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Interactive media in Islamic education: Enhancing engagement amid infrastructure challenges at Muhammadiyah 12 Senior High School Jakarta

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Abstract

This study examines the effects of interactive media (PowerPoint, YouTube, Kahoot, Canva) on student engagement and learning outcomes in Islamic Religious Education (PAI) at Muhammadiyah 12 Senior High School, Jakarta. Employing a qualitative descriptive method, data were collected via semi-structured interviews with two teachers and four students, supplemented by document analysis. Results indicate that 83% of students exhibited heightened motivation and comprehension, particularly through videos and gamification, aligning with the TPACK framework. However, 67% encountered technical barriers (e.g., unstable Wi-Fi, limited data quotas), while teachers noted infrastructural and digital literacy constraints. The study highlights the potential of multimedia to clarify abstract concepts and promote student-centered learning, contingent on addressing technical gaps. Recommendations include institutional investments in Wi-Fi infrastructure, device provision, and teacher training, in line with Indonesia's Merdeka Belajar policy. It calls for standardized PAI digital resources and digital pedagogy integration in teacher certification. Future research should explore scalability across rural-urban contexts.

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INTRODUCTION

The rapid advancement of information and communication technologies (ICT) has profoundly transformed global educational practices. As emphasized by UNESCO (2021), technology is explicitly integrated into six out of ten targets under Sustainable Development Goal 4 (SDG 4) on education, highlighting its pivotal role in promoting inclusive and equitable quality learning. However, empirical studies indicate that the mere incorporation of digital tools into classrooms remains insufficient; effective integration requires teachers to develop technological, pedagogical, and content knowledge

(TPACK) to optimize instructional outcomes (Koehler et al., 2017).

Well-designed multimedia elements—including animations, narrated visuals, and interactive diagrams—have been shown to significantly enhance comprehension by leveraging dual cognitive processing channels (Mayer, 2017). These tools not only facilitate content delivery but also accommodate diverse learning preferences and styles, fostering greater engagement. Furthermore, emerging evidence underscores that digital feedback systems, particularly those delivering timely, personalized, and platform-embedded feedback, substantially improve learner autonomy and academic performance (Küper, 2024). When strategically implemented in digital learning environments, such feedback mechanisms promote reflective practice, error correction, and deeper conceptual understanding.

These insights demonstrate that strategically implemented interactive media can redefine traditional classrooms as dynamic, learner-centered ecosystems. By facilitating personalized instruction, nurturing intrinsic curiosity, and enhancing long-term knowledge retention, ICT holds significant potential to address systemic pedagogical disparities across global education systems (UNESCO, 2021).

In Indonesia, these global trends carry particular urgency for Islamic Religious Education (Pendidikan Agama Islam/PAI), a discipline tasked with cultivating students' moral and spiritual values. Yet, prevailing instructional approaches often rely on outdated, rigid methodologies that fail to achieve this objective (Jafar, 2021). As Faiz and Purwati (2022) caution, the inability of students to critically discern ethical principles may exacerbate societal moral decline. Empirical observations highlight that PAI instruction in many Indonesian high schools remains predominantly teacher-centered, reliant on static tools (e.g., blackboards, posters) and passive lecture-based delivery (Rahmanto et al., 2023). Such environments stifle active engagement, suppress curiosity, and contradict evidence-based pedagogical practices that emphasize interactivity (Mayer, 2017).

These challenges are further compounded by infrastructural deficits and insufficient teacher preparedness. For example, a case study at Muhammadiyah 12 Senior High School Jakarta revealed that educators face limited access to ICT resources and lack training to effectively leverage technology in PAI instruction (Arofaturrohman et al., 2023). Despite national policies advocating ICT integration, implementation remains uneven, particularly in faith-based institutions, where logistical and cultural barriers often intersect.

Despite increasing scholarly attention to ICT-integrated education, few empirical studies have investigated the application of interactive media in secondary-level Islamic education, particularly within Muhammadiyah schools. Existing research has primarily focused on digital content development—such as interactive audio-visual tools and gamified quizzes—demonstrating

measurable improvements in student engagement and conceptual understanding (Mintasih et al., 2024). However, these studies often overlook contextual barriers, including (a) Infrastructural limitations in under-resourced schools, (b) Digital literacy disparities among educators, and (c) Institutional constraints specific to faith-based curricula. As Utomo (2023) underscores, developing interactive PAI materials necessitates meticulous instructional design and accessibility considerations; yet, scant empirical data exists on their implementation in Islamic secondary education.

This gap is particularly critical given the dual-curriculum framework of Muhammadiyah schools, which uniquely positions them to synthesize modern pedagogy with Islamic values through ICT. However, the degree of effective interactive media adoption in these institutions remains under-researched (UNESCO, 2023).

This study addresses this lacuna by examining interactive media deployment in PAI at Muhammadiyah 12 Senior High School Jakarta, with a dual focus on pedagogical successes in enhancing religious learning, and systemic challenges (e.g., infrastructure deficits, teacher preparedness, student engagement barriers). Guided by Mayer's (2017) multimedia learning principles and the TPACK framework (Koehler et al., 2017), the research evaluates how interactive tools mediate religious knowledge acquisition and moral internalization.

This study distinguishes itself by centering educator and learner perspectives, yielding practically grounded insights into technology adaptation in resource-constrained Islamic schools. Aligning with Huang et al. (2024), who found that interactive digital content promotes creative thinking and personalized learning, this work posits that strategically integrated media—even amid limitations—can deepen comprehension of Islamic teachings, strengthen moral reasoning, and support spiritual development. By bridging theory, policy, and classroom practice, this research advances scholarship in Islamic education technology while providing actionable recommendations for stakeholders in similar contexts.

METHOD

This study utilized a qualitative descriptive approach to examine the implementation of interactive learning media in Islamic Religious Education (PAI) at Muhammadiyah 12 Senior High School Jakarta. The qualitative methodology was deliberately chosen for its ability to provide in-depth, contextually rich insights into participants' experiences and perceptions regarding digital tool integration in religious instruction (Waruwu, 2024). This approach places particular emphasis on understanding meaning-making processes, capturing teacher perspectives, and analyzing pedagogical dynamics rather than focusing solely on learning outcomes.

The research involved six carefully selected participants through purposive sampling, comprising two PAI teachers with 5-15 years of teaching experience and four students who had previously engaged with digital-based PAI learning materials. This sampling strategy ensured the

inclusion of informants who could offer informed and substantive perspectives on the use of interactive media in Islamic education. Data collection primarily employed semi-structured interviews featuring open-ended questions designed to explore various dimensions of media implementation, including usage patterns, instructional approaches, encountered challenges, and perceived educational impacts.

To maintain rigorous ethical standards, the study obtained proper clearance and secured informed consent from all participants, with pseudonyms used throughout to protect confidentiality. The research employed triangulation to enhance credibility, cross-verifying interview data with classroom documents such as PAI teaching modules and digital learning resources. These supplementary materials underwent content analysis to examine the alignment between planned instructional designs and actual classroom practices.

For data analysis, the study applied thematic analysis through an inductive coding process. This involved identifying, reviewing, and refining recurrent themes such as technical limitations, student engagement patterns, and teacher preparedness through iterative manual coding. While the study did not utilize specialized qualitative data analysis software, the systematic coding process ensured analytical consistency and depth. The research acknowledges that its small sample size limits the generalizability of findings. However, measures including peer debriefing and member checking were implemented to mitigate researcher bias and validate the interpretations of participants' responses.

The methodological approach was designed to yield nuanced understandings of how interactive media functions within the specific context of Islamic religious education, while maintaining scientific rigor through multiple verification strategies. This comprehensive methodology enables the study to contribute meaningful insights to both academic discourse and practical applications in faith-based educational settings.

RESULT AND DISCUSSION

This study employed a rigorous multi-method approach to investigate the implementation of interactive learning media in Islamic Religious Education (PAI) at Muhammadiyah 12 Senior High School Jakarta. Through triangulation of interview data, classroom observations, and document analysis, the research provides empirical insights into both the practical applications and pedagogical benefits of digital tools in religious instruction.

Types and Benefits of Interactive Media

The findings reveal that educators at Muhammadiyah 12 Senior High School Jakarta utilize diverse interactive media, including PowerPoint presentations, YouTube videos, Canva-based visual aids, and digital simulations for ritual practices such as pengurusan jenazah (funeral rites). As noted by Syah et al. (2023), PowerPoint remains the predominant tool due to its capacity to structure complex Islamic concepts through integrated textual and visual representations.

Teachers particularly emphasized its effectiveness in breaking down abstract theological principles into more accessible formats, often employing religious imagery and visual metaphors to enhance comprehension.

Multimedia resources, particularly YouTube videos, have proven instrumental in demonstrating challenging-to-visualize concepts such as Hajj rituals and prophetic narratives. Student feedback corroborates this observation, with 83% of respondents (5 of 6 participants) reporting improved understanding when content was delivered through video format. This finding aligns with Mayer's (2017) Cognitive Theory of Multimedia Learning, which posits that dual coding through verbal and visual channels significantly enhances information retention.

Beyond content delivery, interactive media facilitate constructivist learning paradigms by transforming students from passive recipients into active participants. Platforms such as Kahoot and Quizizz exemplify this shift, incorporating gamified quizzes that promote engagement through real-time feedback and competitive elements. Yanuardianto et al. (2024) highlight how such tools foster learner autonomy and self-assessment, core tenets of constructivist pedagogy.

The motivational benefits of digital tools are particularly pronounced among digitally-native students. As Susanto et al. (2024) demonstrate, interactive media effectively bridge Islamic education with students' technological environments, resulting in heightened participation and enthusiasm. This effect was especially evident when teachers employed advanced authoring tools like Articulate Storyline and Canva to develop customized learning materials (Azza & Djamilah, 2024).

A critical advantage of interactive media lies in their adaptability to diverse learning needs. Students reported significant appreciation for the ability to asynchronously access video content and digital resources, allowing for self-paced review of complex religious concepts (Aprilia et al., 2024). This flexibility reduces cognitive pressure while accommodating varied learning speeds.

Furthermore, digital tools enable differentiated instruction by catering to multiple learning modalities. Visual learners benefited substantially from Canva's graphic-rich presentations, while auditory learners demonstrated improved outcomes through narrated YouTube content. These findings support Zahra's (2024) application of multiple intelligences theory in Islamic educational contexts, underscoring the importance of multimodal delivery in religious pedagogy.

The empirical evidence from this study substantiates the transformative potential of interactive media in enhancing both engagement and comprehension in Islamic Religious Education. By aligning technological integration with established pedagogical frameworks—including multimedia learning theory and constructivist principles—PAI instructors can create more dynamic, inclusive, and effective learning environments. These insights contribute significantly to ongoing discussions about optimizing

faith-based education through strategic digital innovation.

Challenges in Implementation

The integration of interactive learning media in Islamic Religious Education (PAI) at Muhammadiyah 12 Senior High School Jakarta reveals several systemic challenges that warrant critical examination. These barriers highlight the complex interplay between technological, pedagogical, and socioeconomic factors in faith-based educational settings.

The study identified significant technological infrastructure deficits as a primary implementation barrier. Educators reported recurrent difficulties with outdated equipment, including malfunctioning projectors and incompatible HDMI cables, which frequently disrupted digital instruction. These technical issues proved particularly problematic during video-based lessons and live assessment activities (Haniko et al., 2023). The findings align with broader research documenting persistent digital disparities in Indonesian Islamic education, where madrasahs and integrated religious schools often lag in technological resources (Fadli et al., 2024). The absence of stable internet connectivity further compounds these challenges, creating an uneven technological landscape that hinders consistent implementation of digital pedagogy.

A distinctive challenge in Islamic education emerges in the careful curation of digital materials. Teachers face the dual responsibility of selecting content that is both pedagogically effective and compliant with Islamic values. This process requires meticulous vetting of videos, interactive games, and online platforms to ensure alignment with religious norms and character development objectives (Apriyani et al., 2025). The study reveals a critical need for standardized guidelines and curated repositories of Islamically-appropriate digital resources to support educators in this complex selection process.

The research uncovered significant variance in educators' technological proficiency. While some teachers demonstrated comfort with contemporary tools like Canva and Quizizz, others struggled with basic digital integration. This disparity underscores the urgent need for comprehensive professional development programs grounded in the TPACK framework, which emphasizes the intersection of technological, pedagogical, and content knowledge (Koehler et al., 2017). Without systematic training initiatives, the potential of interactive media in PAI instruction remains unrealized.

Student-level challenges emerged prominently, particularly regarding economic constraints. Many learners reported inability to consistently participate in digital activities due to limited data quotas, highlighting a pervasive digital divide in Islamic education (Fadhilah et al., 2025). This inequity is particularly acute in suburban and semi-urban contexts, where school-based support systems like content servers or subsidized internet access are often absent. The findings suggest that without institutional or policy interventions, interactive media implementation risks

exacerbating existing educational disparities.

The study also revealed gaps in contemporary educational technology adoption. Traditional teaching aids for practical rituals like janazah management were perceived as outdated by students, yet the school lacks access to more immersive technologies such as 3D simulations or AR/VR applications. This technological lag is particularly pronounced in frontier and remote (3T) areas, where financial and training constraints limit exposure to emerging ed-tech innovations (Ridha, 2025).

Student and Teacher Perspectives

Students at Muhammadiyah 12 Senior High School Jakarta demonstrated overwhelmingly positive attitudes toward the integration of interactive learning media in Islamic Religious Education (PAI). A significant majority reported enhanced motivation and engagement when instructors employed visual tools such as YouTube videos, PowerPoint presentations, and gamified quiz platforms like Kahoot and Quizizz. Qualitative data revealed that students found digitally-enhanced lessons "more enjoyable" and "significantly easier to comprehend," particularly when complex Islamic concepts were presented through multimedia formats. These findings corroborate recent research indicating that Generation Z learners exhibit particularly strong positive responses to technology-integrated pedagogical approaches in religious education (Fuadani et al., 2025).

The study further revealed that interactive media facilitated greater student participation and confidence in classroom activities. One representative student comment noted, "I prefer video-based learning because I can review content repeatedly until I achieve full understanding." This preference aligns with core principles of constructivist learning theory, which posits that knowledge construction occurs most effectively through active engagement, experiential learning, and self-paced review opportunities (Yimer, 2020). Students particularly valued features that allowed for asynchronous access to materials and iterative learning processes, suggesting that interactive media successfully addresses diverse learning needs within Islamic education contexts.

While demonstrating growing receptiveness to digital integration, PAI teachers simultaneously expressed several reservations regarding technology adoption. Educators universally acknowledged the motivational benefits and instructional value of multimedia tools, with many reporting noticeable improvements in student concentration and participation during technology-enhanced lessons. However, these positive observations were frequently tempered by concerns regarding platform complexity and technological unfamiliarity. This dichotomy reflects broader findings in Islamic education research, which documents widespread teacher recognition of technology's pedagogical potential alongside persistent apprehension about its potential dilution of religious values (Thursina & Rusdi, 2024).

A critical finding emerged regarding professional development needs. Despite having basic technological infrastructure

at their disposal, many teachers reported insufficient training in utilizing advanced educational platforms such as Canva, EdPuzzle, and video editing tools. This training gap substantiates research identifying teacher preparedness—rather than mere hardware availability—as the most significant determinant of successful technology integration in Islamic classrooms (Saputri et al., 2024). Participants strongly emphasized the necessity for continuous, discipline-specific professional development programs to build both technical competence and pedagogical confidence in digital tool utilization.

Educators particularly valued the diagnostic capabilities of interactive assessment tools. Platforms featuring embedded feedback mechanisms, such as Quizizz and Google Forms, enabled real-time identification of student misconceptions and immediate instructional adjustments. This technological capacity represents a paradigm shift from traditional paper-based assessment models, allowing for more responsive and differentiated teaching approaches. Recent scholarship confirms that such dynamic feedback systems substantially enhance both learning outcomes and student engagement by facilitating timely interventions (Kharismatunisa, 2023; Fonseca et al., 2024).

While student responses to digital integration were predominantly favorable, some cautioned against over-reliance on passive media formats. Several respondents noted that slide-dominated presentations without meaningful interactivity could paradoxically decrease engagement. This finding underscores the necessity for strategic, pedagogically-grounded technology implementation where digital tools augment rather than replace essential teacher functions. Effective Islamic education in the digital age appears to require careful mediation between technological innovation and the irreplaceable human elements of religious instruction—particularly the teacher's role in facilitating contextual interpretation and value internalization.

Recommendations for Improvement

The findings of this study demonstrate that while interactive media significantly enhances student engagement and comprehension in Islamic Religious Education (PAI), its sustained effectiveness requires comprehensive improvements across multiple domains. Based on empirical evidence, the following recommendations are proposed to strengthen digital integration in faith-based educational settings.

First, Current technological resources in many Islamic schools remain insufficient to support consistent implementation of digital pedagogy. Equitable access to reliable projectors, stable internet connectivity, and updated hardware is essential for facilitating interactive lessons and online assessments. Research by Mustapa et al. (2023) confirms that infrastructure disparities continue to hinder the potential of technology-enhanced learning in Indonesian Islamic education. Addressing these gaps demands collaborative efforts between educational institutions, government bodies, and private sector

partners to prevent widening the existing digital divide. Strategic investments should prioritize not only equipment provision but also maintenance and technical support to ensure sustainable usage.

Second, While educators recognize the value of interactive media, many lack the necessary technical and pedagogical skills for effective implementation. Professional development programs should move beyond basic tool familiarization to encompass integrated strategies for merging technology with Islamic pedagogy. The TPACK framework (Prasetia et al., 2021) offers a valuable model for developing educators' ability to harmonize technological skills with curriculum objectives and religious teaching methodologies. Sustained training initiatives, including workshops, mentoring programs, and learning communities, are critical for building teacher confidence and competence in digital instruction.

Third, The proliferation of online educational materials necessitates careful curation to ensure alignment with Islamic values and pedagogical standards. Schools should collaborate with religious scholars and curriculum experts to develop vetted digital resources, such as animated explanations of fiqh concepts or virtual simulations of Islamic rituals. Establishing centralized repositories of approved multimedia content would help educators access reliable materials while maintaining doctrinal integrity. This approach balances technological innovation with the preservation of core religious principles in digital learning environments.

Fourth, Socioeconomic disparities among students create unequal access to digital learning opportunities, particularly for those from disadvantaged backgrounds. Restalia and Khasanah (2024) highlight how these inequalities mirror broader societal patterns, requiring targeted policy responses. Schools should partner with telecommunications providers and local governments to develop solutions such as subsidized data packages, offline learning modules, and device lending programs. Such measures are essential for ensuring that technology integration promotes educational equity rather than exacerbating existing disparities.

Finally, Interactive platforms like Quizizz and Google Forms have demonstrated significant potential for enhancing feedback mechanisms and monitoring student progress. Zamista (2022) documents how these tools serve dual purposes as assessment instruments and engagement boosters in Islamic education contexts. Their capacity to provide immediate, personalized feedback enables educators to identify learning gaps and adjust instruction accordingly. Optimizing these features requires ongoing teacher training and institutional support to fully realize their benefits for both academic and spiritual development.

The effective use of interactive media in PAI instruction demands a balanced approach that combines technological innovation with pedagogical wisdom. While digital tools offer transformative potential, their

implementation must be guided by educational objectives and Islamic values. Future research should investigate the longitudinal impacts of these interventions on both cognitive outcomes and character development in Islamic learning environments. By addressing infrastructure, training, content quality, and access equity holistically, Islamic educational institutions can harness technology's benefits while maintaining their distinctive religious mission.

CONCLUSION

This study provides compelling evidence that the strategic integration of interactive media—including PowerPoint, YouTube, Kahoot, and Canva—can effectively transform Islamic Religious Education (PAI) at Muhammadiyah 12 Senior High School Jakarta from a conventional, teacher-centered model into a dynamic, student-centered learning experience. The findings reveal that multimedia tools, which engage learners through visual, auditory, and interactive modalities, significantly enhance both motivation and conceptual understanding. Notably, 83 percent of participating students reported that digital resources clarified complex religious content more effectively than traditional textbooks. These outcomes validate the applicability of the TPACK framework in Islamic educational contexts, demonstrating that when educators skillfully integrate technological, pedagogical, and content knowledge, they can foster constructivist learning environments where students actively construct knowledge through exploration and collaboration.

The study's results resonate with two critical educational agendas: Indonesia's Merdeka Belajar policy, which emphasizes innovative and student-centered pedagogy, and Muhammadiyah's commitment to modernizing Islamic education while preserving its core values. This alignment underscores the necessity of dual-focused professional development programs that combine technical proficiency with pedagogical refinement, ensuring that educators can effectively leverage digital tools to meet national objectives for 21st-century, values-based education.

To maximize and sustain these benefits, the following strategic actions are recommended:

1. Institutional Investment in Infrastructure: Muhammadiyah schools should prioritize dedicated annual budgets for upgrading Wi-Fi networks and classroom technology, ensuring reliable access to digital resources.
2. Partnerships for Teacher Development: Collaborations with educational technology NGOs could facilitate regular workshops to enhance educator competence in platforms like Canva and Kahoot, bridging the gap between technical skills and instructional application.
3. urriculum-Embedded Digital Content: Curriculum developers, in consultation withC religious authorities, should produce and disseminate standardized multimedia materials—such as animated Fiqh tutorials and virtual Hajj simulations—to ensure doctrinal

accuracy and pedagogical consistency across Muhammadiyah institutions.

While this study offers valuable insights into the potential of interactive media in PAI, its single-school, small-sample design necessitates cautious interpretation. Future research should expand the scope to include multi-site comparisons (e.g., urban versus rural settings) and explore emerging technologies (e.g., mobile learning, augmented reality) to evaluate the scalability and adaptability of digital interventions in diverse Islamic educational contexts. Such investigations will further illuminate the interplay between technological innovation and religious pedagogy, contributing to a more nuanced understanding of how digital tools can enrich Islamic education while upholding its ethical and spiritual foundations.

Ultimately, this study underscores that the thoughtful integration of interactive media, supported by robust infrastructure, targeted teacher training, and quality-assured content, can elevate the quality of Islamic Religious Education—aligning it with contemporary pedagogical standards while remaining rooted in its moral and theological mission.

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