DIGITAL INNOVATION IN ISLAMIC RELIGIOUS EDUCATION: A STUDY OF MADRASAH ALIYAH IN BANDA ACEH

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Abstract

The digital era has reshaped educational paradigms, requiring innovative approaches across disciplines, including Islamic Religious Education (PAI) at the Madrasah Aliyah level. This study explores the forms and effectiveness of digital innovations implemented in PAI instruction at selected Madrasah Aliyah in Banda Aceh. Using a descriptive qualitative method, data were collected through classroom observations, in-depth interviews, and document analysis at two public madrasahs. The findings reveal several forms of digital innovation: (1) the use of instructional videos and religious animations; (2) gamified formative assessments via platforms such as Kahoot! and Quizizz; (3) the use of Learning Management Systems like Google Classroom; and (4) limited development of culturally grounded digital content rooted in Acehnese traditions. While these innovations have positively influenced student engagement, comprehension, and digital literacy, implementation remains uneven due to infrastructural limitations, gaps in teacher competence, and insufficient institutional support. The study emphasizes the potential of contextually responsive digital tools to enhance Islamic learning when accompanied by sustained capacity building and systemic support. By highlighting both pedagogical benefits and practical constraints, this research contributes to the discourse on culturally informed, technology-integrated Islamic education.

Keywords: *Digital innovation; Islamic Religious Education (PAI); Madrasah Aliyah; culturally responsive pedagogy; digital learning integration*

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A. Introduction

Over the past two decades, rapid advancements in digital technology have significantly reshaped the educational landscape. The digitization of learning has not only transformed modes of communication but has also revolutionized how teaching and learning processes unfold. Within the context of Islamic education—particularly Islamic Religious Education (PAI)—the integration of technology has become essential for delivering Islamic values in ways that are both contextually relevant and aligned with contemporary developments (Azhari et al., 2025; Restalia & Khasanah, 2024). This shift

is especially urgent given that today's learners are digital natives, individuals who have grown up immersed in digital ecosystems.

Traditionally, PAI instruction has relied heavily on teacher-centered methods, such as lectures, rote memorization, and text-based assignments. While these methods remain effective for transmitting doctrinal content, they often fall short in promoting active engagement or fostering contextual understanding among students. Consequently, there is a pressing need for more innovative pedagogical approaches that leverage digital tools—such as interactive media, Islamic learning applications, religious animation videos, e-learning platforms, and Learning Management Systems (LMS)—to connect religious material with the digital realities of students' lives (Azizah et al., 2025). Selwyn (2012) similarly emphasizes that digital technology, when integrated into education in a participatory and context-aware manner, can significantly enhance learning experiences by making them deeper and more meaningful.

As faith-based secondary institutions, Madrasah Aliyah occupy a strategic position in transforming PAI instruction to meet contemporary challenges. In this regard, digital innovation serves not only as a medium for transmitting religious knowledge but also as a tool for instilling spiritual and moral values in engaging, age-appropriate formats. Empirical studies suggest that the use of creative digital media can enhance students' interest, participation, and comprehension of religious content (Putra & Ayyaisy, 2025). Furthermore, Anderson and Dron (2011) have demonstrated that technology-based learning models—particularly those that promote interactivity, collaboration, and flexibility—can significantly increase student engagement and retention.

Despite these promising opportunities, not all madrasahs are equally prepared to implement digital learning. In Banda Aceh—a city known for its strong Islamic traditions and role as a center of Islamic education—the digital transformation of PAI instruction still faces a range of challenges. These include limited access to technological infrastructure, insufficient digital training for teachers, and low levels of digital literacy among both educators and students (Gultom et al., 2025). Such obstacles result in a gap between the potential of digital innovation and its practical application in the classroom.

The COVID-19 pandemic underscored the urgency of building adaptive education systems, where digital learning is not merely an option but a necessity. Against this backdrop, there is a clear need for empirical research to explore how digital innovation is currently being implemented in PAI instruction at Madrasah Aliyah in Banda Aceh. This study is guided by the following research question: *What forms of digital innovation are being applied in Islamic Religious Education at Madrasah Aliyah in Banda Aceh, and how effective are these innovations in enhancing the quality of instruction?* Accordingly, the primary objective of this study is to describe the various forms of digital innovation used in PAI instruction at Madrasah Aliyah in Banda Aceh and to analyze their effectiveness in improving learning outcomes. Through this investigation, the study seeks to provide an empirical overview of digital innovation practices, assess their pedagogical

impact, and identify the challenges and solutions encountered by educators and students in the implementation process.

B. Method

This study employed a descriptive qualitative approach to gain an in-depth understanding of the forms and effectiveness of digital innovations in Islamic Religious Education (PAI) instruction at Madrasah Aliyah in Banda Aceh. A qualitative approach was considered appropriate for capturing educational phenomena in their natural and contextual settings, allowing researchers to explore not only observable practices but also the underlying experiences, perceptions, and pedagogical dynamics. The research was conducted at two state madrasahs—Madrasah Aliyah Negeri (MAN) 1 Banda Aceh and MAN 2 Banda Aceh—both of which have adopted digital innovations in their PAI teaching. The study involved multiple stakeholders, including PAI teachers, school principals, and students from grades XI and XII who had participated in digitally enhanced learning activities.

Data collection was carried out through three main techniques: classroom observation, in-depth interviews, and document analysis. Observations were conducted directly in PAI classes using structured observation sheets that recorded student engagement, the use of digital media, and teacher-student interactions. To complement these observations, semi-structured interviews were held with PAI teachers, principals, and students to gather insights into their experiences, perceptions, and the challenges they faced during implementation. These interviews were guided by protocols that covered aspects such as digital tool usage, instructional effectiveness, and both technical and pedagogical obstacles. Additionally, document analysis was conducted on instructional materials, digital media content, and student assessment results. A documentation checklist was used to catalog digital teaching materials, such as interactive videos, e-learning applications, digital lesson plans (RPP), and both formative and summative evaluation records.

The primary instrument in this research was the researcher, who acted as a human instrument in the data collection and interpretation process, supported by prepared guides for observation, interviews, and documentation. Data analysis followed an interactive qualitative process involving data reduction, data display, and conclusion drawing. The data reduction phase involved sorting and organizing raw data from the field—through open, axial, and selective coding—to identify recurring themes and patterns aligned with the research questions. The next phase involved presenting the reduced data in descriptive narratives, thematic matrices, and interpretive tables to illustrate key findings, relationships among categories, and contextual dynamics. Conclusions were drawn iteratively throughout the research process, with regular verification using new data to ensure validity. To enhance the trustworthiness of the findings, triangulation techniques were employed, comparing data from multiple sources (teachers, students, principals) and data collection methods (observation, interviews, and documentation).

C. Results and Discussion

1. Results

Forms of Digital Innovation in Islamic Religious Education

Based on classroom observations, interviews, and document analysis conducted at two public Madrasah Aliyah in Banda Aceh, a range of digital innovations were identified in the delivery of Islamic Religious Education (PAI). These practices reflect teachers' efforts to adapt instructional methods to the habits and preferences of a digitally oriented student population. The innovations observed include the use of multimedia content, interactive learning platforms, and online communication tools. The following table summarizes the main forms of digital innovation recorded during the fieldwork:

Table 1. Forms of Digital Innovation Used in PAI Instruction

No	Form of Digital Innovation	Media/Platform Used	Frequency of Use	Description
1	Instructional videos	YouTube, Canva Video, Powtoon	Frequent	Used to explain abstract concepts effectively
2	Interactive presentations	Microsoft PowerPoint with hyperlinks	Frequent	Helps visualize content and maintain student engagement
3	Online classes and discussions	Google Classroom, Zoom, WhatsApp Group	Moderate	Used for reinforcement and reflective dialogue
4	Digital quizzes and assessments	Quizizz, Google Form, Kahoot	Frequent	Makes daily assessments enjoyable and participatory
5	Islamic e-modules and e-books	Interactive PDFs, Android-based apps	Rare	Serve as supplementary learning materials

The widespread use of video-based learning, particularly in explaining doctrinal and historical Islamic content, has proven beneficial for visualizing abstract material. Likewise, digital quiz applications such as Quizizz and Kahoot are frequently used for daily formative assessments. Their gamified features make evaluations more appealing and interactive, fostering higher levels of participation. Teachers also utilize platforms such as Google Classroom and WhatsApp Groups to encourage asynchronous discussions, especially around contemporary themes like religious tolerance and ethical behavior in digital spaces.

Although the production of original digital content—such as e-modules or videos tailored to specific learning outcomes—is still limited, a number of teachers have begun experimenting with content creation to support independent learning. However, disparities exist between institutions. Madrasahs with more advanced technological

infrastructure demonstrate higher levels of digital integration, while others with limited connectivity and hardware show lower engagement.

Several challenges emerged from the data. Among the most common are unstable internet access, a lack of school-provided digital devices, and limited teacher training in digital content development. Many educators rely heavily on existing online materials due to time constraints and a lack of technical expertise. To address these obstacles, some madrasahs have fostered collaboration through subject teacher working groups (*Musyawarah Guru Mata Pelajaran*, MGMP), encouraging the exchange of teaching resources and strategies. Additionally, initiatives such as "One Teacher, One Digital Content" have been launched in several schools, requiring each teacher to develop at least one original digital learning resource per semester. In the short term, the use of accessible tools—like YouTube videos and online quiz platforms—offers a practical solution to meet immediate instructional needs.

Effectiveness of Digital Innovation in PAI Instruction

The implementation of digital innovation in PAI instruction at two Madrasah Aliyah in Banda Aceh has yielded a range of positive outcomes, particularly in relation to student engagement, conceptual understanding, and instructional efficiency. Based on interviews and document analysis, the use of digital tools has demonstrably enriched several core dimensions of the learning process. The table below summarizes the key areas of impact observed during the study:

Table 2. Impact of Digital Innovation on PAI Learning

Aspect Observed	Positive Impact	Description
Student learning interest	Increased	Higher enthusiasm, particularly during video-based and gamified learning
Conceptual understanding	Improved	Visualization aids in grasping abstract topics such as *aqidah*
Active participation	Enhanced in online discussions and digital quizzes	Evident in platforms like Google Classroom and WhatsApp Groups
Evaluation and feedback	More timely and measurable	Teachers can instantly track performance and provide real-time feedback
Digital literacy skills	Emerging among students	Developed through consistent use of learning apps and digital platforms

Increased student interest and motivation were among the most immediate and visible outcomes of digital innovation. Students reported greater enthusiasm for learning activities that incorporated interactive media, particularly when instructional videos or quiz-based games were used. These tools not only captured attention but also reduced fatigue during lessons, contributing to a more dynamic learning atmosphere.

Conceptual comprehension also improved through the use of visual resources. Abstract and philosophical themes in Islamic studies—such as the foundations of *aqidah* or narratives from Islamic history—became more accessible when paired with multimedia explanations. Visual storytelling enabled students to connect theoretical knowledge with real-life contexts, thereby deepening their understanding. In terms of classroom interaction, students became more engaged and participatory, especially in digital forums and quizzes. They actively responded to questions, collaborated in online discussions, and contributed their perspectives during peer-to-peer learning sessions. Digital tools thus fostered a more dialogic and student-centered learning environment, breaking away from traditional lecture-based instruction. Evaluation processes also benefited from the integration of digital platforms. Applications such as Google Forms and Quizizz allowed teachers to conduct rapid assessments and instantly analyze student performance. Feedback could be delivered in real time, enabling immediate reflection and correction. This efficiency supports a continuous learning loop, where students are more aware of their progress and areas for improvement.

Another noteworthy effect was the gradual development of students' digital literacy. Although not yet uniformly strong, students began acquiring functional skills in navigating online platforms, participating in virtual discussions, and accessing digital content. These competencies not only support their academic growth but also prepare them for digital engagement beyond the classroom. Nonetheless, some challenges remain. Issues such as limited internet connectivity, unequal access to digital devices, and varied teacher competence in content development continue to affect the consistency of implementation. Some educators managed to mitigate these obstacles by using personal devices, downloading materials for offline use, and participating in self-guided professional development. Thus, digital innovation in PAI instruction has made significant contributions to improving learning quality in Madrasah Aliyah. While structural and capacity-based challenges persist, the positive trends underscore the potential of well-integrated digital tools to enhance student outcomes.

2. Discussion

The findings of this study demonstrate that digital innovation in Islamic Religious Education (PAI) instruction at two Madrasah Aliyah in Banda Aceh has had a positive influence on key dimensions of the learning process, including student motivation, conceptual comprehension, classroom engagement, and assessment efficiency. The integration of digital media—particularly instructional videos and interactive quizzes—has enabled some teachers to shift from conventional, text-heavy instruction toward more dynamic and student-centered approaches. For instance, abstract topics in *aqidah* and Islamic history were rendered more accessible through multimedia, while gamified assessments increased students' enthusiasm and active participation.

These patterns suggest an emerging pedagogical shift in which several educators are moving beyond the role of knowledge transmitters to act as facilitators of interactive, contextualized learning experiences. However, this transition is not yet uniform across all

teachers or schools. The study revealed that the adoption of more complex digital resources—such as e-modules and culturally grounded Islamic content—remains limited and uneven, primarily due to gaps in infrastructure, digital literacy, and institutional support.

This study's findings align with previous research by Nasir et al. (2024), who emphasized that meaningful technology integration in religious education requires not only access to digital tools but also the implementation of active, student-oriented pedagogy. Furthermore, international studies, such as that by Almahasees et al. (2021), have confirmed that interactive digital platforms can significantly improve engagement and cognitive outcomes, especially in value-based disciplines like Islamic education. What distinguishes the present research is its contextual focus—documenting how digital tools are used within Islamic learning environments in Aceh, a region with deeply rooted religious traditions. While earlier studies often examined generic applications of educational technology, this research highlights localized practices and the challenges of aligning digital innovation with religious values and cultural norms.

At the same time, the study underscores several enduring limitations. Many madrasahs continue to face infrastructural and pedagogical challenges that inhibit the full potential of digital innovation. Unreliable internet connectivity, insufficient access to digital devices, and the lack of structured teacher training in digital content development all represent significant barriers. Additionally, the degree of innovation often depends on individual teacher initiative rather than systematic institutional policy. While a number of digitally inclined teachers have begun producing original learning content, others remain reliant on pre-existing materials that may lack contextual relevance.

The future of digital innovation in PAI instruction therefore depends on the extent to which madrasahs can build enabling environments—through collaborative teacher networks (such as MGMPs), structured digital training, and investment in infrastructure. Strengthening these foundations will allow innovation to flourish more broadly and equitably, ensuring that digital tools enhance not only instructional delivery but also the cultivation of digital religious literacy.

D. Conclusion

This study concludes that the integration of digital innovation into Islamic Religious Education (PAI) instruction at two Madrasah Aliyah in Banda Aceh has taken multiple forms, including the use of instructional videos, interactive quizzes, digital discussion platforms, and visual presentations. These tools have contributed meaningfully to enhancing students' interest in learning, promoting active engagement, and improving comprehension of complex Islamic teachings—particularly among students exposed to well-facilitated digital environments. However, the adoption and effectiveness of these innovations remain uneven. While some educators have embraced digital tools with creativity and contextual sensitivity, others continue to face significant obstacles, including limited technological infrastructure, inconsistent internet access, and insufficient training in digital content development. These disparities underscore the need

for a more coordinated and systemic approach to digital transformation in Islamic education.

From a practical standpoint, the study highlights important implications for PAI educators and school administrators. Teachers are encouraged to develop not only technical competence but also pedagogical strategies that promote student-centered and culturally relevant learning. This shift requires continuous professional development in digital literacy and instructional design, supported by institutional mechanisms that recognize and reward innovation. Madrasah leadership also plays a critical role in enabling digital innovation by providing the necessary infrastructure—such as devices, internet connectivity, and functional learning management systems—as well as fostering collaborative platforms like MGMPs to support shared learning and content development. Initiatives such as "One Teacher, One Digital Content" represent promising steps toward building a culture of innovation, but require broader institutional commitment to be sustainable.

To build on the findings of this study, future research should explore digital innovation practices in madrasahs located in rural or underserved areas, where resource constraints are often more pronounced. Comparative studies across different geographic and socio-economic contexts could provide deeper insights into structural disparities and inform inclusive digital education strategies. Additionally, there is an opportunity to develop and evaluate integrative digital learning models that bridge Islamic values with 21st-century competencies such as digital ethics, religious tolerance, and character formation. By pursuing such approaches, Islamic Religious Education can remain faithful to its core mission while effectively engaging with the realities of the digital age.

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