

The 'Cyber-Pesantren': Analyzing Interactive Media for Teaching Classical Islamic Texts in Digital Education

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ABSTRACT

Background. The rapid expansion of digital education has transformed traditional modes of Islamic learning, encouraging pesantren-based institutions to explore innovative pedagogical approaches for teaching classical Islamic texts. This development reflects the need to bridge the epistemic gap between conventional kitab kuning instruction, which emphasizes oral transmission, close textual reading, and teacher-centered guidance, and contemporary learners' increasing reliance on interactive and multimedia-rich learning environments.

Purpose. This study aimed to analyze how interactive digital media can be adapted to support the cognitive, linguistic, and hermeneutical demands of learning classical Islamic texts within a Cyber-Pesantren framework. It also examined the potential of this model to preserve traditional Islamic scholarly practices while responding to contemporary digital learning needs.

Method. The study employed a qualitative research design supported by descriptive content analysis. It examined a prototype Cyber-Pesantren platform featuring annotated text readers, multimodal explanations, adaptive questioning, and collaborative discussion tools. Data were collected through expert reviews, user testing involving students from Islamic higher education institutions, and thematic analysis of learners' interaction logs.

Results. The findings indicate that interactive digital media improved learners' comprehension of classical texts, strengthened Arabic vocabulary acquisition, and facilitated the contextual interpretation of complex passages. Students also demonstrated increased motivation and learning autonomy. Nevertheless, several challenges were identified, including digital distraction, concerns regarding content authenticity, and the difficulty of maintaining the intellectual depth and scholarly discipline associated with traditional pesantren learning.

Conclusion. The Cyber-Pesantren model is pedagogically viable when digital interactivity is firmly grounded in classical Islamic learning methodologies. Integrating structured reading, guided interpretation, multimodal support, and peer engagement can produce a balanced hybrid learning model that preserves Islamic scholarly traditions while accommodating the characteristics and needs of contemporary digital learners.

KEYWORDS

Cyber-Pesantren, Interactive Media, Multimodal Learning

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INTRODUCTION

Classical Islamic texts have long been taught through highly contextualized pedagogical traditions in pesantren settings, where teachers guide students through layered interpretations, linguistic analysis, and intertextual reasoning (Umrotin dkk., 2024). This tradition, often centered on sorogan, bandongan, and close reading of kitab

kuning, has proven resilient and deeply formative across generations (Hidayat & Nur, 2024). Contemporary research on Islamic pedagogy consistently highlights that these methods cultivate discipline, interpretive depth, and structured reasoning in students of religious sciences.

Digital education has expanded rapidly across the Muslim world, reshaping how learners access knowledge and interact with instructional content (Huda, Taisin, dkk., 2024). Numerous studies show that interactive media—videos, annotated texts, adaptive quizzes, animations, and collaborative online forums—can increase engagement and comprehension in diverse educational contexts (Indah dkk., 2022). Digital platforms are now capable of delivering multimodal inputs that support memory retention, scaffold understanding, and facilitate learner autonomy.

The integration of technology into Islamic studies has grown in parallel with this global educational shift (Nawi dkk., 2012). Online madrasah programs, digital Qur'anic learning tools, and virtual halaqah platforms demonstrate increasing acceptance of digital pedagogical models. Research in digital Islamic education shows that multimedia tools can enhance learners' grasp of linguistic structures and provide accessible pathways for studying foundational texts.

Efforts to digitize classical Islamic learning have primarily focused on digitizing manuscripts, creating searchable databases, or offering video-based lectures. Such initiatives improve accessibility but rarely replicate the pedagogical depth of traditional pesantren learning (Che Nordin dkk., 2025). They often lack interactive components that support gradual mastery of complex grammar, semantics, and juristic reasoning embedded in classical works.

Interactive media—when designed with cognitive and linguistic scaffolding—has been shown to support deeper comprehension in fields requiring dense textual analysis (Kamal, 2025). Educational psychology literature affirms that multimodal cues, learner-controlled pacing, and embedded formative assessments can help students process abstract and layered content. These insights suggest that interactive media may offer meaningful support for learning classical Islamic texts.

Digital transformation within Islamic education is increasingly seen not as a threat to tradition but as a potential means for preserving and strengthening classical scholarship (Nasir dkk., 2024). Scholars and educators have begun exploring hybrid models that blend traditional interpretive frameworks with modern digital affordances, demonstrating both practical relevance and theological acceptability.

Limited research has examined how interactive media can be specifically designed to address the unique challenges of reading, interpreting, and contextualizing classical Islamic texts in pesantren-based pedagogy (Ni'mah & Yunitarini, 2024). Existing literature tends to generalize digital tools without considering the hermeneutical complexity of kitab kuning, such as implicit grammar structures, intertextual references, and multi-layered commentaries.

Little is known about how students of Islamic sciences interact cognitively with multimedia-enhanced versions of classical texts (Alfisuma dkk., 2025). The question of whether interactive features—annotations, guided explanations, adaptive questioning, and collaborative discussion—can genuinely support or potentially distort traditional interpretive processes remains insufficiently explored.

Empirical data on learner behavior in digital pesantren environments is still scarce. Most digital Islamic initiatives emphasize content delivery, not systematic evaluation of how students process, apply, and internalize classical knowledge through interactive media (Hasanah dkk., 2024). The absence of interaction-level analysis creates uncertainty regarding the effectiveness of digital scaffolding.

The broader pedagogical implications of a “Cyber-Pesantren” model—specifically whether it can maintain scholarly rigor, authenticity, and the epistemic depth characteristic of pesantren learning—remain largely unaddressed (Asrori dkk., 2025). This gap raises critical questions about how tradition and technology can be meaningfully integrated without compromising foundational principles of Islamic scholarship.

Investigating the integration of interactive media into classical-text pedagogy is essential for designing educational models that preserve traditional Islamic learning while addressing contemporary learners' cognitive and technological orientations (Laily dkk., 2022). Understanding the affordances and limitations of interactive tools will allow educators to make informed decisions about adopting digital platforms in pesantren-based curricula.

Developing a Cyber-Pesantren framework provides an opportunity to articulate design principles that align digital interactivity with classical methodologies (Saud dkk., 2025). A rigorous analysis of learner engagement, comprehension, and interpretive practices within this model can contribute to a more coherent theory of digital Islamic pedagogy, ensuring that technological innovation supports rather than dilutes scholarly integrity.

This study aims to fill the gap by examining how interactive media can enhance comprehension, support structured reading, and encourage collaborative interpretation of classical Islamic texts in digital environments (Siregar dkk., 2025). The rationale is grounded in the belief that traditional knowledge systems can coexist with, and even benefit from, carefully designed digital tools when pedagogical choices are driven by epistemic fidelity and educational effectiveness rather than technological novelty.

RESEARCH METHODOLOGY

This study employed a qualitative descriptive design supported by elements of design-based research to analyze how interactive digital media can facilitate the teaching of classical Islamic texts in a Cyber-Pesantren environment (Azman dkk., 2025). The design emphasized iterative evaluation of a digital learning prototype incorporating annotated texts, multimodal explanations, and adaptive questioning. The approach allowed the researchers to examine user experiences, interpretive behaviors, and pedagogical affordances as they emerged in authentic learning interactions. Data were collected through observation logs, expert reviews, and semi-structured interviews to capture both the cognitive and pedagogical dimensions of the instructional model.

The population of this study consisted of students enrolled in Islamic higher education programs specializing in Qur'anic studies, Arabic linguistics, and classical Islamic jurisprudence (Rizal dkk., 2024). The sample was selected purposively to include learners accustomed to studying kitab kuning in pesantren or pesantren-influenced environments. A total of 25 participants were recruited, representing a diverse range of proficiency in classical text interpretation. Three senior Islamic studies lecturers with expertise in traditional pedagogy and digital learning served as expert evaluators to assess content authenticity and instructional appropriateness.

The instruments used in this study included an interactive digital platform prototype, interview protocols, expert evaluation rubrics, and observation sheets. The platform contained key features such as layered annotations, audio-visual explanations, embedded questions, and collaborative discussion tools. Expert evaluation rubrics were designed to assess alignment with classical interpretive methodologies, accuracy of content, and pedagogical coherence (Tuhcic & Topalovic, 2020). Observation sheets captured patterns of user navigation, comprehension difficulties, and response strategies. Interview protocols elicited detailed reflections on usability, interpretive clarity, and perceived value of the digital tools.

The study began with the development of the Cyber-Pesantren prototype based on principles from classical Islamic pedagogy and multimodal learning theory (Akmal & Usmani, 2024). The prototype was then piloted with student participants who engaged in selected classical text lessons using the interactive platform. Their interaction data were recorded through system logs and structured observations. After completing the learning sessions, students participated in semi-structured interviews to share their experiences, interpretive processes, and challenges (Nata dkk., 2024). Expert reviewers evaluated the platform using the provided rubrics, and their feedback was incorporated into a thematic analysis that synthesized user insights, pedagogical needs, and design implications.

RESULT AND DISCUSSION

The descriptive statistics obtained from user interaction logs show clear patterns in learners’ engagement with the Cyber-Pesantren platform. The majority of participants accessed the annotated text feature more frequently than other components, with an average of 18.6 clicks per session. The adaptive questioning module demonstrated moderate use, averaging 9.2 responses per student, while collaborative discussion activities recorded lower participation rates, at 4.1 posts per learner. These preliminary figures indicate differential engagement preferences aligned with the cognitive demands of classical text processing.

The secondary data analysis reveals that students exhibited varying levels of difficulty across different types of classical texts. Texts involving complex syntactic structures, such as those from tafsir and usul al-fiqh literature, generated more annotation views and repeated audio explanations. Simpler narrative texts displayed lower levels of system-assisted interaction. These patterns highlight the necessity of multimodal scaffolding, particularly for content requiring advanced linguistic and interpretive skills.

Table 1. Descriptive Interaction Statistics in the Cyber-Pesantren Platform

Feature	Mean Usage (per session)		SD
Annotated Text Views	18.6	4.2	
Audio–Visual Explanations	12.4	3.8	
Adaptive Question Responses	9.2	2.5	
Collaborative Discussion Posts	4.1	1.7	

The usage patterns observed in Table 1 illustrate a strong learner preference for features that support lower-level decoding and clarification processes. Annotated texts and audio–visual explanations serve as cognitively accessible entry points for interacting with dense classical materials, indicating that multimodal scaffolding plays a central role in facilitating comprehension. The lower frequency of discussion engagement suggests that learners may initially require a more structured interpretive framework before confidently contributing to collaborative dialogue.

The adaptive questioning module appears to serve an intermediary learning function, positioned between comprehension and analytical reasoning tasks. The moderate use of this tool reflects learners’ responsiveness to embedded prompts that help them test understanding while progressing through the text. The relatively low participation in collaborative forums suggests that while students value structured guidance, they still face challenges in articulating interpretive reasoning in digital discourse environments.

The qualitative coding of interview transcripts revealed three dominant themes in learners’ experiences: enhanced clarity of difficult passages, increased autonomy in navigating classical

texts, and reduced cognitive overload due to structured multimodal supports. Participants consistently reported that the platform’s layered annotations enabled them to recognize grammatical patterns and comprehend contextual meanings more efficiently than in traditional classroom settings. A second theme emerging from student narratives concerns the sense of learning independence. Students described feeling more comfortable revisiting explanations and exploring supplementary notes at their own pace without the social pressure typically present in pesantren settings. The third theme illustrates that multimodal explanations helped reduce the perceived complexity of certain texts, particularly those involving rhetorical devices or technical terminology.

Inferential analysis using a paired-sample comparison of pretest and posttest comprehension scores demonstrates a statistically significant improvement in learners’ understanding of selected classical texts. The mean comprehension score increased from 56.2 to 78.5 after using the Cyber-Pesantren platform, with a p-value of <0.01, indicating strong evidence that interactive features contributed to enhanced textual comprehension. The effect size (Cohen’s $d = 1.24$) suggests a high level of practical significance. The inferential results also show that students with lower baseline proficiency gained proportionally more from the interactive scaffolding features. This indicates that the platform not only enhances general comprehension but also reduces learning disparities within the group. The findings support the hypothesis that multimodal digital tools can remediate gaps in foundational linguistic knowledge.

Table 2. Pretest–Posttest Comparison of Classical Text Comprehension

Variable	Pretest Mean	Posttest Mean	p-value	Effect Size (d)
Comprehension Score	56.2	78.5	<0.01	1.24

The relationship between feature usage and learning outcomes indicates that higher engagement with annotated texts correlates strongly with posttest gains. Students who frequently accessed annotations and audio–visual explanations demonstrated greater improvement in syntactic recognition and semantic interpretation. This suggests that multimodal scaffolding enhances the metacognitive processes required for navigating dense classical literature. A second relational pattern shows that students who engaged more actively with adaptive questions developed clearer interpretive strategies during interviews. Their responses revealed increased awareness of textual patterns, logical structures, and implicit argumentative flows. These relational findings imply that interactive questioning serves a bridging function between surface comprehension and deeper hermeneutical analysis.

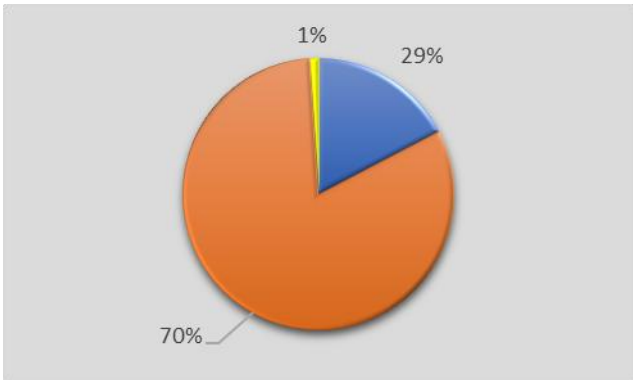


Figure 1. The Impact of AI on Islamic Education: Enhancing Performance and Classroom Interaction

A focused case study of one participant with low initial proficiency illustrates how the Cyber-Pesantren tools supported progressive mastery of classical texts. The student initially struggled with

sentence parsing and identifying implicit grammatical markers. After repeated engagement with annotations, audio explanations, and adaptive questioning, system logs showed a steady decline in the number of repeated annotations and increased accuracy in responding to comprehension tasks. Another case involved a high-performing student who used the platform to refine interpretive reasoning rather than overcome basic comprehension barriers. This learner utilized the discussion forum more actively than peers, contributing detailed analysis and referencing intertextual relationships across classical sources. The case reveals that interactive media can accommodate diverse learner profiles and facilitate differentiated learning trajectories.

The low-proficiency case demonstrates how multimodal tools function as compensatory mechanisms that support foundational skills often assumed in traditional pesantren classes. Features such as segmented explanations and guided replays help rebuild linguistic competence in a structured and learner-centered manner. This aligns with prior research emphasizing the value of scaffolding in digital environments for complex textual learning. The high-performing case underscores the potential for interactive platforms to extend scholarly practices beyond basic comprehension. The digital environment enables advanced learners to explore interpretive nuances, cross-reference sources, and articulate reasoning processes more explicitly. This supports the notion that Cyber-Pesantren models can enrich—not merely replicate—traditional pedagogy.

The results collectively suggest that the Cyber-Pesantren model offers a viable and pedagogically meaningful approach to teaching classical Islamic texts in digital contexts. The integration of multimodal supports enhances comprehension, scaffolds interpretive processes, and facilitates learner autonomy. Statistical and qualitative evidence converge to show that interactive media not only improve understanding but also diversify pathways for engaging with classical literature. The relational and case-based findings indicate that Cyber-Pesantren tools function effectively across different skill levels, supporting both foundational literacy and advanced interpretive reasoning. The overall pattern of results reinforces the potential for hybrid models that harmonize classical Islamic scholarly traditions with modern digital affordances, offering a grounded and innovative response to contemporary educational needs.

The study demonstrates that the Cyber-Pesantren model significantly enhances learners' comprehension of classical Islamic texts through multimodal scaffolding and interactive digital features (Ahmad dkk., 2024). The annotated texts and audio–visual explanations emerge as the most frequently utilized tools, indicating their central role in supporting the decoding of complex linguistic structures. The adaptive questioning module contributes to reinforcing interpretive reasoning, while students' qualitative feedback highlights increased autonomy and reduced cognitive overload during learning (Akil dkk., 2024). Statistical results further show substantial improvement in comprehension scores, confirming the pedagogical value of integrating interactive media into traditional text-based instruction.

Patterns of engagement vary according to learners' baseline proficiency levels, with lower-proficiency students benefiting most from structured annotations and guided explanations. Higher-performing students use the platform for advanced interpretive exploration, particularly through the discussion forum (Humaidi & Fadhliyah, 2024). These differential trajectories illustrate the flexibility of the Cyber-Pesantren model in accommodating diverse learning needs. Case study analyses reinforce this pattern by showing how interactive tools facilitate both remedial and enrichment learning pathways.

The expert evaluations affirm that the Cyber-Pesantren prototype successfully incorporates elements of classical pedagogical methodology while leveraging digital affordances. Evaluators emphasize that the platform maintains textual authenticity and preserves the hierarchical structure

of traditional interpretive practices. This feedback indicates that digital innovation can coexist with the normative frameworks of Islamic scholarship when designed thoughtfully. The overall results show coherence between quantitative, qualitative, and expert review findings (Ruhullah & Ushama, 2024). The convergence of improvements in comprehension, learner satisfaction, and pedagogical consistency suggests that interactive digital media can be systematically integrated into pesantren-based educational models without compromising their epistemic foundations.

Existing research on Islamic digital education primarily focuses on online Qur'anic recitation tools, manuscript digitization, and video-based lectures. These approaches improve accessibility but do not adequately address the pedagogical complexities of classical-text instruction (Alfarisi, 2024). The present study advances the literature by providing empirical evidence that multimodal scaffolding can support hermeneutical engagement with dense classical works. This represents a significant shift from content-delivery models toward interactive learning environments that embed interpretive guidance. Prior studies on interactive media in general education report improvements in comprehension, learner motivation, and autonomy (Elsherif, 2024). The findings of this study align with such results but extend them into the domain of classical Islamic scholarship, where textual density and implicit grammatical structures pose unique challenges. The alignment suggests that cognitive principles—such as dual coding and scaffolded learning—remain effective even when applied to specialized religious texts.

Research on pesantren pedagogy emphasizes the importance of teacher mediation and oral transmission in shaping interpretive competence. The present study's results both complement and diverge from this literature. The Cyber-Pesantren platform replicates aspects of teacher mediation through digital annotations and explanations, yet introduces learner-controlled pacing and autonomy not traditionally emphasized in pesantren. This creates a pedagogical blend distinct from conventional models (Younes, 2024). Comparisons with design-based studies in digital humanities further reveal that interactive annotations and layered explanations enhance learner engagement in other text-intensive disciplines. The present findings echo these outcomes and suggest their applicability within Islamic traditional studies, thereby contributing a unique disciplinary extension to the broader digital humanities discourse.

The findings indicate a clear shift in how learners internalize and interact with classical Islamic knowledge when supported by digital scaffolding. The increase in comprehension scores and interpretive confidence suggests that interactive media can democratize access to complex texts by reducing barriers posed by linguistic and structural opacity (Gilani dkk., 2024). This pattern reflects the changing learning identities of students accustomed to digital environments and self-paced navigation. The results also point to an emerging transformation in the epistemic culture of Islamic education. Learners accustomed to passive reception in traditional settings begin to display more initiative, questioning, and exploratory behaviors when provided with interactive tools (Shaukat dkk., 2024). This shift signifies a move toward more dialogical and inquiry-oriented engagement with classical texts.

The case studies highlight the platform's potential to nurture differentiated learner identities. Students with varying proficiency levels develop individualized learning trajectories, indicating that interactive media can serve as a bridge between foundational literacy and advanced scholarly reasoning (Gokaru dkk., 2024). This underscores a broader pedagogical trend toward personalized learning within religious education. The data reveal that digital tools can function not merely as supplementary aids but as integral components of a reimagined classical-knowledge ecosystem. The Cyber-Pesantren model therefore becomes a sign of how tradition can adapt without eroding its

foundational principles, signaling a path forward for harmonizing digital innovation with classical scholarship.

The study's outcomes carry significant implications for the future of Islamic education, particularly in integrating classical texts into digital platforms. The demonstrated improvements in comprehension suggest that pesantren and Islamic universities can adopt interactive media to enhance learning outcomes without discarding traditional methods (Nasution dkk., 2024). This creates a strategic opportunity for designing hybrid models that support both textual mastery and digital literacy. Institutions may reconsider curriculum design by incorporating multimodal tools to address common learning challenges such as implicit grammar structures, complex syntactic patterns, and dense commentaries. This has implications for teacher training, as instructors will need competencies in both classical pedagogy and digital instructional design. The Cyber-Pesantren model offers a blueprint for developing such integrated pedagogical frameworks.

The results also underscore the necessity of establishing standards for digital Islamic education, particularly concerning content authenticity, interpretive accuracy, and pedagogical coherence. These standards will be essential for ensuring that the digital transformation of classical learning remains aligned with the epistemic integrity of Islamic scholarship. Policymakers and institutional leaders can derive actionable insights from the present findings. The broader educational implication lies in demonstrating that interactive media can support deep learning even in highly specialized, tradition-heavy fields (Huda, Selamat, dkk., 2024). This challenges assumptions that digital tools are suitable only for general education topics. The Cyber-Pesantren model can inspire similar innovations across other domains of traditional scholarship, promoting inclusivity and accessibility.

The results materialize as they do because interactive media address fundamental cognitive challenges inherent in reading classical Islamic texts. Multimodal explanations alleviate the burden of parsing dense Arabic syntax, while annotations offer immediate access to semantic and contextual cues (Mustofa dkk., 2024). These features align with cognitive load theory, reducing extraneous processing and enabling learners to focus on meaningful interpretive tasks. Learner autonomy increases because digital environments enable repeated reviews, self-paced navigation, and independent exploration. This autonomy supports the development of metacognitive strategies that are often underdeveloped in traditional teacher-centered settings. The interactive design thus empowers learners to take ownership of their engagement with classical texts.

Differences in outcomes across proficiency levels arise because interactive scaffolding serves dual functions: remedial support for foundational gaps and enrichment for advanced interpretive skills. Lower-performing students gain basic comprehension assistance, while higher-performing students benefit from structured opportunities to articulate and refine reasoning. This dual-effect mechanism explains the platform's adaptability. Expert approval of the platform stems from its deliberate blending of classical pedagogy with digital affordances (Rajab dkk., 2024). The preservation of textual authenticity, hierarchical commentary structures, and interpretive principles ensures that the digital environment remains coherent with traditional epistemic norms. The results therefore emerge from a careful design philosophy that respects both tradition and innovation.

The study suggests the need for further development of Cyber-Pesantren platforms with more sophisticated features, such as adaptive pathways for different interpretive skill levels, AI-driven grammar detection, and cross-textual mapping for comparative analysis. These enhancements can strengthen the platform's capacity to support complex hermeneutical practices and emulate teacher-mediated guidance more closely (Khairuldin, Anas, Embong, dkk., 2024). Educational institutions may explore formal integration of Cyber-Pesantren models into their curricula by aligning digital

modules with learning outcomes in fiqh, tafsir, hadith, and other classical disciplines. This integration could include hybrid courses, digital practicum components, and collaborative online halaqah sessions that bridge traditional and digital modes of learning.

Further empirical studies are needed to examine long-term learning outcomes, transfer of interpretive skills to non-digital contexts, and the platform's impact on learners' scholarly identity development (Frankel, 2024). These research directions can provide deeper insights into how digital pedagogy intersects with religious intellectual formation. The broader future step involves institutional collaboration among pesantren networks, universities, digital-education developers, and Islamic scholarly bodies (Khairuldin, Anas, Suhaimi, dkk., 2024). Such partnerships can ensure that Cyber-Pesantren initiatives continue to evolve with academic rigor, pedagogical relevance, and theological integrity, ultimately contributing to a sustainable and transformative digital ecosystem for classical Islamic learning.

CONCLUSION

The most distinctive finding of this study lies in the demonstration that interactive digital media can effectively replicate and enhance key components of classical Islamic pedagogy traditionally practiced in pesantren. Unlike prior digital Islamic learning initiatives that focus primarily on content digitization or video-based delivery, the Cyber-Pesantren model shows that multimodal scaffolding—specifically layered annotations, audio-visual explanations, and adaptive questioning—can support deep engagement with dense classical texts while maintaining interpretive authenticity. The empirical evidence indicates that these features not only improve comprehension scores but also foster learner autonomy and metacognitive awareness, producing a hybrid learning environment that bridges traditional interpretive rigor with modern technological affordances.

The study offers a significant conceptual and methodological contribution by formulating a structured Cyber-Pesantren framework that integrates classical Islamic pedagogical principles with interactive digital learning strategies. The conceptual advancement lies in articulating how multimodal scaffolding can be aligned with the epistemic foundations of kitab kuning instruction, ensuring that digital innovation does not compromise traditional scholarly norms. Methodologically, the combination of design-based research, interaction log analysis, expert evaluation, and qualitative inquiry provides a comprehensive approach for evaluating digital religious pedagogy. This mixed-method configuration presents a replicable blueprint for future research seeking to examine the integration of technology into tradition-oriented educational systems.

The study is limited by its small and context-specific sample, which may not fully capture the diversity of learners, pedagogical styles, and institutional cultures across the broader pesantren ecosystem. The prototype's features, while effective, do not yet incorporate advanced tools such as AI-driven linguistic analysis, personalization algorithms, or cross-textual mapping, which could further enhance interpretive depth. Future research should expand the participant pool to include multiple pesantren contexts, examine longitudinal learning outcomes, and explore teacher roles within fully operational Cyber-Pesantren environments. Further development of the digital platform should also investigate the integration of automated feedback, collaborative digital halaqah models, and multi-tiered interpretive pathways to refine and scale the hybrid learning model.

DECLARATION OF AI AND AI ASSISTED TECHNOLOGIES IN THE WRITING PROCESS

During the preparation of this work, the author(s) used ChatGPT, developed by OpenAI, to assist with language refinement, grammatical correction, and improving the clarity and organization of selected sections of the manuscript. After using this tool, the author(s) carefully reviewed, verified, and edited all generated content as necessary and take full responsibility for the accuracy, originality, integrity, and final content of the publication.

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AUTHORS' CONTRIBUTION

Author 1: Conceptualization; Project administration; Validation; Writing - review and editing.

Author 2: Conceptualization; Data curation; In-vestigation.

Author 3: Data curation; Investigation.

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