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Artificial Intelligence-Based Learning Environment in Learning Islamic Religious Education in Higher Education: Opportunities and Challenges

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Abstract

This research aims to explore and analyze the application of Artificial Intelligence (AI)-based learning environments in Islamic education in higher education, as well as identifying the opportunities and challenges faced. In this digital era, the integration of AI in the educational process is expected to improve the quality of learning, personalization of materials and teaching efficiency. This study uses a qualitative method with a case study approach at two private Islamic Religious Universities in Jambi Province which have implemented AI technology in their curriculum. The research results show that the application of AI in Islamic Education learning environment offers a variety of significant opportunities, such as increased access to a wider range of learning resources, the ability to personalize the learning experience for each student, and increased efficiency of administrative processes. However, this research also revealed several key challenges, including limited technological infrastructure, the need for special training for lecturers and teaching staff, and ethical issues related to data privacy and surveillance. The next thing that is in the spotlight as a form of challenge in creating an AI-based learning environment is strengthening collaboration between educational institutions, industry, technology and government for quality education. The main conclusion of this research is that although there are challenges that need to be overcome, the potential benefits offered by AI in Islamic education are enormous and promising. Therefore, it is important for Islamic educational institutions, especially universities, to develop effective and sustainable implementation strategies, including investment in technological infrastructure and training for educators. This research contributes to the existing literature by providing empirical data on the application of AI in Islamic Education and providing practical recommendations for optimizing the

use of AI in improving the quality of education in higher education.

Keywords**:** Artificial Intelligence; College; Education Technology; Islamic Education; Learning Process

Introduction

In the digital era which continues to advance and develop, technology has become an integral part in various aspects of life, including in the education sector. There is no doubt about the recognition of the potential of Artificial Intelligence (AI) as a step towards a more inclusive, effective and adaptive educational revolution to change education in a positive way. This is proven by several indicators such as the study of AI in education which has become a research trend that is much in demand and studied in the 2019-2024 period, as can be seen from the increase in the number of publications, collaboration between researchers, and increasingly intense research focus on this topic from researchers. and academics (Ristyana Suryanti, Jaja Jahidin, 2024a)

Learning Islamic Religious Education (PAI) in Higher Education is part of the national curriculum as a fundamental pillar in creating student character and morals which cannot be separated from the influence of the Technology/AI revolution (S, Suhartini dan Rahman, 2023). In fact, the use of AI in the context of PAI learning can bring various new opportunities through the use of learning environments that are integrated with the use of AI, such as: 1) better access to diverse learning resources (Akgun, S., 2021), 2) improving the quality of learning by providing instant feedback to students, answering questions, and guiding them through complex concepts (Arksey, H.; O'Malley, 2005), 3) helps in personalizing the learning experience, real-time feedback, and directing learning process in the right direction, 4) increasing time and cost efficiency by automating administrative tasks such as assessment, creating schedules, and creating learning content, 5) ultimately the presence of AI in learning will be a cost-effective solution for institutions education, especially in resource-limited environments, by providing scalable and easily accessible learning opportunities (FIRUZ KAMALOV1, DAVID SANTANDREU CALONGE2, 2023) and 6) ease of facilitators (teachers) in presenting virtual reality to provide visually rich educational content to students. Learner (Vittorini, P.; Menini, S.; Tonelli, 2021).

The large number of AI integration opportunities in PAI learning in higher education certainly cannot be separated from the challenges that will be faced and that higher education must be prepared for. These include: 1) preparing how the dehumanization of the learning process and the potential loss of human interaction does not occur, 2) ensuring that students' moral and ethical values as the main values/core values of PAI learning remain a priority despite the large involvement of AI integration in learning, 3) ensuring readiness infrastructure, especially facilities and infrastructure for PAI lectures or learning (Luma, M., & Djafri, 2023). The integration of AI through the creation of a learning environment in HEIs must be able to ensure that the use of AI in PAI learning will have the potential

to create a learning method revolution without sacrificing the essence and core values taught in this PAI course (S, Suhartini dan Rahman, 2023), including main values related to the formation of individual character who is obedient, has noble, democratic and responsible character (Kosim, M., & Munawaroh, 2021). So it is very important to ensure that the use of AI will not reduce or disrupt the process of achieving PAIW's core learning values (Hanafi, Y., Hadiyanto, A., Abdussalam, A., Munir, M., Hermawan, W., Suhendar dan Barnansyah, R. M., Anwar, S., Purwanto, Y., & Yani, 2022), Internalization values of religious moderation in Islamic religious education lectures at public universities.

This article examines and analyzes the opportunities and challenges that arise in the process of using AI in PAI learning in higher education through creating a learning environment. Academically, this study more specifically discusses the integration of AI in learning to investigate the potential impact of AI on education through a review and analysis of existing literature, with a focus on the opportunities and challenges of AI in such AI-based learning environments. It is hoped that the results of this analysis can reach a common ground that makes it possible to utilize AI technology to support more innovative and effective PAI learning while ensuring that the core values and principles of PAI are maintained. Meanwhile, practically, the integration of AI in PAI learning through AI-based learning environment modifications aims to improve the quality and effectiveness of the learning process. By utilizing the potential of AI for independent learning, increasing access and quality of material, analyzing curriculum improvements, as well as developing simulations and models of religious concepts.

Studies of AI-based learning environments in learning have been carried out by several previous researchers, including: 1) Azhari et al in 2022 which discussed the integration of PAI learning in the use of technology in the Society 5.0 era in general in higher education (Azhari, M. R., Mashuri, S., & Alhabsyi, 2022), 2) Hanafi (2022) who obtained research results discussing the internalization of religious moderation values in Islamic Religious Education lectures at public universities (Hanafi, Y., Hadiyanto, A., Abdussalam, A., Munir, M., Hermawan, W., Suhendar dan Barnansyah, R. M., Anwar, S., Purwanto, Y., & Yani, 2022), Internalization of religious moderation values in Islamic religious education lectures at public universities, 3) (Ifadah, L., & Utomo, 2019) which obtained results research that discusses Islamic Religious Education learning strategies in facing the challenges of the industrial revolution era 4.0, 4) Ismail, F. (2018) which also discusses character development through Islamic Religious Education even though it does not yet show AI integration in PAI learning in order to achieve the core learning values (Ismail, 2018). Next, a study on the use of ICT in PAI learning was also carried out by Asmara Yumarni (2019) regarding Information Technology-Based PAI Learning Innovations. The results of his research highlight the use of ICT as a PAI learning innovation. This research saw that the use of online journals and various digital sources became instruments for assignments which were then collected via social media and

electronic mail (Yumarni, 2019). Apart from that, there are also research articles on the topic Integration of Artificial Intelligence in Education: Opportunities, Challenges, Threats and Obstacles. A Literature Review by Indra Saputra, M. Astuti, Muhammad Sayuti, and D. Kusumastuti. The article explains the results of the author's team's research regarding AI opportunities in education related to the delivery of learning materials, evaluation, management systems, and educational policy making. Meanwhile, existing challenges are related to pedagogy, educational frameworks, and literacy (Saputra, I., Astuti, M., Sayuti, M., & Kusumastuti, 2023). The research results of Waway et al (2023) also show that there are several opportunities and challenges related to the use of AI in PAI learning in higher education, namely improving the quality and effectiveness of the PAI learning process through independent learning, increasing access and quality of materials, analyzing curriculum improvements, and developing simulations and models. religious concepts, while the challenge is more about ethical aspects and religious sensitivity in the development and application of AI in PAI learning, where the use of AI must pay attention to applicable religious norms and values (S, Suhartini dan Rahman, 2023).

The presence of previous articles, as previously explained, is the basis for writing this article. Looking at the outline of the findings of the authors in previous research who have not studied the integration of AI in the learning environment in PAI learning in higher education, in this journal these points will be of novelty value. On that basis, a study of the analysis of opportunities and challenges for AI integration in the learning environment in PAI learning in higher education is novel in this article. So it is clear that improving the quality of learning, personalization of materials, and teaching efficiency, this journal reflects the need to utilize AI technology to create a more adaptive, effective and efficient learning environment. With an emphasis on the application of AI in the context of higher education, this journal aims to identify opportunities and challenges related to the integration of AI in the educational process, especially in PAI learning in higher education.

Research Methodology

This research study uses a descriptive (naturalistic) qualitative approach with a case study method. The case study method is a form of qualitative research to find meaning, investigate processes and gain insight and in-depth understanding of individuals, groups or situations (Lodico, 2010). Through a qualitative approach, it will provide in-depth insight into the challenges and opportunities of using AI-based learning environments in PAI learning in higher education, especially Private Islamic Religious Universities (PTKIS) in Jambi Province. The locus of this research is Yasni Bungo Islamic Institute and Darul Ulum Sarolangun Islamic College.

The data collection techniques used in this research are Observation, Interviews and Documentation. Observation is the basic method for obtaining data in qualitative research. Observation is the main data collection method that researchers use to answer the problem

formulation in research (Ary, 2010). The observations that researchers will carry out in this research are observations in which the research team goes directly into the field to observe the behavior or activities of individuals at the research location. The observation technique that will be used in this research is participant observation, namely where the researcher, in carrying out the research, is directly involved and involved with the research objects (respondents) who will be studied. Thus, it is hoped that the data obtained later from the informants will be more valid, especially regarding the issue of AI integration in the learning environment in PAI courses at PTKIS as the research locus. The next technique is Interview. Interviews are one of the most widely used methods and are the basis for obtaining qualitative data. Interviews are used to collect data from people about opinions, beliefs and feelings about situations in their own words. Interviews can provide information that cannot be obtained through observation, or can be used to verify observations (Cresswell, 2015). An interview is a dialogue conducted by an interviewer to obtain information from the interviewee. This interview is used to explore information regarding the opportunities and challenges of an AI-based learning environment in PAI learning at PTKIS Jambi Province. In this research, the subjects who will be interviewed are Deputy Chancellor 1, Dean of the Faculty of Tarbiyah and Teacher Training, Head of the PAI Study Program, Permanent PAI Lecturers and PAI Students at the two PTKIS which are the research locus. The next method is Documentation. Documented components include curriculum, learning plans, learning materials, as well as PAI learning facilities and infrastructure in both PTKIS. In order to support the validity of the data in this research, a study was also carried out on various secondary literature, namely scientific journals, articles, reports and books related to the theme of the article.

The data analysis technique in this research uses a mixing model between the Miles and Huberman (1984) model which includes three stages, namely data reduction, data display, and conclusion drawing/verification using John's model. W. Creswell with coding characteristics (Cresswell, 2015).

Findings and Discussion

Findings

From the research results, several findings were obtained related to the opportunities and challenges of an AI-based learning environment in PAI learning in higher education. The findings regarding the opportunities for an AI-based learning environment in PAI learning at PTKIS Jambi Province are as follows:

The Access Enhancement to Wider Learning Resources

The integration of AI in education systems can open the door to wider access to various learning resources through personalization of learning experiences, automation of administrative tasks, and real-time feedback. By utilizing AI technology, learning can be tailored to individual needs,

allowing easier and more efficient access to diverse learning materials. The applicative forms that have been carried out at this research locus as part of the integration of AI in an effort to increase access to wider learning resources include: the use of online learning platforms such as Quipper, Ruang Guru, Zenius, Brainly and Kampus Merdeka in implementing PAI learning. Through this platform, research informants said that students can ask the chatbots questions about certain topics and the chatbot will provide appropriate answers based on their understanding. Apart from that, chatbots can also provide recommendations for additional learning resources, practice questions, or learning materials tailored to students' needs and level of understanding. One of the real innovations that can be seen from the impact of AI in increasing access to wider learning resources can be seen from innovations in learning models that originate from learning content that suits their respective learning styles as seen in the excerpt from one of the photos below in learning. PAI with sub-topic Clothing Procedures according to the Koran:

Figure 1: Utilization of Online Learning Platforms in PAI Learning Activities in Identifying Dressing Procedures According to the Al-Qur'an which are Integrated in Classroom Learning

The Ability to Personalize the Learning Experience for Each Student

AI enables personalization of education by tailoring content and learning experiences to meet the unique needs, learning styles, and preferences of each student. With this approach, students can learn at their own pace, increasing engagement and overall learning outcomes. One applicable form of personalizing the learning experience using AI in IAI Yasni Bungo and STAI Darul Ulum Sarolangun learning environment is through an adaptive learning system to analyze students' strengths and weaknesses, so that they can offer learning that suits their needs. By leveraging student data, the system can identify learning patterns, and suggest personalized content and resources to optimize their learning experience. In addition, the adaptive learning platform can also change the speed, material and complexity of the curriculum based on each student's achievement, thereby providing an optimal learning experience.

One form of activity shown by IAI Yasni Bungo and STAI Darul Ulum Sarolangun in utilizing an AI-based learning environment in PAI learning is through the use of e-journals and e-books in analyzing problems presented in PAI material on Android and laptop respectively. Some of the documentation can be seen in the image below:

Figure 2: Utilization of E-Journals and E-Books in PAI Learning Activities with the Problem Based Learning (PBL) Model

The Administrative Enhancement Process Efficiency

One form of application of AI integration in increasing the efficiency of administrative processes is through the automation of administrative tasks such as assessment, classification and planning of learning activities. By leveraging AI technology, administrative tasks that are typically time-consuming can be automated, allowing educators to focus on direct interactions with students and effective teaching strategies. A concrete example of the application of AI in improving the efficiency of administrative processes is the use of adaptive assessment systems. The system uses artificial intelligence algorithms to provide tailored instructions and real-time feedback to students, helping them understand the material better and improving learning outcomes. The Quiziz and Kahoot applications are the mainstay applications for PAI IAI Yasni Bungo and STAI Darul Ulum Sarolangun lecturers. AI technology can also be used to automate tasks such as grading, scheduling, and planning learning activities, reducing the administrative workload for educators and speeding up the classroom management process. Thus, the integration of AI in improving the efficiency of administrative processes in education not only saves time and effort, but also allows educators to focus on more important aspects of the learning process, such as direct interaction with students and the development of innovative teaching strategies.

Discussion

The Access Enhancement to Wider Learning Resources

Increasing access to a wider range of learning resources is an effort to utilize artificial intelligence (AI) in education to provide wider and more inclusive access to various learning resources applied in the learning environment. The integration of AI in education allows individuals from various backgrounds and geographic locations to access learning resources that are relevant to their needs and interests (Arksey, H.; O'Malley, 2005). Thus, this approach aims to overcome geographic, financial and social barriers that may hinder access to quality education. With AI, online learning platforms can provide digital learning resources that can be accessed by many people without being constrained by geographic or financial factors, opening up opportunities for individuals in

various parts of the world to gain new knowledge and skills (Mahfood, B.; Elnagar, A.; Kamalov, 2023). In addition, personalizing the learning experience using AI can also increase access to education by providing content tailored to each individual's needs and learning style, allowing them to learn according to their own rhythm and preferences (Nicolescu, 2022).

The integration of AI in learning can help create wider access to learning resources in the following ways: 1) Personalization of Learning: AI can be used to create learning plans that are tailored to each student's needs and level of understanding, so that each individual can learn according to their needs. at their own pace and learning style, 2) Interactive Learning Assistance: Through an AI-based chatbots or virtual assistant application, students can ask questions, get explanations, and obtain learning assistance interactively whenever needed, 3) 24/7 Access: With technology AI, learning resources can be accessed by students anytime and anywhere, so learning is not limited by a certain time or location, 4) Increased Availability of Learning Materials: AI can be used to produce more diverse and relevant learning content, as well as provide additional learning resources which can help students understand the material (Ristyana Suryanti, Jaja Jahidin, 2024b).

Shihui's research results further suggest that increased access to a wider range of learning resources can be interpreted as: a) personalization of learning: AI integration allows personalization of learning tailored to individual needs, preferences and level of understanding. In this way, each student can access learning materials that suit their needs, increasing accessibility to relevant learning resources, b) Learning Content Development: AI can be used to develop diverse learning content tailored to the needs of each student. This allows students to access a wider and varied range of learning resources, according to their preferences and learning styles, c) Use of Technology: The integration of AI in learning can also include the use of technology such as chat bots or recommendation systems that can provide quick and easy access to information and learning resources. Thus, students can easily access various relevant learning resources (Law, 2021).

Administrative Process Efficiency Enhancement

It is an effort to increase efficiency in administrative processes through the application of modern technology, such as artificial intelligence. Increasing the efficiency of administrative processes also refers to efforts to improve performance and productivity in various administrative processes in higher education institutions using artificial intelligence (AI) technology and applications. This can include the use of information systems, data analysis, and automation of administrative tasks to reduce the time and costs required to carry out various administrative activities in higher education (Olaf Zawacki-Richter, Victoria I. Marín, 2019). By applying AI in administrative processes, educational institutions can optimize the time, resources and labor required to carry out daily operations, thereby creating a more efficient and effective learning environment (Prathamesh Churi dan Mohamed Elhoseny, 2023).

Increasing the efficiency of administrative processes can be interpreted as follows: 1) Automation of Administrative Tasks: AI integration can be used to automate administrative tasks such as student data management, scheduling, attendance tracking, and other administration. This can reduce the administrative workload of teachers and college staff, thereby increasing the overall efficiency of administrative processes, 2) Use of Learning Management Systems: AI can be used in the development of intelligent learning management systems, which can help in curriculum management, assessment and reporting . With this system, administrative processes related to learning can be carried out more efficiently and accurately, 3) Administrative Data Analysis: AI can also be used to analyze administrative data such as student attendance data, academic performance and program evaluation. With accurate and fast data analysis, administrative decisions can be taken more efficiently and based on evidence (Law, 2021). Through AI technology integrated into the learning environment in PAI learning, administrative processes such as student data management, curriculum planning, student performance evaluation, and general administration in higher education can be improved in terms of speed, accuracy, and efficiency. AI can also help in the automation of routine administrative tasks, allowing administrative staff to focus on tasks that require human decisions and creativity (Song Pu, Nor Aniza Ahmad, 2021).

Ability to Personalize the Learning Experience for Each Student

It is the ability of AI technology to provide learning experiences that are tailored to the individual needs and learning styles of each student in a learning environment that has been created based on AI. By using AI, learning systems can collect data about each student's learning preferences, level of understanding, learning speed, and content preferences. Based on this information, the AI system can present customized learning materials, provide personalized feedback, and tailor the learning approach to each student individually. Thus, the ability to personalize the learning experience can increase student engagement, motivation and learning effectiveness (Prathamesh Churi dan Mohamed Elhoseny, 2023). Next, technological capabilities and the application of artificial intelligence (AI) play an important role in providing learning experiences that are tailored to the needs, preferences and abilities of each student individually. This can include the use of a system that can identify each student's learning style, level of understanding, and learning needs to provide appropriate learning recommendations and support their academic development (Bartolomé, A., Castañeda, L., & Adell, 2018).

The ability to personalize the learning experience for each student refers to the efforts of Islamic Religious Education Lecturers to adapt learning methods and use of technology according to individual student needs, interests and learning styles. This includes the use of various technologies and learning approaches that can be adapted to the characteristics and learning preferences of each student, so that the learning process becomes more effective, efficient and interesting for them. By

personalizing the learning experience, it is hoped that each student can be more involved, motivated, and gain a better understanding of Islamic Religious Education material (Mohammad Rizkiyanto Azhari, 2022).

Conclusion

This research explores the application of Artificial Intelligence (AI)-based learning environments in Islamic education in higher education and identifies the opportunities and challenges faced. The research results show that AI integration has great potential in improving the quality of learning, personalization of materials, and teaching efficiency in Islamic educational institutions. The application of AI also expands access to learning resources and increases administrative efficiency. However, this research revealed several key challenges, including limited technological infrastructure, special training needs for lecturers and teaching staff, and ethical issues related to data privacy and surveillance. To overcome these challenges, collaboration is needed between educational institutions, industry, technology and government. The main conclusion is that although there are challenges that need to be overcome, the potential benefits offered by AI in Islamic education are enormous and promising. Therefore, it is important for Islamic educational institutions, especially universities, to develop effective and sustainable AI implementation strategies, including investment in technological infrastructure and training for educators. This research contributes to the literature by providing empirical data on the application of AI in Islamic education and providing practical recommendations for optimizing the use of AI in improving the quality of education in higher education. Next are the implications, limitations and opportunities for future research from the research results in this journal: a) Implications: (1) improving the quality of learning: The integration of AI in Islamic education in higher education can improve the quality of learning through material personalization and teaching efficiency , (2) Wider Access: The use of AI allows access to wider and more varied learning resources, supporting inclusivity in education, (3) Administrative Efficiency: AI can increase efficiency in administrative processes, allowing lecturers and teaching staff to focus more on activities teaching; b) Limitations: (1) Technological Infrastructure: Limited technological infrastructure in several educational institutions is still the main obstacle in implementing AI, (2) Training and Competency: Lack of special training for lecturers and teaching staff can hinder the effectiveness of implementing AI, (3) Issues Ethics and Privacy: There are concerns regarding data privacy and surveillance, which need to be addressed with appropriate policies and regulations; c) Opportunities for Future Research: (1) Comparative Studies: Further research could conduct comparative studies between institutions that have and have not implemented AI to understand the specific impacts, (2) Development of AI Learning Models: Develop and test AI-based learning models that more sophisticated and in accordance with the context of Islamic education.

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