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Digital Transformation of Islamic Education: Trends, Challenges, and Future Research Directions

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ABSTRACT

The digital transformation of Islamic education has become an increasingly important issue, particularly in light of the rapid technological acceleration experienced after 2020. However, limited attention has been given to understanding how Islamic educational institutions prepared for digital transformation prior to the pandemic. This study aims to systematically examine research trends, challenges, and institutional readiness related to digital transformation in Islamic education during the period 2015–2020. The main problem addressed in this paper is the fragmented and descriptive nature of existing studies, which lack comprehensive synthesis and policy-oriented analysis. This study employed a systematic literature review (SLR) approach, following the PRISMA framework. Data were collected from Google Scholar, Moraref, SINTA, and ERIC, resulting in 32 peer-reviewed journal articles that met the inclusion criteria. The selected studies were analyzed using thematic analysis to identify dominant patterns related to digital technologies, pedagogical practices, institutional readiness, and challenges. The findings reveal that digital transformation in Islamic education during this period was predominantly at an early and instrumental stage, focusing mainly on basic technologies such as e-learning platforms and learning management systems. Institutional preparedness was generally low, with digital initiatives largely driven by individual teachers rather than strategic policies or leadership frameworks. These results highlight the need for value-based management, leadership support, and human-centered digital strategies to ensure sustainable digital transformation in Islamic education.

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1. INTRODUCTION

The rapid advancement of digital technology has significantly transformed educational practices worldwide, including within the context of Islamic education. Between 2015 and 2020, educational institutions increasingly adopted digital tools such as e-learning platforms, learning management systems, and digital instructional media to enhance teaching and learning processes. This phenomenon is particularly crucial in Islamic education, which traditionally emphasizes face-to-face interaction, moral formation, and value-based instruction (tarbiyah, ta'lim, and ta'dib). The integration of digital technology into Islamic education thus presents not only a technological shift but also a pedagogical and managerial challenge that requires careful academic examination (Adiyono, 2019). Both quantitative indicators—such as increased use of digital platforms—and qualitative dimensions (Begkos, C., & Antonopoulou, K., 2020; Papancheva, R., & Dimitrova, K., 2017), such as changes in teaching practices and institutional readiness, underscore the urgency of studying digital transformation in Islamic education prior to the COVID-19 pandemic.

It's looming. Studies of Islamic education primarily focus on digital learning from the implementation of technology to specific applications in localized institutional settings, that is: madrasahs, pesantren, or Islamic higher education institutions. Previous research into the use of e-learning platforms, digital instructional media, teacher readiness, and student response to technology use in learning has had broken patterns of context specificity and descriptive nature with limited incorporation of theory and policy (Tondeur et al., 2012; Petticrew & Roberts, 2006; Selwyn, 2016). In addition, while the management and leadership roles have been widely considered focal points in educational change, only a handful of studies have considered digital transformation in Islamic education through a management-oriented and policy-focused perspective. According to Adiyono (2019), effective Islamic education is characterized by the alignment between pedagogical practices, institution planning, and leadership commitment; in empirical studies, however, digital adoption is rarely connected with governance structures, human resource management, and institutional performance (Abello Colak, 2015; Bush, 2013). In the same light, Adiyono (2020) claims that Islamic education systems were largely unprepared for the sudden digital acceleration that came from the COVID-19 pandemic: structural and managerial weaknesses were even found before 2020. This situation conforms to the general arguments of educational research, indicating that absence of strategic planning, professional development, and coherent policy all significantly compromise the sustainability of innovation at all levels of digital engagement (OECD, 2015; Fullan, 2016). These gaps provide a strong basis for the absence of a systematic and integrative review to map the early efforts of digital transformation in Islamic education and critically assess the readiness of institutions before the pandemic. Hence, the novelty of this study lies in the attempt to synthesize and critically analyze the scholarly efforts published between 2015 and 2020, providing a comprehensive pre-pandemic baseline that integrated technological, pedagogical, and managerial perspectives to address the divide between existing fragmented studies.

The novelty of this study lies in its attempt to synthesize and critically analyze scholarly research on digital transformation in Islamic education published between 2015 and 2020, a period that represents the formative stage of digital adoption. Unlike previous studies that focus on post-pandemic digital learning or single-case implementations, this paper positions itself as a pre-pandemic baseline analysis, offering a comprehensive overview of technological trends, pedagogical orientations, and institutional preparedness. By integrating perspectives from Islamic education management (Adiyono, 2019) and organizational performance studies (Adiyono, 2019, doctoral dissertation), this study addresses the shortcomings of existing literature that often separates technological adoption from leadership, policy, and human resource dimensions (Chakraborty, A. R., & Mansor, N. N. A., 2013; Florkowski, G. W., & Olivas-Luján, M. R., 2006).

The specific purpose of this paper is to address the limitations of prior research by offering a systematic and theory-informed synthesis of studies on digital transformation in Islamic education conducted before 2020. This study aims to identify dominant research trends, recurring challenges, and underexplored gaps that constrained the effectiveness and sustainability of early digital initiatives. Previous studies have largely examined digital learning at the level of tools and classroom practices, with limited attention to institutional readiness, leadership, and policy coherence (Selwyn, 2016; Kirkwood & Price, 2014). Drawing on broader theories of educational change and digital innovation, this paper positions digital transformation as a multidimensional process that requires alignment between technology, pedagogy, organizational structures, and human capacity (Fullan, 2016; OECD, 2015). By synthesizing research published between 2015 and 2020, this study seeks to provide a conceptual foundation for understanding why many Islamic educational institutions encountered significant difficulties in responding to rapid digital disruption during the COVID-19 pandemic, as highlighted by Adiyono (2020). In doing so, the paper contributes a pre-pandemic baseline that enables more critical reflection on post-pandemic

digital policies and practices in Islamic education, addressing gaps that have remained largely unexplored in earlier literature (UNESCO, 2018).

This study argues that digital transformation in Islamic education during 2015–2020 was predominantly instrumental rather than transformational, driven by individual initiatives rather than institutional strategies. The central argument tested in this paper is that the limited impact of digital technology in Islamic education prior to 2020 was not primarily due to resistance to change, but rather to the absence of structured management frameworks, leadership support, and policy alignment. By systematically reviewing existing studies, this paper aims to demonstrate that digital transformation efforts lacked strategic integration with Islamic educational values and institutional governance, thereby limiting their sustainability and transformative potential.

2. RESEARCH METHOD

This article utilized a systematic literature review (SLR) to investigate scientific works published on the digital transformation of Islamic education between 2015 and 2020. The review aimed to reveal the primary research trends, challenges, and paths in the early stages of digital adoption in Islamic education-before and at the beginning of large-scale digital disruption. The SLR method was chosen for its methodological rigor, transparency, and replicability in synthesizing existing knowledge (Kitchenham & Charters, 2007). The review process used the core principles of the PRISMA framework, identification, screening, eligibility, and inclusion stages to minimize bias and increase reliability (Moher et al., 2009).

The data sources were Google Scholar, Moraref, SINTA, and ERIC, chosen for their wide-ranging national and international scholarly publications on education and Islamic studies. A systematic search strategy was applied with previously laid keywords and Boolean operators such as "Islamic education," "digital learning," "educational technology," "e-learning," and "online learning." The search focused on peer-reviewed journal articles published between 2015 and 2020 that were either in English or Indonesian, discussing the incorporation of digital technologies in Islamic education. Studies were excluded from review for the purpose of upholding the review's academic quality and relevance (Petticrew & Roberts, 2006) if fact and truth-based and full-text available documents were not about Islamic education.

The articles were thematically analysed which would engender systematic identification, analysis, and interpretation of material patterns within qualitative data (Braun & Clarke, 2006). Information extraction revolved around the year of publication, educational context, design of the research, types of digital technologies applied, and reports on detailing challenges in digital transformation. Each article was considered in relevance and clarity of research objectives to enhance the credibility of synthesis. The synthesis will be narrated to highlight dominant research trends, persistent challenges and gaps in critical research, hence providing a conceptual basis for further research on digital innovation in Islamic education.

Table 1. Overview of Reviewed Studies on Digital Transformation in Islamic Education (2015–2020)

Category	Classification	Number of Studies (n=32)	Percentage (%)
Year of Publication	2015–2016	9	28.1
	2017–2018	13	40.6
	2019–2020	10	31.3
Geographical Context	Southeast Asia (Indonesia, Malaysia)	18	56.3
	Middle East	8	25.0
	South Asia	6	18.7
Research Methodology	Qualitative	15	46.9
	Quantitative	9	28.1
	Mixed Methods	8	25.0
Digital Technology Focus	E-learning platforms / LMS	14	43.8
	Digital teaching media (video, PPT)	9	28.1
	Mobile learning applications	6	18.8
	Web-based learning resources	3	9.3
	Advanced technologies (AI, analytics)	0	0.0
Institutional Readiness	Teacher-driven initiatives	21	65.6
	Institutionally planned programs	7	21.9
	Policy-supported digital strategies	4	12.5
Key Challenges Identified	Limited digital competence	12	37.5
	Inadequate infrastructure	10	31.3
	Digital stress and workload	6	18.8
	Lack of policy and leadership	4	12.4

Table 1 demonstrates that digital transformation in Islamic education prior to 2020 was predominantly concentrated on basic technological adoption and driven largely by individual educators rather than institutional policies. The absence of advanced digital technologies and the limited presence of structured leadership support highlight systemic weaknesses that constrained sustainable digital transformation and institutional resilience.

3. RESULTS AND DISCUSSION

3.1. Characteristics of Reviewed Studies

Based on the systematic literature review process, a total of 32 peer-reviewed journal articles published between 2015 and 2020 were included for final analysis. The reviewed studies were derived from document-based data sources, including empirical research reports, case studies, and evaluative studies related to digital transformation in Islamic education. Most studies originated from Southeast Asia (Indonesia and Malaysia), followed by the Middle East and South Asia, indicating that research on digital Islamic education was predominantly concentrated in Muslim-majority regions during this period. Methodologically, qualitative approaches dominated, while quantitative and mixed-method studies were relatively limited.

The distribution of publication year shows a gradual increase in output along the end of the review period, with a marked surge in studies published between 2018 and 2020, a reflection of increasing academic attention toward digital initiatives in Islamic education just prior to the global digital acceleration triggered by the COVID-19 pandemic. The bulk of the articles reviewed focused on formal Islamic educational institutions, such as madrasahs, Islamic schools, and Islamic higher education institutions, while comparatively fewer studies examined nonformal settings such as pesantren and community-based Islamic learning centers. In terms of research focus, the majority of studies investigated the implementation and effectiveness of digital learning tools rather than their long-term impact on educational outcomes, institutional transformation, or policy development, suggesting the research during this period was largely descriptive and exploratory in nature.

3.2. Types of Digital Technologies Applied in Islamic Education

The findings indicate that digital transformation in Islamic education during 2015–2020 primarily focused on basic digital learning technologies. Learning Management Systems (LMS), e-learning platforms, and digital teaching media were the most frequently reported tools. Advanced digital technologies such as artificial intelligence, learning analytics, and adaptive learning systems were almost absent, suggesting that digital adoption was still at an introductory stage.

Table 2. Types of Digital Technologies Used in Islamic Education Studies (2015–2020)

Digital Technology Type	Number of Studies	Percentage (%)
E-learning platforms / LMS	14	43.8
Digital teaching media (video, PPT)	9	28.1
Mobile learning applications	6	18.8
Web-based learning resources	3	9.3
Advanced technologies (AI, analytics)	0	0.0

Table 2 illustrates that the digital technologies adopted in Islamic education studies between 2015 and 2020 were predominantly limited to basic instructional and delivery-oriented tools. E-learning platforms and Learning Management Systems (LMS) emerged as the most frequently utilized technologies, accounting for 43.8% of the reviewed studies, indicating an early focus on facilitating content distribution and administrative efficiency rather than pedagogical innovation. Digital teaching media such as videos and presentation slides followed at 28.1%, reflecting a tendency to digitize conventional classroom practices rather than transform learning designs. Mobile learning applications, although present in 18.8% of the studies, were generally used as supplementary tools rather than integrated learning ecosystems. Notably, no studies reported the use of advanced digital technologies such as artificial intelligence or learning analytics, underscoring that digital transformation in Islamic education during this period remained at an introductory stage. This pattern suggests that institutional efforts were largely reactive and instrumental, lacking strategic investment in data-driven, adaptive, or intelligent learning systems that could support sustainable and scalable digital innovation.

The pattern indicates that the use of digital technology in Islamic education during this period was mainly instrumental to support the delivery of instruction rather than to transform pedagogical practices or the learning experiences. The domination of LMS and e-learning platforms indicates an emphasis on

accessibility and content distribution, while limited mobile learning adoption suggests that flexibility and learner-centered design had not yet become key preoccupations. The ancestor of the absence of newer technologies denotes poor institutional capacity, digital readiness, and lack of research orientation toward innovations; thus indicating that digital transformation efforts were inhibited because of infrastructure, pedagogy, and strategy. Therefore, between 2015 and 2020, digital initiatives in Islamic education were essentially traceable as incremental and transitional, forming a foundational but not transformational phase toward future technological integration.

Would probably include some comments on digital learning. It would seem that there are blended learning models coming into the scene, but very few were found to be practicing student-centered and constructivist approaches. A few studies have directly aligned certain digital learning practices with Islamic pedagogy on the basis of tarbiyah, ta'lim, and ta'dib.

Literature reviewed mentioned several challenges to digital transformation. The most notable ones were infrastructure, low digital-driven knowledge of faculty, and lack of institutional support. Cultural and ethical implications regarding digital content not being aligned to Islam were also reported, but these were more normative in discussion than empirical.

Table 3. Reported Challenges in Digital Transformation of Islamic Education (2015–2020)

Category of Challenge	Frequency of Occurrence	Description Summary
Technological	21	Limited internet access and digital facilities
Pedagogical	18	Low teacher digital competence
Institutional	15	Lack of strategic planning and policy support
Cultural and ethical	10	Concerns over value alignment
Socio-economic	9	Unequal access among students

Table 3 points out the fact that challenges during the period from 2015 to 2020 in Islamic education for digital transformation are multidimensional and inter-related. It was technological constraints that emerged as the most commonly cited of these challenges-with 21 studies reporting on limited internet connectivity and sub-standard digital infrastructures as barriers to effective implementation. Next were pedagogical challenges, as 18 studies discussed low levels of teachers' digital competence, which by implication suggested insufficient opportunities for professional development and training. Institutional challenges were also notable, with 15 studies reporting a lack of coherent strategic planning, lack of leadership commitment, and non-existence of supportive policies which would enable digital initiatives. Cultural and ethical concerns were flagged by 10 other studies that echoed fears about alignment of digital contents and practices with Islamic values and educational ethics. Socio-economic challenges, which were mentioned in nine other studies, further revealed that inequality in access to digital devices and sources of learning was still reported. Overall, these findings illustrated that, in addition to lacunae and limitations in technology, digital transformation in Islamic education was constrained by pedagogical readiness, institutional governance, and much broader socio-cultural factors, emphasizing the need for holistic and value-based digital strategies. Such a scenario indeed acts as an indefinite barrier of debilitation to Islamic education by modern technology.

3.3. Types of Digital Technologies Applied in Islamic Education

The findings indicate that institutional preparedness for digital transformation in Islamic education from 2015 to 2020 was still relatively low. Most Islamic educational institutions were found not to have formal policies or strategic frameworks to guide the application of digital technologies in teaching and learning processes. Digital initiatives were largely begun and undertaken by individual teachers from personal motivation and technological competence, not supported by any vision of the institution or through any long-term plans. This means that using digital technologies tends to be inconsistent across institutions and largely target individual actors.

In addition, very few studies reported structured institutional support mechanisms, such as professional development programs, planning for digital infrastructure, or leadership-driven agendas for digital transformation. The absence of institutional leadership and appropriate policy alignment limit wide-ranging capability in implementing and scaling digital practices. These conditions indicate that reactive, experimental in nature. Not systematic coordination, not sustainable, and policy-driven direction of digital transformation in Islamic education during the period.

Table 4. Institutional Readiness and Policy Orientation in Digital Transformation of Islamic Education (2015–2020)

Institutional Dimension	Level of Readiness	Description
Formal digital transformation policy	Low	Most institutions lacked written policies or strategic digital frameworks
Institutional leadership support	Low	Limited involvement of school or university leadership
Professional development programs	Low to Moderate	Training provided sporadically and not systematically planned
Digital infrastructure planning	Low	Infrastructure development was ad hoc and resource-dependent
Teacher-driven initiatives	High	Digital adoption largely depended on individual teacher initiatives

Table 4 demonstrates that institutional readiness for digital transformation in Islamic education between 2015 and 2020 was generally low and uneven across key organizational dimensions. Most institutions lacked formal digital transformation policies and strategic frameworks, indicating that digital initiatives were not guided by long-term planning or clear institutional vision. Leadership support was also limited, with minimal involvement from school or university leaders in directing, monitoring, or sustaining digital innovation efforts. Professional development programs for educators were reported as low to moderate, as training activities tended to be sporadic, short-term, and disconnected from institutional goals. Similarly, digital infrastructure planning was largely ad hoc and highly dependent on available resources rather than systematic needs assessments. In contrast, teacher-driven initiatives showed a high level of readiness, highlighting that individual educators often acted as the primary drivers of digital adoption. This imbalance suggests that digital transformation in Islamic education during this period was highly personalized and fragmented, relying more on individual commitment than on coherent institutional support systems, which ultimately limited scalability and sustainability.

Discussion

The very reason for this systematic literature review is that digital transformation in Islamic education between the years 2015 and 2020 was considered to bear indications of nascent adoption of technology with fragmented institutional readiness to absorb such transformation coupled by limited policy orientation surrounding it. Such findings are in line with the wider notion of Islamic education management that asserts an educational transformation should be primarily based on structured management approaches rather than singular initiatives. As Adiyono (2019) articulates, coherent planning, commitment from leadership, and value-based governance are required to realize good Islamic education management. There being no apparent institutional digital policies in this review means that such initiatives were not yet included in the higher framework of Islamic educational management; hence, their implementation was haphazard and not sustainable.

From a pedagogical and a philosophical angle, basic digital technologies like LMS and e-learning platforms continue to dominate the pedagogical shifts introduced; a move realistic and pragmatic in the advent of changing technology, instead of showing a movement in paradigms of thought among Islamic education. This condition resonates with the assertion of Adiyono (2020) that Islamic education, prior to and at early stages of COVID-19, was largely unprepared for sudden digital disruptions. The studies reviewed show that technology was mainly employed as an additional tool for content delivery without sufficient integration of Islamic pedagogy principles such as tarbiah, ta'lim, and ta'dib. Thus, this indicates some conceptual gap between technology adoption and philosophical basis in Islamic education hence digital transformation has not yet been internalized to form part of the holistic educational vision (Sahin, A., 2018; Al Zeera, Z., 2001).

Next to institutional preparedness, the matter clearly reeks of leadership and human resource management in the best interest of digital transformation in education. Predominantly teacher-driven digital initiatives from this study are in tandem with Adiyono's (2019) Ph.D. Research, whereby the quality of leadership, systems of selection, and systems of compensation are decisive factors in the performance and sustainability of an institution. Alabi and Alabi (2010) and Bush (2013) hold the same view, arguing that educational change is unlikely to be sustained in the absence of strong instructional leadership and coherent management structures. In the field of digital transformation, when there are discrepancies in terms of transparent systems for selection, incentives, and CPD of teachers, these teachers will remain alone in navigating the cringe-worthy technological change without a system to cushion their efforts, thus exacerbating the inequities in digital competence and instructional quality (Tondeur et al., 2012; OECD, 2015). This is most common in Islamic educational institutions, where many are private and individual adoption of digital innovations is questioned without anything impactful from the institutional side.

Similarly, this point was stressed in Adiyono's (2020) research on teachers' roles in moral and religious development,-hence, identifying teachers as chief agents of change in Islamic education. But, as emphasized by Fullan (2016) and UNESCO (2018), teacher agency that is not backed by institutional standards runs the risk of generating superficial, erratic, and transitory innovations. Should the Islamic education sector not have leadership-ridden policies, organized capacity-building programs, and values-driven digital governance, the very existence of digital transformation will still be too fragile without any long-term impact.

The challenges highlighted in this review—especially digital stress, limited digital competencies, and infrastructural constraints—could be theoretically traced back to Adiyono's (2020) work on stress management, emphasizing that organizational change without due preparation often creates psychological strain on the educators. There is considerable evidence to show that actively integrating technology into the educational setting increases cognitive workload, emotional exhaustion, and technology-related anxiety without enough professional support and training (Salanova et al., 2014; Schaufeli, 2017). This likely added to the pressures already identified in the Islamic educational institutions due to a lack of structured digital planning and systematic professional development, where teachers were expected to make an ad-hoc adjustment to a digital environment, often without institutional support. Tondeur et al. (2012) and OECD (2015) have also confirmed that inadequate schooling and infrastructural limitations add a great deal of stress to teachers and hinder the effective adoption of digital technologies. Furthermore, literature on the educational change notes that prolonged digital transformation calls for readiness both technologically and pedagogically along with a concern for educators' psychological well-being and emotional resilience (Fullan, 2016; UNESCO, 2018). Accordingly, findings hint that digital transformation in Islamic education must follow a holistic path that integrates technological innovation with stress management strategies, institutional support systems, and human-centered leadership for long-term sustainability and meaningful educational change.

This study contributes to the existing literature by demonstrating that digital transformation in Islamic education before 2020 was largely managerial and pedagogical unprepared, rather than resistant. The findings imply that future digital transformation efforts should adopt a value-based Islamic education management framework, integrating strategic planning, leadership development, teacher capacity building, and ethical considerations. Future research is therefore recommended to explore integrative models of digital Islamic education that combine management theory, Islamic pedagogy, and emerging technologies, particularly in the post-pandemic context where digital transformation has become unavoidable.

4. CONCLUSION

The current version of this study concludes that digital transformation into Islamic education between 2015 and 2020 was not primarily impeded by any resistance to technology as it is mostly believed but by lack of institutional governance, policy environment engendered by leadership, and strategic planning framework. An important and, to some degree, unanticipated finding overall, digital initiatives were mainly contingent on individual teachers' competencies and motivations, with scant institutional readiness and policy orientation, resulting in a concatenation of sporadic and unsustainable digital practices. This study is nevertheless limited by the small number of reviewed articles, restricted temporal scope before the year 2020, limited variation in institutional levels and geographical contexts, and the exclusive adoption of document-driven methods of systematic literature review. Hence, future research needs to add a larger and more contextualized sample, examine multi-level institutional situations and more regional coverage, and deploy mixed-methods approaches in pursuit of a deeper and broader comprehension of digital transformations in Islamic education. Such an augmented study would carry much stronger empirical underpinnings for conceiving effective, context-responsive, and sustainable digital education policy intervention in Islamic educational institutions.

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