

Implementation of Artificial Intelligence-Based Instructional Media in Islamic Religious Education: A Case Study at SMP Negeri 4 Muara Bungo

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ABSTRACT

The increasing adoption of Artificial Intelligence (AI) in education has transformed instructional practices by enabling more adaptive and interactive learning environments. However, the utilization of AI in Islamic Religious Education (PAI) remains relatively limited, particularly in regional schools with restricted technological readiness and digital literacy. This study aimed to explore the utilization of Artificial Intelligence (AI) in developing instructional media for Islamic Religious Education at SMP Negeri 4 Muara Bungo, including the challenges encountered and the adaptive strategies implemented by teachers during the integration process. This study employed a qualitative descriptive-exploratory design involving two PAI teachers and thirty students selected through purposive sampling. Data were collected through observations, interviews, and documentation and analyzed using Miles and Huberman's interactive analysis model. The findings revealed that teachers utilized AI-based applications such as ChatGPT, Canva AI, and Gamma AI to develop instructional materials and interactive learning media. The integration of AI contributed positively to instructional efficiency, increased students' engagement, and created more interactive classroom learning experiences. Nevertheless, teachers encountered several challenges, including limited digital literacy, technological infrastructure barriers, and concerns regarding the reliability of AI-generated information. To optimize AI utilization, teachers adopted several adaptive strategies, including self-directed learning, collaborative adaptation, and the integration of AI-supported media with conventional instructional approaches. This study provides empirical evidence regarding AI utilization in Islamic Religious Education within regional school contexts while emphasizing the importance of balancing technological innovation with pedagogical and moral values.

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Introduction

The rapid development of digital technology in the era of the Industrial Revolution 4.0 has significantly transformed various sectors, including education (Kumar, 2025; Mhlanga, 2024). The integration of technology into educational practices is no longer viewed merely as a complementary tool, but rather as an essential component in creating effective, innovative, and adaptive learning environments (Mohamed Hashim et al., 2022). One of the most rapidly growing technologies currently influencing education is Artificial Intelligence (AI) (Lai et al., 2024; Ma & Lei, 2024). The

emergence of AI has opened new opportunities for educators to develop learning media that are more interactive, personalized, and responsive to students' learning needs (Zhu, 2022).

The utilization of AI in education enables teachers to design instructional materials, create visual and audiovisual learning media, develop automated assessments, and provide more flexible and engaging learning experiences (Pham & Sampson, 2022). AI technology also supports differentiated learning by allowing educational content to be adjusted according to students' characteristics, abilities, and learning preferences (Bukar et al., 2024). In the context of 21st-century education, teachers' ability to integrate digital technology, including AI, has become an important aspect of improving both the quality of instruction and students' competencies (Iyamuremye et al., 2024).

In Islamic Religious Education (Pendidikan Agama Islam/PAI), the use of innovative instructional media has become increasingly important (Arif et al., 2025). PAI is not only oriented toward the delivery of religious knowledge but also aims to develop students' moral character, ethics, and spirituality (Arif & Aziz, 2023; Susanti et al., 2024). Therefore, the learning process requires creative and contextual approaches to ensure that Islamic values can be understood more effectively and meaningfully by students (Chou et al., 2022). However, in practice, PAI instruction in many schools is still dominated by conventional teaching methods with limited use of instructional media, resulting in monotonous learning experiences and low student engagement.

Previous studies have demonstrated that the implementation of AI in education contributes positively to learning effectiveness (Zheng et al., 2023). Li & Wong, (2023) argued that AI can facilitate more adaptive and personalized learning systems. Similarly, Huang et al., (2023) found that AI-based learning enhances student engagement and learning motivation. Furthermore, Almuhanha, (2025) emphasized that AI-based instructional media support differentiated learning and assist teachers in developing more innovative teaching practices. Nevertheless, most previous studies have primarily focused on general education contexts and have not specifically examined the utilization of AI in developing instructional media for Islamic Religious Education (PAI) (Adiyono et al., 2025).

In addition, existing studies on AI in PAI learning tend to focus mainly on perceptions of technology use or the general effectiveness of digital learning media (Zain et al., 2025). Limited attention has been given to how PAI teachers practically utilize AI in designing and developing instructional media (Mainuddin et al., 2025). Previous research has also predominantly been conducted in urban schools with relatively adequate technological facilities, while studies in schools located in less-developed or resource-limited areas remain scarce (Zuhriyeh et al., 2025). This condition indicates a significant research gap regarding the utilization of AI in developing PAI instructional media within junior high school contexts in regional areas.

The implementation of AI in PAI learning also faces several challenges, including teachers' limited digital literacy, insufficient understanding of AI utilization, lack of professional training, and concerns that technology integration may reduce spiritual interaction and character-building processes in religious education (Aini & Aisyah, 2025; Akbar & Arifin, 2025). In fact, when utilized appropriately, AI can become a strategic tool to support teachers in creating more creative, interactive, and student-centered PAI learning experiences that are relevant to the needs of the digital generation (Muhammad & Wahab, 2025).

Theoretically, this study is grounded in Bandura's Self-Efficacy Theory (1997), which explains that individuals' beliefs in their own abilities influence their actions and success in using technology (Pfundt & Peterson, 2024). In addition, this study employs Rogers' Diffusion of Innovation Theory (2003), which states that the adoption of innovation is influenced by perceived usefulness, ease of use, and the social and cultural conditions of users (Menzli et al., 2022). These theories are relevant for analyzing how PAI teachers perceive, adopt, and utilize AI in developing instructional media within the learning process (Almardiah & Muis, 2025; Sari, 2025).

Based on preliminary observations conducted at SMP Negeri 4 Muara Bungo, it was found that some teachers are familiar with the use of AI in education; however, its utilization in developing PAI instructional media remains suboptimal. Teachers still experience limitations in understanding

and applying AI effectively, resulting in instructional media that are relatively simple and less varied. This condition highlights the need for further investigation into the utilization of AI in developing PAI instructional media, including the challenges faced by teachers and the strategies employed to optimize the use of such technology.

Therefore, this study aims to analyze the utilization of Artificial Intelligence (AI) in developing instructional media for Islamic Religious Education (PAI) at SMP Negeri 4 Muara Bungo. This research is expected to contribute theoretically to the development of AI-based learning studies within Islamic education and practically to provide insights for teachers in developing innovative, effective, and technology-relevant instructional media in the digital era.

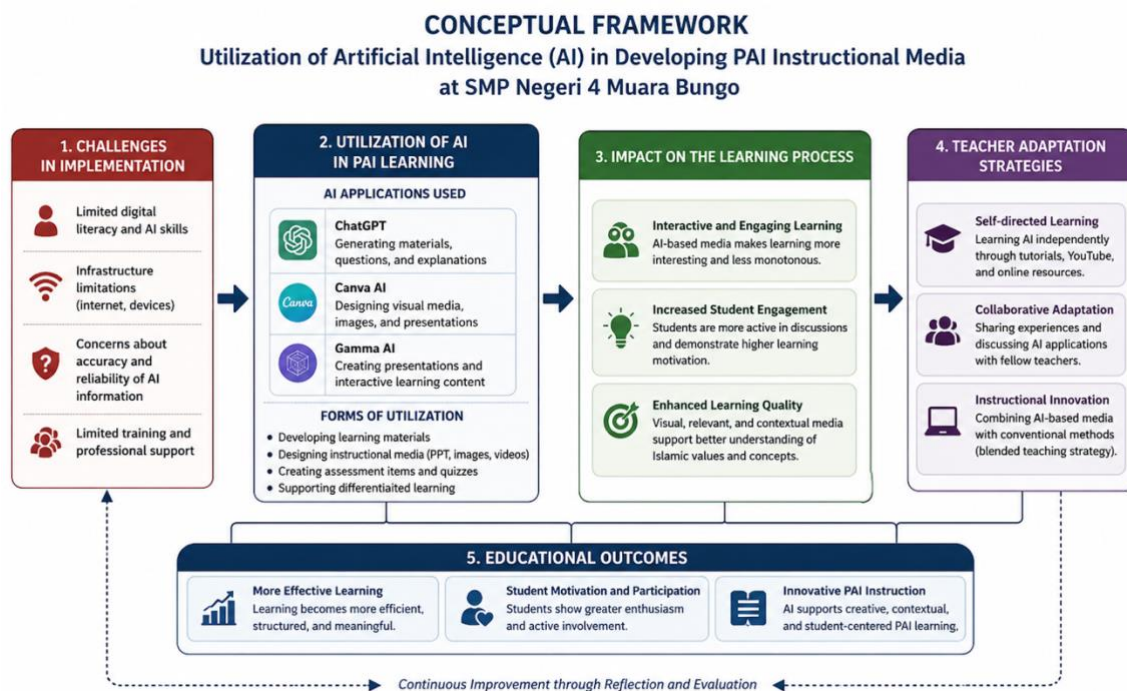


Figure 1.1 Conceptual Framework of AI Utilization in PAI Learning

Figure 1 illustrates the conceptual framework of this study regarding the utilization of Artificial Intelligence (AI) in developing instructional media for Islamic Religious Education (PAI). The framework demonstrates that the implementation of AI in PAI learning is influenced by several challenges, including limited digital literacy, infrastructure barriers, and concerns regarding AI reliability. In response to these challenges, teachers utilize AI applications such as ChatGPT, Canva AI, and Gamma AI to support instructional media development. The framework further highlights the impact of AI utilization on student engagement, learning quality, and instructional innovation, as well as the adaptive strategies employed by teachers to optimize technology integration in classroom learning.

Method

This study employed a qualitative approach using a descriptive-exploratory research design (Steyn et al., 2023). A qualitative approach was chosen because the study aims to gain an in-depth understanding of the utilization of Artificial Intelligence (AI) in developing instructional media for Islamic Religious Education (Pendidikan Agama Islam/PAI), including the challenges faced by teachers and the strategies implemented to optimize the use of AI in the learning process. The descriptive-exploratory design was used to describe actual conditions in the field while simultaneously exploring teachers' experiences and practices in utilizing AI within PAI learning activities (Stanley, 2023).

The research was conducted at SMP Negeri 4 Muara Bungo, located in Bungo Regency, Jambi Province, Indonesia. The research site was selected based on the consideration that the school has begun integrating digital technology into learning activities; however, the utilization of AI in developing PAI instructional media remains limited and requires further investigation. The study was conducted from January to March 2026.

The research participants consisted of 2 Islamic Religious Education (PAI) teachers and 30 students of SMP Negeri 4 Muara Bungo. The participants were selected using purposive sampling, in which informants were intentionally chosen based on their direct experience and involvement in the use of AI-based instructional media in PAI learning. In the learning process, teachers utilized several AI-based applications, such as ChatGPT, Canva AI, and Gamma AI, to assist in preparing learning materials, designing presentations, and developing visual and interactive instructional media.

Data collection techniques in this study included observation, interviews, and documentation. Observation was conducted to directly examine the PAI learning process, the use of AI in developing instructional media, teacher-student interactions during classroom activities, and students' responses toward AI-based learning media. In-depth interviews were conducted with PAI teachers to obtain information regarding the forms of AI utilization, challenges encountered in using the technology, and strategies implemented to optimize AI integration in learning activities. In addition, interviews with students were conducted to identify their perceptions and experiences regarding the use of AI-based instructional media in PAI learning. Documentation was used to support the research data in the form of photographs of learning activities, teaching materials, instructional media products, and other relevant documents related to the study.

The data analysis technique employed in this study followed the interactive analysis model proposed by Miles and Huberman, which consists of data reduction, data display, and conclusion drawing (Hall & Liebenberg, 2024). In the data reduction stage, the researcher selected, focused, and simplified the data obtained from observations, interviews, and documentation based on the research focus. The data were then systematically presented in descriptive form to facilitate understanding and interpretation. The final stage involved drawing conclusions and verifying findings to ensure that the results accurately reflected the actual conditions in the field.

To ensure data validity, this study applied source triangulation and technique triangulation. Source triangulation was conducted by comparing information obtained from teachers and students, while technique triangulation involved comparing findings from observations, interviews, and documentation. In addition, prolonged engagement and persistent observation were conducted to enhance the credibility and trustworthiness of the research findings.

Result

The findings of this study were categorized into several major themes based on the thematic coding analysis of interview, observation, and documentation data. The themes represent the patterns and key issues related to the utilization of Artificial Intelligence (AI) in developing instructional media for Islamic Religious Education (PAI). A summary of the themes, subthemes, and key findings identified in this study is presented in Table 1.

Table 1.1: Themes and Findings of AI Utilization in PAI Learning

Main Theme	Subtheme	Key Findings
Utilization of AI in PAI Learning	Student engagement	AI-based media increased students' interest and classroom participation
Challenges in AI Implementation	Teacher limitations	Teachers experienced limited digital literacy and difficulty using AI prompts
Strategies for Optimizing AI	Instructional innovation	Teachers combined AI-based media with conventional teaching methods

As presented in Table 1, the findings demonstrate that the utilization of AI in PAI learning involves not only instructional benefits but also technological challenges and adaptive strategies employed by teachers in integrating AI into classroom practices.

A. The Utilization of Artificial Intelligence in Developing Islamic Religious Education (PAI) Instructional Media

1. AI Utilization for Instructional Material Development

The findings of this study indicate that teachers at SMP Negeri 4 Muara Bungo have gradually integrated Artificial Intelligence (AI) into the process of developing instructional media for Islamic Religious Education (PAI). The integration of AI was not merely intended to simplify technical tasks but also functioned as an instructional support mechanism that facilitated the preparation of learning materials, enhanced visual presentation quality, and expanded teachers' creativity in delivering educational content. Several AI-based applications, including ChatGPT, Canva AI, and Gamma AI, were utilized by teachers to generate instructional content, prepare learning activities, create presentation materials, and design more interactive classroom media.

Based on interview findings, teachers perceived that AI technologies reduced instructional preparation time while simultaneously allowing greater flexibility in developing learning materials. Prior to the use of AI, teachers generally relied on textbooks, internet searches, and conventional resources that required a longer process of material selection and adaptation. The integration of AI introduced a more practical approach to instructional planning and enabled teachers to focus more on pedagogical considerations.

Teacher G1 shared the following experience:

"Initially, I mostly relied on textbooks and existing learning materials as the main sources for preparing classroom instruction. However, after becoming familiar with ChatGPT, I began using it to assist me in generating learning materials, creating quiz questions, and identifying examples relevant to the topics discussed in Islamic Religious Education classes. I feel that the process has become more efficient because I no longer need to search manually through many different sources. Nevertheless, I still carefully review the generated content because some information needs adjustment to align with the instructional objectives and the Islamic values emphasized in PAI learning."

Similarly, Teacher G2 explained:

"Applications such as Canva AI and Gamma AI have significantly helped me in preparing instructional presentations and learning materials. Previously, designing learning media required substantial time because I had to create layouts and search for suitable images manually. With AI support, I can prepare more attractive learning materials within a shorter period. Students also seem more enthusiastic because visual elements such as images, icons, and presentation designs make learning activities more engaging and easier to understand."

The interview findings demonstrate that AI utilization extends beyond improving technical efficiency and also contributes to transforming teachers' instructional practices. Teachers no longer function solely as providers of information but increasingly act as facilitators who organize, adapt, and contextualize learning resources according to students' educational needs. AI applications support this process by providing alternative resources and accelerating content preparation.

Observational findings further revealed that the use of AI-generated instructional materials increased variation in classroom learning activities. Teachers incorporated visual representations, interactive presentations, and contextual examples generated through AI-supported platforms. This condition appeared to create a more dynamic classroom atmosphere and reduced students' perceptions that Islamic Religious Education learning was limited to textbook-centered and lecture-based instruction.

Overall, these findings indicate that the utilization of AI in developing instructional media contributes not only to instructional efficiency but also to the transformation of learning practices toward more adaptive, creative, and student-centered approaches within Islamic Religious Education contexts.

2. Improving Student Engagement through AI-Based Learning Media

The findings of this study revealed that the utilization of Artificial Intelligence (AI)-supported instructional media contributed positively to increasing students' engagement during Islamic Religious Education (PAI) learning activities. Observational data indicated that students demonstrated greater attention and participation when learning materials were delivered through interactive visual media developed using AI-supported applications. The use of images, presentation designs, contextual examples, and multimedia elements appeared to create a more engaging classroom atmosphere compared to conventional instructional approaches.

Prior to the integration of AI-based instructional media, classroom activities were predominantly centered on textbooks and verbal explanations delivered by teachers. Such practices often resulted in repetitive learning experiences and reduced students' active participation during classroom interaction. However, after implementing AI-supported learning media, students demonstrated more enthusiasm toward classroom activities and appeared more willing to participate in discussions and respond to questions presented by teachers.

Student S4 shared the following experience:

"I feel that learning activities become more interesting because there are more pictures, visual displays, and animations included in the lesson. Previously, classroom learning mostly involved reading books and listening to explanations from teachers, but now the classroom atmosphere feels different. I become more interested in paying attention because the materials are easier to understand and the explanations seem more connected to our daily experiences."

Similarly, Student S11 explained:

"Learning becomes more interactive and less boring because teachers use different learning media. Sometimes teachers use presentations with attractive images and examples that help us understand the materials more easily. I also feel more confident participating in discussions because the learning materials are presented more clearly and are easier to follow."

The interview findings indicate that students perceived AI-supported instructional media as more engaging and accessible compared to traditional instructional methods. The incorporation of visual elements and interactive content appears to facilitate students' understanding while simultaneously increasing emotional and cognitive involvement during learning activities.

Classroom observations further revealed that students demonstrated greater participation through questioning activities, peer discussions, and responses toward instructional materials presented by teachers. Students appeared more attentive and showed greater curiosity during learning sessions that integrated visual and interactive media components. This finding suggests that AI-based instructional media may contribute to reducing passive learning behaviors and encourage more active learning participation.

Furthermore, these findings indicate that the utilization of AI-supported instructional media creates opportunities for a more student-centered learning environment. Rather than functioning solely as recipients of information, students become more actively involved in the instructional process through increased interaction and participation. The integration of AI into instructional media therefore contributes not only to improving learning attractiveness but also to strengthening students' engagement and learning experiences within Islamic Religious Education contexts.

B. Challenges in the Implementation of Artificial Intelligence in PAI Learning

1. Limited Digital Literacy among Teachers

Although Artificial Intelligence provided various opportunities for instructional innovation, the findings revealed that teachers continued to experience several challenges during the implementation process. One of the most significant challenges identified in this study was teachers' limited digital literacy and technological competencies.

The findings indicate that teachers possessed different levels of technological readiness and experience regarding AI utilization. Although teachers recognized the potential benefits offered by AI applications, some still encountered difficulties in operating the technology effectively and maximizing its instructional functions. Difficulties were particularly associated with generating effective prompts, understanding AI features, and adjusting AI-generated content according to instructional objectives.

Teacher G1 stated:

"I still experience difficulties in using some AI applications effectively. Sometimes I do not know how to create appropriate prompts, and the information generated by AI is not always suitable for what I need in class. I realize that AI offers many possibilities, but I still need more practice and learning opportunities to understand how to use it properly."

Similarly, Teacher G2 explained:

"At the beginning, I felt confused because many AI features were still unfamiliar to me. Sometimes I understood the general function of the application, but I was unsure how to use it in a way that was relevant to classroom instruction. I think teachers still need guidance and training to understand how AI can be applied effectively."

The findings indicate that technological adaptation involves not only access to digital tools but also teachers' competencies and confidence in utilizing technology within instructional contexts.

2. Technological Infrastructure Barriers

Another challenge identified in this study concerned the availability of technological infrastructure supporting the implementation of Artificial Intelligence (AI) in instructional activities. Although AI applications provide various opportunities for instructional innovation, their effective utilization depends significantly on adequate technological facilities and stable internet access. The findings indicate that technological limitations remain one of the main obstacles affecting the implementation of AI-supported learning media within classroom settings.

Based on observational findings, several instructional activities experienced disruptions due to unstable internet connectivity and limitations in digital devices. Teachers occasionally encountered delays when accessing AI-based applications during learning sessions, resulting in interruptions in the instructional process. Such conditions reduced the flexibility of AI implementation and required teachers to modify learning activities according to available technological conditions.

Teacher G2 shared the following experience:

"Internet access sometimes becomes a challenge during classroom activities. There are situations where the connection becomes unstable while using AI applications, and this affects the learning process because some instructional materials cannot be accessed immediately. In several cases, I had to prepare alternative materials beforehand because I was concerned that technological problems might interrupt the lesson."

Similarly, Teacher G1 explained:

“AI applications are helpful for preparing learning media, but the process still depends on internet availability and supporting devices. Sometimes not all students have equal access to digital facilities, and this creates limitations during implementation. Therefore, I need to adjust instructional activities according to the available conditions.”

The interview findings suggest that technological infrastructure remains a determining factor in the successful implementation of AI within educational contexts. The effectiveness of AI integration is not solely influenced by technological innovation itself but also by the availability of supporting facilities that enable teachers and students to utilize technology consistently.

Observational findings further revealed that teachers attempted to anticipate technological barriers by preparing conventional learning resources as alternatives during instructional activities. This adaptive practice reflects teachers' awareness that technological limitations should not negatively affect the continuity of classroom learning.

Overall, these findings indicate that technological infrastructure significantly influences the implementation of AI-supported instructional media and remains an important consideration in achieving effective technology integration within Islamic Religious Education learning environments.

3. Concerns Regarding Information Accuracy and Educational Values

The findings also revealed that teachers expressed concerns regarding the reliability and accuracy of information generated by Artificial Intelligence applications. Although AI applications were perceived as useful tools for supporting instructional activities, teachers remained cautious regarding the content produced by AI systems, particularly in subjects associated with religious and moral education.

Islamic Religious Education (PAI) involves not only cognitive understanding but also the transmission of ethical, spiritual, and religious values. Therefore, teachers considered it necessary to verify AI-generated content before applying it within classroom instruction.

Teacher G2 stated:

“Sometimes I feel uncertain about the accuracy of information generated by AI. I realize that AI can provide quick answers and learning materials, but I still need to verify whether the content is appropriate and consistent with Islamic teachings. I do not want students to receive information that could potentially create misunderstandings.”

Similarly, Teacher G1 explained:

“AI can help teachers prepare instructional materials more quickly, but teachers cannot rely entirely on the generated information. I always review and adjust the content because Islamic Religious Education is closely related to values and beliefs that require careful consideration.”

The findings indicate that teachers continue to position themselves as central actors within instructional processes despite the increasing utilization of technological innovations. Teachers viewed AI as an instructional support tool rather than as an independent source of educational authority.

Furthermore, observational findings demonstrated that teachers frequently examined and adapted AI-generated materials before integrating them into classroom instruction. This practice reflects teachers' pedagogical responsibility in ensuring that instructional content remains relevant, accurate, and aligned with Islamic educational values.

Overall, these findings suggest that concerns regarding information accuracy represent not merely technological issues but also pedagogical and ethical considerations that influence the implementation of AI within Islamic Religious Education contexts.

C. Teachers' Strategies for Optimizing Artificial Intelligence Utilization in PAI Learning

1. Self-Directed Learning

Despite experiencing several technological limitations and implementation challenges, teachers demonstrated adaptive efforts to improve their competencies regarding the utilization of Artificial Intelligence in instructional activities. One of the most prominent strategies identified in this study involved self-directed learning through online resources and independent technological exploration.

Teacher G1 explained:

"I realized that technology continues to develop rapidly, and teachers also need to continue learning. I usually learn independently through YouTube tutorials, online articles, and by experimenting directly with AI applications. At the beginning I often experienced difficulties, but gradually I became more familiar with how these applications work."

The findings indicate that self-directed learning became an important mechanism for improving teachers' technological competencies and confidence in utilizing AI applications within instructional settings.

2. Collaborative Adaptation among Teachers

Teachers also demonstrated collaborative efforts in adapting to AI implementation within instructional settings. Communication and knowledge sharing among colleagues emerged as important mechanisms for reducing technological difficulties and improving instructional practices.

Teacher G2 stated:

"I often discuss AI applications with other teachers because sometimes we experience similar difficulties. Through discussions, we can exchange ideas, learn new features, and share practical ways of applying AI in classroom learning. This makes the adaptation process easier because we are learning together rather than individually."

The findings indicate that collaboration among teachers contributes positively to technological adaptation by facilitating knowledge exchange and reducing uncertainty associated with AI implementation.

3. Integration of AI with Conventional Teaching Practices

The findings further revealed that teachers attempted to integrate AI-supported media with conventional instructional approaches rather than relying entirely on technology during classroom learning.

Teacher G1 explained:

"Although AI helps me prepare learning materials, I still combine it with direct explanation and classroom discussion. I believe that interaction between teachers and students remains important because learning is not only about delivering information but also about guiding students and building values."

Similarly, Teacher G2 stated:

"Technology helps us create better learning media, but teachers still have responsibilities in explaining concepts and ensuring that students understand the materials properly. Therefore, AI is used as support rather than replacing the teacher's role."

The findings indicate that teachers perceived AI as a complementary instructional tool rather than a replacement for pedagogical interaction. Teachers continued to emphasize direct

communication and value transmission as important components of Islamic Religious Education learning.

Discussion

The findings of this study indicate that the utilization of Artificial Intelligence (AI) contributes positively to the development of instructional media in Islamic Religious Education (PAI). Teachers utilized AI applications such as ChatGPT, Canva AI, and Gamma AI to support instructional material preparation and create more interactive learning experiences. The integration of AI was found to improve instructional efficiency and increase students' engagement during classroom learning activities. These findings are consistent with previous studies indicating that AI technologies support adaptive learning environments and facilitate more engaging instructional practices.

From the perspective of Bandura's Self-Efficacy Theory, the findings suggest that teachers' confidence in using technology influences their willingness to adopt and utilize AI in instructional activities. Teachers who demonstrated stronger motivation to learn independently and explore technological tools appeared more willing to integrate AI applications into classroom practices. This finding indicates that technological adaptation is influenced not only by the availability of digital tools but also by teachers' beliefs regarding their own capabilities in utilizing technology effectively.

Furthermore, Rogers' Diffusion of Innovation Theory explains that innovation adoption is influenced by perceived usefulness and ease of use. In this study, teachers perceived AI as beneficial because it simplified instructional preparation and enhanced classroom learning experiences. However, challenges such as limited digital literacy, technological infrastructure barriers, and concerns regarding information accuracy remained significant factors affecting AI implementation. These findings suggest that successful technology integration requires institutional support, professional development opportunities, and adequate technological facilities.

In the context of Islamic Religious Education, the findings also demonstrate that AI should not be viewed as a replacement for teachers but rather as a supporting instructional tool. Teachers continued to maintain their roles in guiding learning activities, verifying instructional content, and ensuring that educational processes remained aligned with pedagogical and moral values. Therefore, effective AI implementation in PAI learning requires a balanced integration between technological innovation and the fundamental values of Islamic education.

The increased student engagement observed in this study may be explained by the capacity of AI-supported instructional media to accommodate diverse learning preferences and provide more visually stimulating learning experiences. Students demonstrated greater attention, participation, and willingness to engage in classroom discussions when instructional materials were presented through interactive visual formats. This finding supports previous studies suggesting that AI-enhanced learning environments promote active learning by increasing students' cognitive and emotional involvement in the instructional process. In Islamic Religious Education, such engagement is particularly valuable because meaningful participation can facilitate deeper understanding and internalization of religious concepts and values.

An important issue emerging from this study is the persistence of digital inequality in regional educational contexts. Although AI technologies offer considerable opportunities for instructional innovation, their implementation remains highly dependent on internet connectivity, device availability, and institutional technological support. The findings indicate that technological readiness continues to be a determining factor influencing the effectiveness of AI integration in schools. Therefore, efforts to promote AI adoption should be accompanied by policies that strengthen digital infrastructure and expand access to educational technologies, particularly in schools located outside major urban centers.

The findings also provide practical implications for teacher professional development. The challenges related to digital literacy and AI utilization suggest that teachers require continuous training programs focusing not only on technical skills but also on pedagogical strategies for integrating AI into classroom learning. Professional development initiatives should emphasize

prompt engineering, critical evaluation of AI-generated content, and ethical considerations in technology use. Such competencies are essential to ensure that AI functions as an effective instructional support tool rather than merely a technological novelty.

Finally, this study suggests that future implementation of AI in Islamic Religious Education should move beyond the use of AI for instructional material preparation toward more sophisticated applications that support personalized learning, formative assessment, and adaptive instructional design. Future research may also examine the long-term effects of AI-supported learning on students' religious understanding, critical thinking skills, and character development. Such investigations would contribute to a more comprehensive understanding of how AI can support educational innovation while preserving the core values of Islamic education.

Conclusion

This study confirms that the utilization of Artificial Intelligence (AI) in developing instructional media for Islamic Religious Education (PAI) at SMP Negeri 4 Muara Bungo contributes positively to instructional innovation and classroom learning experiences. Teachers utilized AI-based applications such as ChatGPT, Canva AI, and Gamma AI to support the preparation of learning materials, presentation design, and the development of more interactive instructional media. The integration of AI not only improved instructional efficiency but also increased students' engagement and participation during classroom learning activities.

The findings also revealed that the implementation of AI in PAI learning remains influenced by several challenges, including limited digital literacy among teachers, technological infrastructure barriers, and concerns regarding the accuracy and appropriateness of AI-generated information. These findings indicate that the successful integration of AI within educational settings is determined not only by technology availability but also by teachers' competencies, technological readiness, and pedagogical considerations.

Furthermore, teachers demonstrated adaptive efforts in optimizing AI utilization through self-directed learning, collaborative adaptation with colleagues, and the integration of AI-supported media with conventional instructional approaches. These strategies indicate that teachers continue to play essential roles in facilitating learning processes and maintaining the pedagogical and moral values emphasized in Islamic education.

The findings of this study contribute to the growing body of knowledge on the integration of Artificial Intelligence in Islamic education, particularly within regional school contexts where technological adoption remains in its early stages. The study highlights the importance of strengthening teachers' digital competencies, improving technological infrastructure, and developing institutional policies that support responsible AI implementation in education. By fostering a balanced integration between technological innovation, pedagogical effectiveness, and Islamic educational values, AI has the potential to become a strategic tool for enhancing learning quality and preparing students to meet the challenges of an increasingly digital society while maintaining strong moral and religious foundations.

Overall, this study suggests that AI should be viewed as a supportive instructional tool rather than a replacement for teachers. Effective AI implementation within Islamic Religious Education requires a balanced integration between technological innovation, teachers' professional competencies, and educational values to create more adaptive, engaging, and meaningful learning experiences.

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