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Learning Needs Analysis for Developing AI-Powered Interactive Media in Islamic Cultural History Learning at Primary Madrasah

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Abstract

This study aims to identify learning needs for developing Artificial Intelligence (AI)-powered interactive learning media in Islamic Cultural History (SKI) learning at a primary madrasah. This research employed a qualitative case study approach conducted at Madrasah Ibtidaiyah Darul Ulum Pondok Wuluh, Probolinggo. The participants consisted of 20 sixth-grade students, one SKI teacher, and one madrasah head, selected through purposive sampling. Data were collected through classroom observations, semi-structured interviews, and documentation. The findings reveal that SKI learning is predominantly conducted through conventional lecture-based methods, resulting in low student engagement. Most students (approximately 80%) expressed a preference for visual, interactive, and game-based learning media, while also reporting feelings of boredom when learning relied solely on textbooks and verbal explanations. The teacher and school leader demonstrated a positive attitude toward integrating digital technology, although limitations in technological skills and infrastructure were identified. The needs analysis indicates that AI-powered learning media should incorporate adaptive feedback, dynamic visualization, interactive features, and integration of Islamic moral values to support both cognitive and affective learning. These findings imply that the development of AI-based interactive media should be designed not only to align with students' learning preferences but also to support teachers' instructional practices and maintain the moral orientation of Islamic education.

Keywords: Interactive Learning Media; Artificial Intelligence; Islamic Cultural History; Madrasah Ibtidaiyah.

Abstrak

Penelitian ini bertujuan untuk mengidentifikasi kebutuhan pembelajaran dalam pengembangan media pembelajaran interaktif berbasis Artificial Intelligence (AI) pada pembelajaran Sejarah Kebudayaan Islam (SKI) di madrasah ibtidaiyah. Penelitian ini menggunakan pendekatan kualitatif dengan jenis studi kasus yang dilaksanakan di Madrasah Ibtidaiyah Darul Ulum Pondok Wuluh, Probolinggo. Partisipan penelitian terdiri dari 20 siswa kelas VI, satu guru SKI, dan satu kepala madrasah yang dipilih melalui teknik purposive sampling. Pengumpulan data dilakukan melalui observasi kelas, wawancara semi

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terstruktur, dan dokumentasi. Hasil penelitian menunjukkan bahwa pembelajaran SKI masih didominasi oleh metode konvensional berbasis ceramah yang berdampak pada rendahnya keterlibatan siswa. Sebagian besar siswa (sekitar 80%) menunjukkan preferensi terhadap media pembelajaran yang bersifat visual, interaktif, dan berbasis permainan, serta mengungkapkan rasa bosan ketika pembelajaran hanya menggunakan buku teks dan penjelasan verbal. Guru dan kepala madrasah menunjukkan sikap positif terhadap integrasi teknologi digital, meskipun masih terdapat keterbatasan dalam keterampilan teknologi dan sarana pendukung. Analisis kebutuhan menunjukkan bahwa media pembelajaran berbasis AI perlu dirancang dengan mengintegrasikan umpan balik adaptif, visualisasi dinamis, fitur interaktif, serta nilai-nilai moral Islam untuk mendukung aspek kognitif dan afektif siswa. Temuan ini mengimplikasikan bahwa pengembangan media interaktif berbasis AI tidak hanya perlu menyesuaikan dengan karakteristik dan preferensi belajar siswa, tetapi juga harus mendukung praktik pembelajaran guru serta tetap menjaga orientasi nilai dalam pendidikan Islam.
Kata kunci: *Media Pembelajaran Interaktif; Kecerdasan Buatan; Sejarah Kebudayaan Islam; Madrasah Ibtidaiyah*.

INTRODUCTION

The rapid development of digital technology has significantly transformed the landscape of education, particularly through the integration of Artificial Intelligence (AI) in learning processes. In the context of 21st-century education, students are required not only to master cognitive knowledge but also to interact effectively with digital technologies to support meaningful learning experiences (Marta et al., 2025). AI has emerged as one of the most promising innovations, offering opportunities to create adaptive, personalized, and interactive learning environments. However, the integration of AI in Islamic education, especially at the primary level, remains limited and requires further exploration.

In Islamic primary education, particularly in the subject of Islamic Cultural History (Sejarah Kebudayaan Islam/SKI), learning is expected to foster not only intellectual understanding but also moral and spiritual development. SKI plays a crucial role in shaping students' awareness of Islamic civilization, identity, and values (Mutmainah & Mufid, 2018). Ideally, learning should encourage students to reflect on historical events and internalize moral lessons embedded in Islamic history. However, in practice, SKI learning in many madrasah ibtidaiyah still relies heavily on conventional, teacher-centered approaches, such as lectures and textbook-based instruction, which tend to limit student engagement and participation (Ramadhan & Usriyah, 2021; Hidayat, 2024).

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This condition contributes to low levels of student motivation and interest in learning SKI. Previous studies have shown that students often perceive SKI as monotonous and less engaging due to its dominant use of textual and memorization-based approaches (Suroiha et al., 2021; Mubarak et al., 2022). Meanwhile, primary school students, as digital natives, demonstrate a stronger preference for visual, interactive, and technology-supported learning experiences (Rumainur & Razak, 2020). The mismatch between students' learning characteristics and existing instructional practices creates a pedagogical gap that needs to be addressed through innovative learning media.

Recent developments in educational technology highlight the potential of AI-powered interactive media to enhance student engagement, motivation, and learning outcomes. AI enables adaptive feedback, dynamic visualization, and personalized learning pathways that can support students' diverse needs (Hwang et al., 2022; Pont-Niclòs et al., 2024). In the context of SKI learning, AI has the potential to transform abstract historical narratives into more concrete and meaningful experiences through simulations, storytelling, and gamified interaction (Maufidhoh & Maghfirah, 2023; Patty & Lekatompessy, 2024). Despite this potential, most existing studies in Islamic education have focused on conventional digital media, such as PowerPoint presentations and animation-based content, which remain largely static and lack adaptive interactivity.

Furthermore, research on AI in education has predominantly been conducted in general subjects such as mathematics and science, with limited attention to Islamic education at the primary level (Yulianti et al., 2024). In the specific domain of SKI learning, there is still a lack of empirical studies that explore how AI-based interactive media can be designed in alignment with Islamic pedagogical values and the actual needs of students and teachers. Therefore, a significant research gap exists in identifying the learning needs for developing AI-powered interactive media that is not only technologically adaptive but also pedagogically meaningful and culturally grounded in Islamic values (Mukti, 2023).

Based on this gap, this study offers a novelty by specifically focusing on the analysis of learning needs for the development of AI-powered interactive learning media in SKI learning at the primary madrasah level. Unlike previous studies that emphasize product development or effectiveness testing, this study prioritizes the exploration of students' preferences, teachers' challenges, and institutional readiness as the foundation for designing AI-based learning media. This approach ensures that future innovations are grounded in real

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educational contexts and aligned with both technological advancement and Islamic moral values.

Therefore, this study aims to identify and analyze the learning needs related to the development of AI-powered interactive media in Islamic Cultural History learning at madrasah ibtidaiyah. The findings of this study are expected to contribute to the development of adaptive, interactive, and value-oriented learning media that support student engagement while maintaining the moral and spiritual orientation of Islamic education.

RESEARCH METHOD

This study employed a qualitative approach with a case study design to explore the learning needs for developing AI-powered interactive media in Islamic Cultural History (SKI) learning. The research was conducted at Madrasah Ibtidaiyah Darul Ulum Pondok Wuluh, Probolinggo, from January to March 2026.

The participants consisted of 20 sixth-grade students, one SKI teacher, and one madrasah head. The participants were selected using purposive sampling. The selection criteria for students included active participation in SKI learning and representation of varying levels of learning engagement. The SKI teacher was selected based on their direct involvement in teaching the subject, while the madrasah head was included due to their role in educational policy and institutional decision-making.

Data were collected through classroom observations, semi-structured interviews, and documentation. Classroom observations focused on teaching methods, student participation, classroom atmosphere, and the use of learning media in SKI lessons. The semi-structured interviews were conducted with students, the teacher, and the madrasah head using an interview guide developed based on theoretical frameworks of learning needs and technology integration. The interview covered several key aspects, including students' learning preferences, perceptions of current learning practices, experiences with digital media, readiness for technology integration, and the importance of integrating Islamic values in AI-based learning media. Documentation data included lesson plans, teaching materials, and relevant school records to support data triangulation.

The data were analyzed using a thematic analysis approach adapted from Miles and Huberman, which involved four main steps. First, data reduction was conducted by selecting, focusing, and simplifying the raw data obtained from observations, interviews, and documentation. Second, data coding was carried out through open coding to identify initial

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categories, followed by axial coding to establish relationships among categories, and selective coding to develop core themes related to learning needs. Third, data display was performed by organizing the data into matrices and tables to facilitate interpretation. Finally, conclusions were drawn by identifying patterns, relationships, and key findings related to students' needs, teachers' challenges, and institutional readiness in AI-based learning media development.

To ensure the trustworthiness of the data, this study applied several validation techniques. Source triangulation was conducted by comparing data obtained from students, the teacher, and the madrasah head. Method triangulation was applied by cross-checking findings from observations, interviews, and documentation. Member checking was carried out by confirming interview results with participants to ensure the accuracy of interpretations. In addition, an audit trail was maintained by systematically documenting the research process, including data collection, coding procedures, and analysis steps, to enhance the transparency and dependability of the study.

RESULT AND DISCUSSION

Overview of Research Setting

The findings indicate that the implementation of Islamic Cultural History (SKI) learning at Madrasah Ibtidaiyah Darul Ulum Pondok Wuluh is still predominantly conventional. The learning process is largely teacher-centered, with students positioned as passive recipients of information. This condition creates a gap between instructional practices and students' learning characteristics in the digital era. The observation results are presented in Table 1.

Table 1. Observation Results of SKI Learning Practices

Aspect	Findings	Researcher Analysis
Learning Methods	Teaching is dominated by lectures and teacher explanations	Learning tends to be one-directional, limiting student engagement and active participation
Learning Media	Learning relies on textbooks and oral narration	The absence of visual and interactive media reduces students' ability to construct historical understanding

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Student Participation	Only a few students actively respond during learning	Participation is uneven, indicating differences in motivation and engagement levels
Classroom Atmosphere	The class is quiet and formal with limited interaction	The learning environment lacks stimulation and does not encourage active learning
Technology Integration	No digital tools are used in SKI learning	There is a mismatch between students' digital habits and classroom practices

The data above show that SKI learning has not yet adapted to the needs of digital-native students. The dominance of lecture-based methods limits students' ability to engage cognitively and emotionally with historical content. As a result, students tend to memorize rather than understand.

Students' Learning Preferences and Needs

The interview results reveal that students prefer visual and interactive learning experiences. However, this preference is not merely related to enjoyment, but also to their need to better understand abstract historical material.

Table 2. Students' Learning Preferences

Aspect	Findings (Interview Data)	Evidence (Student Quotes)	Interpretation
Visual Preference	Most students prefer images, videos, and animations	"I understand better when there are pictures or videos." (Student 5)	Visual media helps students imagine historical events
Interactive Learning	Students enjoy quizzes and game-based activities	"I like quizzes or games because they make learning fun." (Student 11)	Interactivity increases engagement and motivation
Perception of Current Learning	Students feel bored with lecture-based learning	"I feel bored when the teacher only explains using books." (Student 3)	Conventional methods do not meet students' expectations

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Digital Experience	Students are familiar with digital tools	"I have used learning apps before." (Student 7)	Students are ready for technology integration
Interest in AI	Students show curiosity about AI-based learning	"It would be interesting if we use apps that can answer questions." (Student 8)	There is potential readiness for AI-based learning

The findings indicate that students' learning preferences are closely related to their cognitive needs. Visual media supports their ability to imagine historical events, while interactive features increase motivation. Additionally, differences in student responses suggest that learning approaches need to be adaptive rather than uniform.

Teacher Perspective on Learning Challenges

The teacher interview provides insight into pedagogical challenges faced in SKI learning.

Table 3. Teacher's Perspective

Aspect	**Findings (Interview Data)**	**Evidence (Teacher Quotes)**	**Interpretation**
Student Engagement	Students lose focus during long explanations	"Students usually lose focus when I explain for too long."	Need for strategies to maintain attention
Media Limitation	Teaching relies on textbooks only	"I only use textbooks because there are no other media."	Lack of media limits effectiveness
Technology Readiness	Teacher has basic digital skills	"I can use basic technology, but not AI."	Training is needed
Perception of AI	Teacher sees AI as helpful	"AI can help explain materials better."	Positive attitude toward innovation
Value Consideration	Learning must include Islamic values	"Technology must still teach Islamic morals."	Moral integration is essential

The teacher recognizes the limitations of current instructional practices and shows openness to innovation. However, technological readiness remains a challenge. This

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indicates that successful integration of AI-based media requires not only technological tools but also teacher capacity building.

Institutional Readiness

The madrasah head provides a broader perspective on institutional support.

Table 4. Institutional Readiness

Aspect	Findings	Researcher Analysis
Institutional Vision	The school supports modernization while maintaining Islamic values	There is a balance between innovation and tradition
Infrastructure	The school has limited technological facilities	Infrastructure development is needed to support digital learning
Support for Innovation	The institution is open to adopting new technologies	There is strong institutional readiness for innovation
Technology Policy	Technology must support character education	Digital tools must align with Islamic values
Expectations	The school expects increased student interest in SKI	AI-based media is seen as a potential solution

Institutional support plays a crucial role in the success of innovation. Although infrastructure is limited, the positive attitude toward technology creates opportunities for implementing AI-based learning media.

Thematic Analysis of Learning Needs

The triangulation of data from observations, interviews, and documentation results in several key learning needs.

Table 5. Identified Learning Needs

Aspect	Findings	Researcher Analysis
Visual Representation	Students need visual storytelling and animation	Visualization supports understanding of abstract historical concepts
Adaptive Learning	Students need learning adjusted to their abilities	AI can provide personalized learning experiences

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Interactive Learning	Students prefer engaging and participatory activities	Interactivity increases motivation and engagement
Moral Integration	Learning must include Islamic values	Content must integrate cognitive and moral aspects
Teacher Support	Teachers need simple and practical tools	AI should assist teachers in delivering instruction

The analysis shows that learning needs are not only technological but also pedagogical and moral. AI-based media should therefore be designed to address these three dimensions simultaneously.

Discussion

Student Engagement and Learning Preferences

The findings reveal that student engagement in *Islamic Cultural History* (SKI) lessons at Madrasah Ibtidaiyah Darul Ulum Pondok Wuluh remains low when the teaching process relies solely on conventional methods such as lectures and textbook readings. Most students admitted feeling bored and disengaged during SKI sessions that lacked visual aids or interactive activities. They preferred learning experiences that involve visual storytelling, animation, and game-based tasks, which help them better imagine historical events and connect emotionally with the material. This preference underscores the critical role of interactive and technology-supported learning environments in fostering curiosity and active participation among young learners.

These findings align with the study by (Franz et al., 2023)who found that interactive digital media increased primary students' motivation by 78% compared to traditional learning methods. Similarly, (Satria et al., 2025) emphasized that visual-based media significantly enhance conceptual understanding and learning retention, particularly for history-related subjects that demand imagination and narrative comprehension. In this study, students expressed that videos, digital quizzes, and AI-assisted explanations would make SKI more appealing and accessible. Hence, the current condition of passive learning in SKI presents a pedagogical gap that can be bridged through AI-powered interactive media, offering adaptive feedback and immersive engagement(Ramadhan & Usriyah, 2021).

From a cognitive perspective, this aligns with Vygotsky's social constructivist theory, which asserts that learning is most effective when students actively interact with tools and peers in constructing knowledge(Smith, 1993). The AI-based media proposed in this study

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can act as a *mediational tool* that scaffolds learning, providing timely feedback and personalized guidance. Thus, fostering engagement through interactive AI applications not only increases motivation but also enhances the internalization of historical and moral values in Islamic education.

Teacher Readiness and Pedagogical Transformation

Interviews with the SKI teacher revealed enthusiasm toward adopting digital learning tools but also highlighted concerns regarding technical skills and time management. The teacher recognized the potential of AI-powered media to explain complex historical narratives through visualization and adaptive questioning(Suroiha et al., 2021). However, limited technological proficiency and lack of access to digital training remain significant challenges. This condition mirrors findings by (Nikadinata et al., 2025) who reported that many Islamic primary teachers in rural Indonesia struggle with integrating technology due to insufficient training and support infrastructure.

The teacher's positive attitude, despite the lack of technical confidence, demonstrates a readiness for pedagogical transformation when provided with the right support system. According to (Putra et al., 2024)successful adoption of interactive digital learning in Islamic schools depends not only on the technology itself but also on *teacher digital competence and institutional culture*. AI-based media designed for SKI must therefore be intuitive, easy to operate, and aligned with Islamic values to reduce the cognitive and moral burden on teachers.

The teacher's statement that "technology must still teach Islamic morals, not just fun features" highlights a critical ethical dimension. AI should not replace the teacher's moral role but instead complement it by enriching instructional delivery. This reflects the TPACK framework (Technological Pedagogical Content Knowledge) proposed by (Oktalia & Drajati, 2018), which emphasizes the integration of technology, pedagogy, and content in a balanced manner. In the context of Islamic education, this means ensuring that technological innovation supports spiritual and moral development rather than undermining it. The teacher's openness to AI-based teaching tools represents an important step toward developing *digital pedagogy grounded in Islamic ethics*.

Institutional Support and Digital Readiness

At the institutional level, the madrasah head expressed strong support for modernization, provided that it remains consistent with Islamic identity and values.

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The school acknowledges the importance of innovation but faces challenges related to infrastructure and maintenance of technological facilities such as the computer laboratory. Nevertheless, there is a willingness to collaborate with educational technologists or university partners for implementing digital learning programs. This finding resonates with (Aini et al., 2024) who identified that leadership vision and institutional openness are key drivers for digital transformation in madrasah settings.

Institutional readiness is a pivotal factor in sustaining AI-powered media integration. As (Zaman et al., 2020)) note, schools that maintain an adaptive management structure and provide ongoing digital literacy programs tend to achieve higher levels of innovation adoption. The head's statement, "Technology is welcome as long as it strengthens Islamic character education," encapsulates the balance between progress and preservation—an approach crucial for Islamic educational institutions. In this case, Madrasah Ibtidaiyah Darul Ulum is positioned as a receptive yet cautious adopter, ensuring that any digital innovation, including AI, must reinforce rather than dilute its spiritual mission.

From a broader policy perspective, this readiness aligns with Indonesia's Merdeka Curriculum (2022) initiative, which promotes technology integration and student-centered learning. However, for rural madrasahs, the implementation requires tailored strategies that consider limited infrastructure and teacher competency. Hence, collaboration between schools, universities, and government agencies is essential to ensure sustainable innovation.

Identified Learning Needs and Implications for AI-Based Media Design

Data triangulation from observations and interviews identified five major learning needs: (1) visual and interactive representation, (2) adaptive feedback, (3) gamification, (4) language and moral relevance, and (5) teacher support tools. Each of these dimensions has important implications for the design of AI-powered learning media. Students' preference for animated storytelling and visual simulations suggests that AI should provide dynamic visualization of Islamic history—for example, narrating the story of the Prophet's companions or the spread of Islam in Indonesia with contextual animations. Such visualization enhances not only engagement but also comprehension, as found by (Ramadhan et al., 2023), who demonstrated that animation-based learning significantly improved students' historical empathy and retention rates.

Adaptive feedback represents another critical feature, allowing the AI system to respond to each student's learning pace. Studies by (Saddiq, 2020) show that adaptive AI systems in primary education improved learning outcomes by 25%, as students received

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personalized support based on their individual needs. In the context of SKI, this adaptivity can be manifested in intelligent quizzes, AI-driven narration that explains difficult terms, or encouragement messages aligned with Islamic values. Moreover, gamification elements such as badges, scores, and interactive missions can transform moral learning into enjoyable challenges supporting findings from (Assa'idi, 2021) that gamified media increase motivation and spiritual reflection in Islamic lessons.

Another key implication lies in the moral contextualization of AI-based media. Unlike general subjects, Islamic education requires that every learning element reinforces *akhlaq* (moral conduct). As (Faisal et al., 2021) emphasize, the integration of digital learning in Islamic education must adhere to principles of *adab* (ethics) and *hikmah* (wisdom). Therefore, AI-based SKI media must include value-laden dialogues, moral reminders, and narrations that guide students not only intellectually but also spiritually. This ensures that technological advancement becomes a means of strengthening, rather than diluting, Islamic identity among learners.

Teacher support tools are equally vital. Many educators still find it difficult to operate digital media due to limited exposure. Hence, the AI system should include simplified dashboards, automated content generation, and instructional assistants. According to (Saleh & Satriawan, 2020) such features reduce teacher workload by 30% while enhancing instructional quality. For SKI subjects, these tools could include pre-programmed lesson outlines or auto-generated questions derived from AI's text analysis of Islamic stories. This synergy between technology and pedagogy embodies a future-oriented Islamic learning environment—one that is inclusive, adaptive, and spiritually grounded.

The Role of AI in Fostering Interest and Moral Engagement

The incorporation of Artificial Intelligence in Islamic Cultural History learning not only serves to enhance academic interest but also fosters deeper moral engagement. Students in the current study displayed curiosity toward AI systems that could "speak," "explain," or "give feedback" in a human-like way. Such interaction provides a sense of companionship and guidance, which may increase affective connection to the learning process. Research by (Curry, 2024) found that AI-based virtual tutors improved student engagement and empathy toward Islamic characters by simulating moral dialogues. This humanized interaction helps students relate to historical figures as moral exemplars rather than distant icons.

Moreover, AI can function as a reflective tool for value internalization. Through adaptive questioning and moral scenarios, AI systems can guide students to reflect on virtues

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like honesty, justice, and humility core principles in Islamic teachings. This approach corresponds with constructivist moral learning theory (Yu et al., 2013) which posits that moral development occurs through reflective interaction rather than passive reception. Therefore, the integration of AI in SKI education is not merely about digital sophistication but about nurturing reflective, ethical, and spiritually aware learners.

Synthesis and Theoretical Reflection

Synthesizing the findings, this study demonstrates that AI-powered interactive media offers a promising solution to the challenges of low engagement, limited visualization, and lack of interactivity in Islamic Cultural History learning. The triangulated data reveal a coherent pattern: students desire visual and participatory learning; teachers seek supportive and value-aligned technology; and institutions express openness to innovation within moral boundaries. These align with global educational trends emphasizing human-centered AI in education, as articulated by (Yeni et al., 2024), where AI functions as a collaborative partner that amplifies human teaching rather than replaces it.

The study contributes to the intersection of Islamic pedagogy and educational technology, demonstrating how AI can embody the *maqasid al-tarbiyah* (objectives of education), intellectual development (*aql*), moral refinement (*akhlaq*), and faith strengthening (*iman*). It challenges the dichotomy between tradition and modernity by proposing a synthesis: *technological advancement guided by spiritual ethics*. Practically, the results provide a roadmap for developers, educators, and policymakers to design AI-based learning tools that are culturally and morally contextualized.

CONCLUSION

This study identifies key learning needs for the development of AI-powered interactive learning media in Islamic Cultural History (SKI) learning at the primary madrasah level. The findings indicate that current SKI learning practices are still dominated by conventional lecture-based methods, which tend to limit student engagement and participation. Students demonstrate a strong preference for visual, interactive, and technology-supported learning experiences, while also showing readiness to engage with digital and AI-based applications. From the teacher's perspective, there is a positive attitude toward the integration of technology; however, limitations in technological competence and the lack of instructional media remain significant challenges. At the institutional level, the madrasah shows openness to innovation, although infrastructure constraints need to be addressed gradually.

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Importantly, both teachers and school leaders emphasize that learning media must remain aligned with Islamic moral and spiritual values.

Based on the triangulated findings, this study highlights several essential requirements for AI-based learning media, including dynamic visualization, interactive features, adaptive feedback, integration of Islamic values, and user-friendly support for teachers. These findings imply that the development of AI-powered interactive media should be grounded in students' learning characteristics, teachers' needs, and institutional contexts to ensure pedagogical relevance and cultural appropriateness. This study contributes to the field of Islamic education by providing empirical insights into the learning needs for AI-based media development at the primary level. Future research is recommended to focus on the design, development, and evaluation of AI-powered learning media based on the identified needs in order to support more engaging and meaningful SKI learning.

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