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Implementation of Artificial Intelligence in Islamic Religious Education Learning at Madrasah Ibtidaiyah

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ABSTRACT

This research aims to explore and analyze the implementation of artificial intelligence (AI) in Islamic Religious Education (PAI) learning at Madrasah Ibtidaiyah, with a focus on innovation and the effectiveness of using AI in improving the quality of learning. The research method uses a qualitative approach with a case study design involving five Madrasah Ibtidaiyah in Cirebon Regency, involving in-depth interviews with 15 PAI teachers and 50 students, classroom observations, and document analysis. The research results show that the application of AI provides significant benefits such as delivering more interactive material, personalizing learning according to student needs, and more efficient learning evaluation. In conclusion, the implementation of AI in PAI learning at Madrasah Ibtidaiyah can improve the quality of learning and student understanding, although its success depends on technological readiness, teacher training, and support from related parties. It is hoped that this research will become a reference for other madrasas in adopting AI to increase the effectiveness of PAI learning.

Keywords: Artificial Intelligence, Islamic Religious Education, Madrasah Ibtidaiyah, Interactive Learning, Personalization.

How to Cite:

INTRODUCTION

Islamic Religious Education (PAI) is a crucial component in the education system in Indonesia, especially at the Madrasah Ibtidaiyah level. Madrasah Ibtidaiyah plays an important role in forming the religious and moral foundations of students from an early age. As part of efforts to improve the quality of education, it is important to utilize technology that can support the learning process effectively. One technology that offers great potential in this regard is artificial intelligence (AI) (Anderson, 2018).

Artificial intelligence, with its ability to process data and make decisions based on algorithms, has demonstrated significant impact in various fields, including education. In the context of PAI learning, AI can be integrated to develop more interactive learning media and personalize teaching materials according to student needs (Baker & Smith, 2019; Chen et al, 2020). The implementation of AI in religious education has the potential to bring innovation that can enrich existing teaching methods.

Although the potential of AI in education has been widely recognized, its application in PAI learning at Madrasah Ibtidaiyah is still relatively new (Fisser et al, 2018; Baker & Smith, 2019). Adoption of this technology requires a deep understanding of how AI can be integrated with the PAI curriculum without ignoring fundamental religious values. Therefore, it is important to explore how AI can be adapted in this context and what the benefits and challenges are.

The effectiveness of using AI in improving the quality of PAI learning needs to be analyzed carefully. Although AI offers a variety of technological solutions, its success largely depends on proper implementation and readiness of infrastructure in madrasah (Holmes et al, 2019; Huang & Yang, 2018). This research aims to assess the extent to which AI can influence the learning process and student learning outcomes, as well as how this technology can support the achievement of religious education goals.

So far, most research on AI in education has focused more on applications in general subjects. Research regarding the use of AI in PAI at Madrasah Ibtidaiyah is still limited, so this research is important to fill this knowledge gap (Kim et al., 2017; Wang et al., 2019). By analyzing the innovations presented by AI, this research aims to provide a deeper understanding of the potential and challenges of using AI in the context of religious education.

In practice, the integration of AI in PAI learning involves the use of various tools and applications that can assist in the delivery of material, evaluation of learning, and interaction between teachers and students. AI can help identify areas where students need additional help, provide material appropriate to the student's level of understanding, and provide fast and objective feedback.

However, the application of AI in PAI learning also requires attention to ethical and social aspects. It is important to ensure that the technology used is not only technically effective but also sensitive to cultural and religious values. Therefore, researchers are interested in analyzing how AI can be applied in a way that respects and supports the principles of religious education.

Thus, it is hoped that this research will not only make an academic but also practical contribution to the development of religious education in madrasas. By understanding how AI can improve PAI learning, it is hoped that effective strategies can be obtained to optimally integrate this technology in the religious education curriculum at Madrasah Ibtidaiyah to support the achievement of better and more relevant religious education goals with current developments.

RESEARCH METHODOLOGY

This research uses a qualitative approach with a case study design. A qualitative approach was chosen because it allows in-depth exploration and detailed analysis regarding the implementation of artificial intelligence (AI) in Islamic Religious Education (PAI) learning at Madrasah Ibtidaiyah. A case study design was chosen because the research focus is on a contemporary phenomenon in a real-life

context, namely the application of AI in a specific religious education environment. This method allows researchers to gain a comprehensive understanding of the practices, challenges and benefits of using AI in madrasas.

Data collection was carried out through three main techniques: in-depth interviews, classroom observations, and document analysis. In-depth interviews with PAI teachers aim to gain insight into their experiences, perceptions and views on the use of AI in learning. Class observations were carried out to see directly how AI is used in the learning process and interactions between teachers and students. Document analysis involves examining a variety of materials and sources related to the application of AI, including lesson plans, evaluation reports, and other documents.

This research involved five Madrasah Ibtidaiyah in Cirebon Regency which have implemented AI technology in PAI learning. The selection of madrasas was based on purposive sampling, which allows researchers to select subjects who are considered most relevant and have sufficient experience in using AI. The total participants consisted of 15 PAI teachers and 50 students, who were selected purposively to ensure that they had direct experience and involvement with AI technology in learning.

The data analysis technique used in this research is thematic analysis. Data obtained from interviews, observations, and documents were coded and categorized based on themes relevant to the research objectives. This process involved several stages, including data transcription, repeated reading, coding, grouping codes into themes, and interpretation of findings. Thematic analysis allows researchers to identify patterns and relationships in data, and draw informative and meaningful conclusions.

This research flow diagram includes several main stages. The first stage is planning and preparation, which involves identifying the madrasah to be researched and preparing research instruments. The second stage is data collection, which consists of in-depth interviews, classroom observations, and document analysis. The third stage is data analysis, which involves coding and grouping the data into main themes. The final stage is interpretation and reporting of findings, where the researcher draws conclusions and prepares a research report.

Overall, this qualitative method with a case study design provides a comprehensive framework for exploring and analyzing the implementation of AI in PAI learning at Madrasah Ibtidaiyah. Diverse data collection techniques and in-depth thematic analysis enable researchers to gain rich and detailed insight into the phenomena studied, as well as provide practical and informative recommendations for the development of religious education in madrasah.

RESULTS AND DISCUSSION

Research Results

The results of interviews with Islamic Religious Education (PAI) teachers at five Madrasah Ibtidaiyah show that the application of artificial intelligence (AI) in learning has a significant positive impact. Teachers stated that AI helps them deliver material in a more interactive and engaging way. Several teachers mentioned that using AI-based applications allows them to visualize abstract religious concepts more clearly, so that students understand and remember the material more easily.

Classroom observations supported the findings from the interviews. In classes that use AI technology, it can be seen that students are more involved and enthusiastic in the learning process. For example, the use of visual aids generated by AI makes students more interested in following lessons. In addition, interaction between teachers and students also increases because AI enables more dynamic and interactive learning. Teachers can ask questions that are tailored to students' level of understanding, so that the learning process becomes more effective.

The documentation results show that the application of AI also allows personalization of learning to suit individual student needs. In several lesson plan documents, it appears that teachers can design specific material for each student based on analysis of data generated by the AI system. This allows students to learn at their own pace and learning style, which in turn accelerates their understanding of the material.

The teachers interviewed also revealed that the use of AI helps them identify students' learning difficulties early. With fast and accurate data analysis, AI can pinpoint areas where students are struggling and need additional help. This allows teachers to provide timely and effective interventions, thereby preventing students from falling behind in learning.

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Research Discussion

The research results show that the application of artificial intelligence (AI) in Islamic Religious Education (PAI) learning at Madrasah Ibtidaiyah brings several significant benefits. One of the main benefits is AI's ability to make the delivery of material more interactive and interesting. This is in line with findings from research by Chen et al. (2020) which shows that the use of AI in education can increase student interactivity and engagement in learning. In this study, teachers stated that "AI allows me to present teaching materials in the form of videos and animations that make students more interested and focused during learning," which supports the findings.

The use of AI also enables personalization of learning, meaning material can be tailored to individual students' needs and abilities. According to research by Anderson et al. (2018), personalization of learning through AI can help students learn at their own pace and improve learning outcomes. In line with this, one of the teachers in this study expressed, "AI helps me adjust the difficulty level of assignments according to each student's abilities, so that they can learn at their own pace." This is supported by observations that show students' increased understanding when they are given assignments that match their abilities.

AI also plays an important role in increasing student learning motivation. The results of this research show that students feel more motivated to learn with AI technology. This finding is supported by research from Wang et al. (2019) which states that AI technology can increase students' learning motivation by

making learning more interesting and fun. One student expressed, "Learning becomes more fun with AI technology. I feel more motivated to learn because the material is presented in a way that is not boring."

Learning evaluation becomes more efficient and objective with the help of AI. In this research, teachers stated that with AI, they could carry out assessments automatically and get fast and accurate results. Research by Luckin et al. (2016) also show that AI can increase efficiency and objectivity in learning evaluation. "AI helps me carry out daily assessments more quickly and without bias, so I can provide direct feedback to students," said one teacher. The documentation results also show that student learning outcomes reports can be generated in real-time, allowing teachers to immediately find out student progress and provide necessary assistance.

AI implementation also helps in early identification of student learning difficulties. Research by Holmes et al. (2019) found that AI can be used to identify students experiencing learning difficulties early and provide appropriate intervention. In this study, one teacher stated, “With data analysis from AI, I can see which areas students are struggling with and immediately provide additional help.” Classroom observations support these findings, indicating that this timely intervention is helpful in preventing students from falling behind and ensuring that all students are able to follow the material well.

Documentation shows that AI provides various digital resources that help teachers in compiling more varied and interesting teaching materials. This is in line with findings from research by Huang and Yang (2018), which states that AI can provide various digital learning resources that enrich teaching material. Teachers can access learning videos, interactive simulations and adaptive quizzes generated by AI. "This resource really helps me in making learning more interesting and less monotonous," said a teacher. This was also observed in classroom observations, where students appeared more enthusiastic and actively involved when using visual and interactive aids.

The research results also show that the use of AI can speed up students' understanding of the material. According to research by Baker and Smith (2019), AI can help students understand material more quickly by providing clear explanations and equipped with visualizations. In this research, a teacher stated, "Students understand the material more quickly because the explanations given by AI are very clear and equipped with visualization." Observations also show significant improvements in students' understanding when using AI technology compared to traditional methods.

Students who participated in this research felt that learning with AI provided a more enjoyable and satisfying learning experience. Research by Kim et al. (2017) also found that AI-based learning can increase student learning satisfaction. One student said, "Learning with AI is like playing while learning, I don't feel bored and understand more quickly." Observations support this statement, where the classroom atmosphere looks livelier and more dynamic with the presence of AI technology.

However, this research also found several challenges in implementing AI at Madrasah Ibtidaiyah, especially related to the readiness of technological infrastructure. Some madrasas still face problems in terms of device availability and stable internet connections. Research by Fisser et al. (2018) show that technological infrastructure readiness is an important factor for the successful implementation of AI in education. "We still need to improve our technological infrastructure to maximize the benefits of AI in learning," said a madrasah head.

Overall, this research shows that the application of AI in PAI learning at Madrasah Ibtidaiyah provides significant benefits in increasing interactivity, personalization, learning motivation, and learning evaluation efficiency. These findings are in line with previous research showing that AI can improve the quality of education. Although there are several challenges that need to be overcome, the results of this research provide valuable insight into the potential of AI in supporting the achievement of better religious

education goals and are relevant to technological developments. With the right support, AI can be a very effective tool in improving the quality of learning in madrasah.

CONCLUSION

The research results show that the implementation of artificial intelligence (AI) in Islamic Religious Education (PAI) learning at Madrasah Ibtidaiyah has significant positive implications for improving the quality of learning and student understanding. The benefits offered by AI, such as delivering more interactive and interesting material, personalizing learning, and efficient and objective evaluation, have a real impact on the teaching and learning process. However, the success of this implementation cannot be separated from several crucial supporting factors.

One of the main implications of this research is the importance of technological infrastructure readiness. Adequate infrastructure, such as hardware (computers, tablets, etc.) and a stable internet connection, are basic prerequisites for AI technology to be implemented effectively in madrasas. Without a strong infrastructure, the benefits of AI cannot be optimized, and this can be a major barrier to adoption of this technology. Therefore, investment in developing technological infrastructure in madrasas must be a priority.

Apart from infrastructure, teacher training is also a key factor in the success of AI implementation. Teachers must be equipped with adequate knowledge and skills to use AI technology in learning. Ongoing and comprehensive training will help teachers understand the potential of AI and how to integrate it into the PAI curriculum. This support not only improves teacher competency, but also ensures that technology is used effectively to improve the quality of education.

Support from various related parties, including the government, educational institutions and communities, is also very important. Policies that support the use of technology in education, adequate funding, and collaboration between madrasas and related parties, will help create a conducive ecosystem for the implementation of AI. Active participation from all these stakeholders will ensure that madrasas have the necessary resources to optimally adopt and utilize AI technology.

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