual factors. This evolving perspective underscores that sustainable digital transformation requires not only technological access but also intentional alignment with pedagogical goals, institutional support, and value-based educational principles.

Table 1. Key Dimensions of Digital Transformation in Education

Dimension	Description	Key References
Digital Literacy	Ability to use and evaluate digital tools	Adeline & Irwansyah (2022)
ICT Infrastructure	Availability of the internet and devices	Verawati et al (2023)
Pedagogical Innovation	Integration of technology in teaching methods	Yusuf et al (2023)
Policy Support	Government and institutional regulations	Azizah & Subiyantoro (2023)

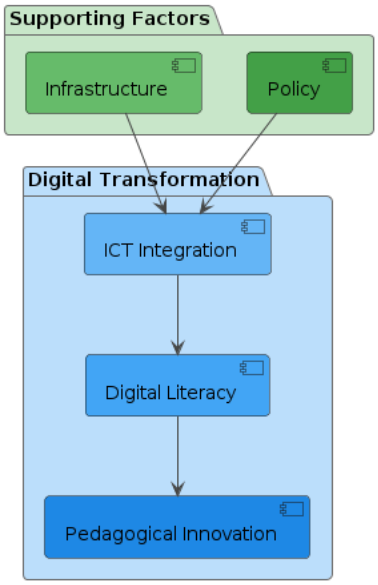

Figure 1. Digital Transformation Framework

This diagram illustrates that digital transformation is driven by ICT integration, supported by infrastructure and policy, and leads to improved digital literacy and pedagogical innovation. It highlights the interconnected nature of technological and human factors in education.

2. Opportunities and Benefits of Technology Integration in PAI Learning

The integration of technology in Islamic Religious Education (PAI) presents significant opportunities to enhance learning outcomes, student engagement, and accessibility. Literature findings reveal that digital tools enable personalized learning experiences, allowing students to access materials according to their individual needs and learning pace. This flexibility is particularly beneficial in PAI, where understanding abstract concepts and moral values requires diverse instructional approaches (Faqihuddin & Romadhon, 2023; Satir et al., 2024). Of the 37 articles reviewed, 31 studies consistently report that technology integration improves accessibility and instructional flexibility, while 26 studies specifically highlight the effectiveness of interactive media—such as videos, simulations, and online quizzes—in increasing student motivation and participation (Sofiah, 2024; Wola, 2023).

Moreover, the implementation of frameworks such as TPACK enables teachers to integrate technology effectively into their teaching practices. By combining technological, pedagogical, and content knowledge, educators can design more meaningful and contextually relevant learning experiences. Research shows that teachers who apply TPACK are more capable of developing innovative learning strategies that improve student outcomes (Astutik et al., 2023; Mas'un & Saparudin, 2022). However, the literature reveals a critical divergence in outcome measurement: while 24 of the reviewed studies demonstrate improvements in cognitive understanding and knowledge retention, only 8 studies provide empirical evidence of affective or spiritual development. This indicates that current digital interventions in PAI predominantly focus on knowledge delivery, with less attention to the moral internalization and character formation that are central to Islamic education.

In addition, the implementation of frameworks such as TPACK enables teachers to integrate technology effectively into their teaching practices. By combining technological, pedagogical, and content knowledge, educators can design more meaningful and contextually relevant learning experiences. Research shows that teachers who apply TPACK are more capable

of developing innovative learning strategies that improve student outcomes (Astutik et al., 2023; Mas'un & Saparudin, 2022).

Table 2. Benefits of Technology Integration in PAI

Aspect	Impact	References
Accessibility	Flexible access to learning materials	Satir et al (2024)
Engagement	Increased student participation	Sofiah (2024)
Personalization	Adaptive learning experiences	Wola (2023)
Learning Outcomes	Improved understanding and retention	Astutik et al (2023)

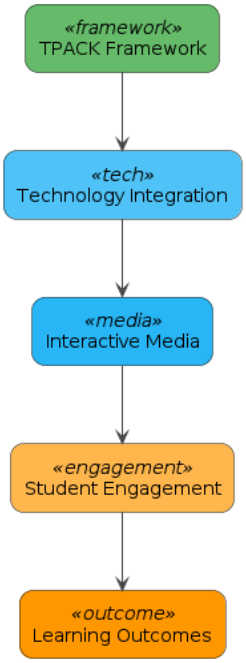

Figure 2. Technology Integration in PAI

The diagram shows how technology integration supported by TPACK leads to interactive media use, increased engagement, and improved learning outcomes in PAI.

3. Challenges in Implementing Digital Learning in PAI

Despite its potential benefits, the implementation of digital learning in PAI faces several persistent barriers that hinder effective integration. The most frequently cited challenge across the reviewed literature is inadequate infrastructure, particularly in rural and under-resourced schools. A total of 24 studies highlight limited access to stable internet connections, insufficient digital devices, and unequal technological distribution as primary constraints that restrict the scalability of e-learning initiatives (Muskania & Ms, 2021; Verawati et al., 2023). Closely related to infrastructure is the issue of teacher competence and digital literacy. Approximately 21 studies consistently report that many educators lack sufficient training and confidence to integrate ICT into their pedagogical practices effectively, underscoring an urgent need for continuous professional development focused on digital pedagogy and instructional design (Azizah & Subiyantoro, 2023; Hardiyanti & Alwi, 2022).

Interestingly, the literature reveals a clear divergence in how these challenges are conceptualized. While the majority of studies (n=28) frame barriers primarily as technical or

resource-based constraints that can be resolved through infrastructure investment and standardized training, a smaller but critical subset of 9 studies argues that the most pressing challenges are epistemological and ethical in nature (Gunawan et al., 2023; Sanusi et al., 2022). These studies emphasize that uncritical technology integration in PAI raises concerns regarding content authenticity, cultural sensitivity, data privacy, and the potential secularization of religious pedagogy. This contrast underscores a significant gap in current discourse: while policy and institutional efforts often prioritize hardware access and basic digital skills, scholars of religious education stress that sustainable implementation requires careful alignment of digital tools with Islamic values and ethical governance. Consequently, addressing the challenges of digital PAI cannot rely solely on technological upgrades; it demands a value-sensitive approach that balances digital readiness with pedagogical and moral integrity.

Table 3. Challenges in Digital PAI Learning

Challenge	Description	References
Infrastructure	Limited internet and devices	Verawati et al (2023)
Teacher Competence	Lack of ICT skills	Hardiyanti & Alwi (2022)
Digital Literacy	Low student and teacher readiness	Azizah & Subiyantoro (2023)
Ethical Issues	Content and privacy concerns	Suhendar et al (2023)

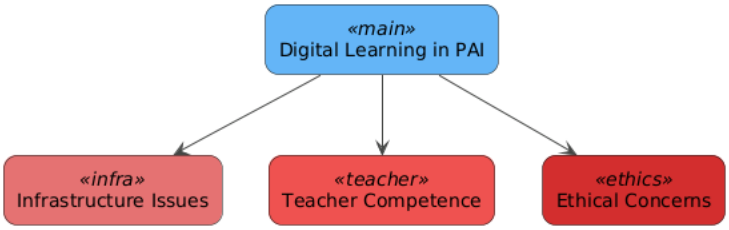

Figure 3. Challenges Framework

This diagram highlights the main barriers affecting digital learning implementation, emphasizing the need for comprehensive solutions.

4. Strategic Solutions and Innovation in PAI Digital Learning

To address the persistent challenges identified in the literature, scholars propose a multi-dimensional approach to digital transformation in PAI. The most frequently recommended strategy centers on enhancing teacher competence through continuous professional development. A total of 22 studies emphasize that targeted training programs focusing on the TPACK framework, digital literacy, and pedagogical design are essential for equipping educators with the skills needed to integrate technology meaningfully (Astutik et al., 2023; Mas'un & Saparudin, 2022). Closely related is the emphasis on designing interactive and contextually relevant digital learning resources. Approximately 19 articles highlight that well-curated multimedia modules, gamified activities, and project-based digital approaches significantly improve student engagement and facilitate deeper comprehension of PAI concepts (Faqihuddin, 2024; Sofiah, 2024).

Furthermore, institutional and policy support is widely recognized as a critical enabler of sustainable digital transformation. Around 17 studies argue that governments and educational institutions must prioritize infrastructure investment, equitable resource distribution, and clear regulatory guidelines to standardize technology integration across schools (Azizah & Subiyantoro,

2023; Hasrianti & Hidayati, 2023). However, the literature reveals a notable divergence in implementation strategies: while several studies advocate for top-down, standardized digital platforms and centralized policy mandates, a smaller but significant subset of 10 articles emphasizes bottom-up, teacher-led innovation and localized pedagogical adaptation as more effective and context-sensitive. This contrast suggests that successful digital transformation in PAI cannot rely solely on uniform technological rollouts; it requires a balanced ecosystem that combines systemic policy support with pedagogical autonomy, ensuring that digital tools are not only accessible but also ethically and culturally aligned with Islamic educational values.

Table 4. Strategic Solutions

Strategy	Description	References
Teacher Training	TPACK-based development programs	Astutik et al (2023)
Media Development	Interactive digital content	Faqihuddin (2024)
Policy Support	Government and institutional roles	Azizah & Subiyantoro (2023)

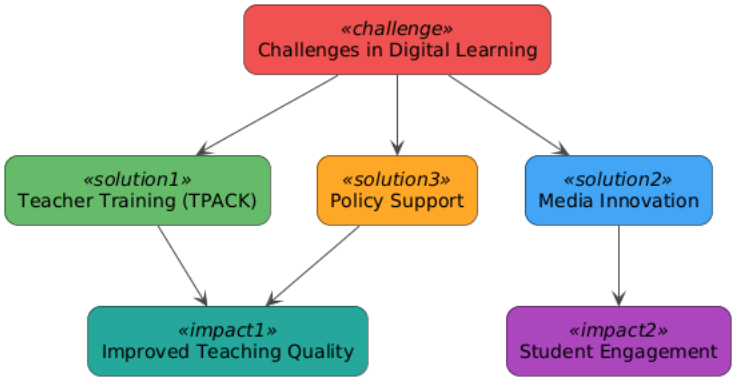

Figure 4. Innovation Strategy

The diagram shows how strategic interventions such as training, media innovation, and policy support can address challenges and improve learning outcomes.

The findings of this study reinforce the argument that digital transformation in education is not merely a technological shift but a pedagogical and cultural transition that requires systemic alignment. The integration of ICT in learning environments, particularly in PAI, must be understood as part of a broader transformation toward student-centered and competency-based education. Previous studies highlight that digital learning environments promote higher-order thinking skills when supported by appropriate instructional design and active learning strategies (Bond, 2020; Haleem A. & Suman, 2022). This aligns with the present findings, which emphasize that technology integration enhances engagement and learning outcomes only when combined with meaningful pedagogical frameworks. Therefore, the effectiveness of digital transformation depends on the synergy between technology, pedagogy, and learner characteristics.

Furthermore, this study highlights the central role of teacher competence in determining the success of technology integration. While infrastructure and access remain critical, the literature consistently identifies teachers as key agents of change in digital learning ecosystems. Research by Alfiyanto & Hidayati (2022) and Alfiyanto et al (2024) demonstrates that teachers' self-efficacy and technological pedagogical skills significantly influence their ability to design and implement effective digital instruction. In the context of PAI, this becomes even more crucial, as teachers must

balance technological innovation with the delivery of moral and religious values. The TPACK framework thus serves not only as a technical guide but also as a pedagogical compass that ensures the alignment of technology with instructional goals and value-based education.

In addition, the discussion reveals that student engagement is a critical mediating factor between technology use and learning outcomes. The use of interactive media, as identified in the results, contributes to increased motivation and participation; however, engagement must be understood beyond behavioral activity. According to several previous studies, engagement includes behavioral, emotional, and cognitive dimensions, all of which are influenced by instructional design and learning context (Al Mamun & Lawrie, 2023; Xu et al., 2023; Zhu et al., 2021). Digital tools can facilitate these dimensions by providing interactive, collaborative, and personalized learning experiences. In PAI learning, this multidimensional engagement is particularly important for fostering not only cognitive understanding but also internalization of values and character development.

Another important aspect emerging from this study is the need to address ethical and cultural considerations in the use of digital technology, especially in religious education. While technologies such as AI and digital platforms offer significant benefits, they also pose risks related to content validity, bias, and data privacy. Recent studies emphasize the importance of ethical digital pedagogy, which integrates moral considerations, cultural sensitivity, and responsible technology use into instructional practices (Daniela, 2025; Falloon, 2020; Ncube & Tawanda, 2025). In the context of PAI, this implies that digital content must be carefully curated and aligned with Islamic values to avoid misinterpretation and ensure the authenticity of religious teachings. Thus, ethical governance becomes a necessary component of digital transformation in education.

Finally, the study underscores the importance of institutional and policy support in sustaining digital innovation in education. The successful implementation of technology integration requires not only individual teacher competence but also systemic support in the form of infrastructure development, policy frameworks, and collaborative ecosystems. Research by OECD (2025) and UNESCO (2023) indicates that countries with strong policy alignment and investment in digital education are more successful in achieving sustainable transformation. This finding is consistent with the current study, which highlights the role of policy in facilitating access, guiding implementation, and ensuring quality standards. Therefore, a holistic approach that integrates policy, practice, and pedagogy is essential for advancing digital transformation in PAI learning and education more broadly.

Conclusion

This study concludes that digital transformation in Islamic Religious Education (PAI) represents a comprehensive pedagogical and cultural shift that integrates technological advancement with value-based learning. The synthesis of literature published between 2020 and 2025 demonstrates that ICT integration, particularly when guided by the TPACK framework, significantly enhances learning accessibility, student engagement, and instructional effectiveness. Interactive digital media and adaptive platforms enable more personalized learning experiences, supporting both cognitive mastery and affective development. However, successful implementation depends not merely on technological access but on teacher readiness, infrastructure equity, and the deliberate alignment of digital tools with Islamic educational values. Sustainable digital transformation in PAI requires a holistic strategy that combines continuous TPACK-based professional development, ethically curated digital content, and strong institutional policy support.

Several limitations of this study should be explicitly acknowledged. As a narrative literature review, this research relies exclusively on peer-reviewed journal articles, conference proceedings, and academic publications available in Indonesian and English, published within the 2020–2025 timeframe. Consequently, it does not incorporate empirical primary data, grey literature, non-peer-reviewed sources, or publications in other languages, which may limit the contextual breadth and

generalizability of certain findings. Additionally, while the thematic synthesis approach effectively maps conceptual trends, challenges, and strategic pathways, it does not employ the statistical aggregation or protocol-driven screening characteristic of systematic reviews or meta-analyses.

Building on these findings and limitations, future research should prioritize empirical validation of the conceptual insights presented in this review. Specifically, longitudinal and quasi-experimental studies are needed to evaluate the long-term impact of TPACK-aligned digital interventions on both cognitive outcomes and moral-spiritual development in PAI. Comparative empirical studies across diverse school contexts, particularly in institutions that have already implemented technology-integrated PAI curricula, would provide practical insights into scalability, contextual adaptation, and implementation fidelity. Furthermore, future work should focus on developing standardized ethical guidelines for digital religious content, investigating the role of teacher-led innovation networks as sustainable grassroots models, and exploring cross-regional variations in digital readiness to inform more equitable policy design. Such empirically grounded research will be essential for translating conceptual frameworks into actionable, value-aligned digital learning ecosystems in Islamic education.

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