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Actualization of the Use of Artificial Intelligence (AI) in Developing Islamic Education in the Era of Society 5.0

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Abstract

The rapid development of artificial intelligence technology has opened up new opportunities in the transformation of education, including Islamic education. This research aims to analyze the use of AI in personalizing Islamic learning in the era of Society 5.0, with a constructivism-based theoretical approach. The method used is a qualitative-descriptive analysis of the literature and phenomena related to the application of AI in Islamic education. The results show that AI has great potential in creating learning that is more adaptive and meets individual needs, especially through the use of personalization algorithms and in-depth data analysis. This article makes a novel contribution by offering a new perspective on the application of AI technology based on constructivism theory, which highlights the importance of the interaction between technology, learners and the social environment. The implication is that the application of AI can encourage innovation in curriculum design and teaching strategies, while ensuring alignment with Islamic values in the digital age.

Keywords: Artificial Intelligence, Islamic Education, Society 5.0

Abstrak

Perkembangan pesat teknologi kecerdasan buatan (artificial intelligence) telah membuka peluang baru dalam transformasi pendidikan, termasuk pendidikan Islam. Penelitian kali ini bertujuan untuk menganalisis pemanfaatan AI dalam mempersonalisasi pembelajaran Islam di era Masyarakat 5.0, dengan pendekatan teoritis berbasis konstruktivisme. Metode yang digunakan adalah analisis kualitatif-deskriptif terhadap literatur serta fenomena-fenomena yang berkaitan dengan penerapan AI dalam pendidikan Islam. Hasil penelitian menunjukkan bahwa AI memiliki potensi besar dalam menciptakan pembelajaran yang lebih adaptif dan memenuhi kebutuhan individu, terutama melalui penggunaan algoritma personalisasi dan analisis data yang mendalam. Artikel ini memberikan kontribusi yang cukup baru dengan menawarkan perspektif baru mengenai penerapan teknologi AI berdasarkan teori konstruktivisme, yang menyoroti pentingnya interaksi antara teknologi, peserta didik, dan lingkungan sosial. Implikasinya, penerapan AI dapat mendorong inovasi dalam desain kurikulum dan strategi pengajaran, sekaligus memastikan keselarasan dengan nilai-nilai Islam di era digital.

Kata kunci: Kecerdasan Buatan, Pendidikan, Society 5.0

INTRODUCTION

The era of Society 5.0, which marks the integration between the physical and digital worlds, has brought about profound changes in various aspects of life, including education. In this context, artificial intelligence (AI) is emerging as one of the main drivers of technological transformation, offering great

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opportunities to improve the accessibility, efficiency and quality of education. For Islamic education, this era presents the potential to utilize AI to enrich the learning experience, but also poses challenges regarding the application of technology in line with Islamic values. (Anida, 2022). The utilization of AI in the educational context has promised great potential to advance learning, optimize learning experiences, and facilitate access to knowledge worldwide. However, in the specific context of Islamic education, the true potential of AI has not yet been fully realized (Raquib dkk., 2022). In this regard, this research aims to investigate in depth how the actualization of AI usage can act as a catalyst in the process of developing Islamic education in the era of Society 5.0 (Bahiyah, 2022).

This research is motivated by the advancement of AI technology, which has enabled faster data processing, more accurate predictive analysis, and personalized learning material adaptation (Tjahyanti dkk., 2022). This allows education to be more responsive to the unique needs of each individual. Furthermore, the use of this technology can expand access to Islamic education, especially for those limited in accessing conventional resources(M. Islam dkk., 2024). However, behind this great potential lie serious challenges, including the need for wise policies, adequate infrastructure, and a deep understanding of the ethical implementation of AI that is responsive to Islamic values (Sudirman dkk., 2022).

In facing the transition towards the era of Society 5.0, which marks the fusion between the physical and digital worlds, a pressing need is revealed to consider how artificial intelligence (AI) technology can enrich and transform the landscape of Islamic education (Serdianus & Saputra, 2023). A fundamental question arises: "How can the use of AI technology be effectively applied to enhance the quality and accessibility of Islamic education in the era of Society 5.0?". First and foremost, it is important to understand that Society 5.0 brings significant consequences to the education paradigm. In this era, digitalization and automation have entered the realm of education, allowing the utilization of AI technology to become an integral element of learning (Raquib, 2023a). However, in the context of Islamic education, adapting to these changes is not a trivial matter. By upholding the values and principles of the religion, the main challenge is to ensure that AI technology not only provides effective education but is also in line with its underlying Islamic teachings (Sultana & Faruk, 2024).

Furthermore, the crucial question is how AI technology can serve as a means to enhance the quality of Islamic education. With its ability to provide personalized learning tailored to the needs of each individual, AI can help overcome individual constraints that may limit access to education (Sari & Fitriana, 2022). However, ensuring that the diversity of educational needs and individual beliefs are accommodated remains a primary consideration in how this technology is implemented. In order to achieve the necessary quality, resources, and accessibility goals, a comprehensive and integrated strategy must be designed (Guan dkk., 2023). This includes aspects such as technological infrastructure, training for educators, and the establishment of regulatory frameworks and ethics that can guide the utilization of AI technology in the context of Islamic education (Ma'rifatunnisa dkk., 2022). While previous research has discussed the benefits of AI in education in general, there is still a gap in the understanding of how this technology can be effectively integrated in Islamic education. Challenges such as the lack of technological infrastructure, the need for thoughtful policies, and an ethical understanding of the use of AI in accordance with Islamic principles are major obstacles to its implementation. Accordingly, the problem formulation of this research is to explore how AI technology can be effectively adopted and applied to enhance the quality and accessibility of Islamic education in the era of Society 5.0, while considering values and religious principles as the main foundation. By addressing this issue, it is hoped that this research will provide deep insights into how to integrate innovative technology with Islamic religious education to create an inclusive, adaptive, and meaningful learning environment for future generations (Batubara, 2020).

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This article aims to answer important questions regarding the role of AI in personalizing Islamic learning in the era of Society 5.0. Specifically, it aims to identify the opportunities and challenges and offer an approach that integrates modern technology with Islamic educational values. As such, this research is expected to make a significant contribution to creating a curriculum that is adaptive and innovative, as well as relevant to the needs of Muslim societies in the digital age. (Bahri, 2022). By closely examining the complex relationship between AI and Islamic education, this research is expected to pave the way for innovative approaches that can shape a more inclusive, adaptive, and effective future for Islamic education (Santoso dkk., 2023).

This research will use a descriptive qualitative method with a phenomenological approach. This means that the research is conducted based on phenomena that are currently happening in the community. This research uses two sources of data, namely primary data sources in the form of observations and interviews with several informants. Then secondary data sources in the form of studies from references relevant to this research. In analyzing the discussion, this research will use Jean Piaget's Constructivism theory (1896-1980), which explains that Constructivism theory understands learning as an activity for students to build or create knowledge by giving meaning to their knowledge according to their experiences.

Constructivism theory is a learning approach that views individuals as actively engaged in constructing their own knowledge. This differs from the conventional perspective that sees knowledge as something that can be transferred from teacher to student. According to Piaget, this theory identifies four main stages in a child's cognitive development, starting from the sensorimotor stage to the formal operational stage. Piaget also suggests that individuals form cognitive structures called "schemas" to understand the world around them. The process of "assimilation" occurs when individuals understand new information by connecting it to existing schemas. However, when individuals encounter a new situation or information that cannot be understood with existing schemas, they must modify or change those schemas, known as "accommodation." Disequilibrium occurs when individuals face situations that do not fit their schemas. Furthermore, constructivism theory emphasizes the important interaction with the physical and social environment in the learning process. The environment plays a key role in shaping knowledge construction. This theory also highlights the importance of cognitive activities such as observation, experimentation, and reflection as effective ways to build knowledge. Constructivist theory offers a rich perspective on how individuals are actively involved in the learning process and constructing their own understanding (Piaget & Coltman, 1970).

The use of a phenomenological approach in the present study is due to the fact that this approach allows the researcher to further explore the experiences and in-depth understanding of the application of AI in Islamic education in the era of Society 5.0. Phenomenology was chosen for its relevance in exploring informants' views on how AI technology affects their learning, as well as understanding the values underlying these interactions. This approach is in line with the research objective of uncovering unique experiences in the context of Islamic education. The data for this study was collected through interview techniques and participatory observation. Interviews were conducted using semi-structured guidelines to ensure flexibility in extracting important information. Informants were selected based on the criteria of their active involvement in the use of AI in Islamic education, including teachers or educators. The observation process was conducted in educational institutions that have begun to implement AI technology, and were able to provide a direct context for the phenomenon under study. Research instruments included interview sheets designed to systematically explore informants' experiences, as well as field notes to document

observations. One of the questions in the interview was related to the impact of AI on your work as an educator oriented towards Islamic education.

In data analysis, Piaget's theory of constructivism was applied to understand the learning process of students. Data were analyzed through interpretation steps, namely data coding, theme identification, and conclusion drawing. This process aims to link the empirical findings with the principles of constructivism, such as the importance of individual adaptation to new information through the process of assimilation and accommodation. The characteristics of the research subjects include their educational background, level of experience with technology, and their position in the Islamic education system. In addition, characteristics in the use of AI are also needed, such as the use of AI to assist thinking in developing learning administration that will be applied in the process of teaching and learning activities so that activities can be more interactive and innovative. In addition, the characteristics of the types of AI used are at least varied and not fixated on only one type of AI.

Artificial Intelligence and Society 5.0

Artificial Intelligence (AI) is a technology that enables machine to perform tasks that require human intelligence, such as learning, planning, problem-solving, and decision-making. AI can be applied in various forms, such as machine learning, deep learning, neural networks, natural language processing, and computer vision. Machine learning is one of the most popular types of AI applications. Machine learning allows machines to learn from data and experiences and make decisions based on patterns found in that data (Taye, 2023). Deep learning is a form of machine learning that uses neural networks to process very large and complex data. Neural networks are artificial neuron networks that mimic how the human brain processes information (Brasse dkk., 2023).

Natural language processing is a form of AI that enables machines to understand and process human language. Natural language processing is used in applications such as chatbots, virtual assistants, and sentiment analysis (Sifat, 2023). Computer vision is a form of AI that allows machines to process images and videos and recognize objects, faces, and actions in those images. Computer vision is used in applications such as facial recognition, object detection, and autonomous vehicles. AI applications can help improve efficiency and productivity in various fields such as manufacturing, healthcare, finance, and education (Bonny dkk., 2023). For example, in the manufacturing sector, AI can be used to predict machine failures and optimize production. In healthcare, AI can be used to diagnose diseases and plan treatments. In finance, AI can be used for risk analysis and portfolio management. In education, AI can be used to design programs and adapt learning to students' needs. As known in this research, it only focuses on the use of AI in Curriculum Development for higher education and does not delve deeply into the utilization of AI in the realm of Islamic Education in general (Alexandra & Budiyantara, 2022).

Society 5.0 is an evolving concept rooted in the fourth industrial revolution, or Industry 4.0. The basic idea of this concept is that technology should aim to improve the quality of human life and shape a better society overall (Deguchi dkk., 2020). The main goal of Society 5.0 is to leverage technological advancements to address existing social and environmental issues, in order to create an inclusive and sustainable society. There are several important characteristics of Society 5.0. Firstly, this concept emphasizes the importance of achieving a balance between economic achievements and solving social problems. This means that technology should be used as a means to address the challenges faced by society. Secondly, Society 5.0 encourages the use of technology to create well-designed products and services to meet various needs, including latent needs (Gabsi, 2024).

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In this way, society can drive balanced economic development and find solutions to social issues. Thirdly, Society 5.0 emphasizes the importance of using technology to bridge existing gaps, including regional, age, gender, and language gaps. The goal is to create an inclusive and sustainable society where every individual can benefit from technological advancements (Kirkpatrick dkk., 2024). Ultimately, this concept prioritizes the application of technology focused on human values. This means that technology should be used considering its impact on the quality of human life. Therefore, Society 5.0 aims to bring positive changes in society's life through the wise and responsible use of technology. This research focuses on discussing the Relevance of the Aswaja Education Concept Anahdliyah Era Industry 4.0 and Society 5.0 in Islamic Higher Education. Thus, the research has shortcomings related to the discussion of the more in-depth utilization of AI-based technology. (Ehwanudin dkk., 2022).

AI Tools for Developing Scientific Literacy Capabilities in the Scope of Islamic Education

Islamic Education is a program of awareness that enables learners to know, understand, internalize, and believe in the teachings of Islam while respecting followers of other religions in harmony and unity among religious communities (Raquib, 2023b). The goal of Islamic education is to practice Islamic values to create harmony and solidarity among humans in daily life. Islamic education is a conscious effort by educators to change individual behavior in their personal lives, in society, and in their natural environment (Nurbaeti & Suharyat, 2023). Education, in general, encompasses all learning experiences that occur in various contexts and throughout life.

Education is a part of life where learning experiences can take place in all environments and throughout life. Islamic education is Islam-based education that guides, protects, and develops learners in realizing their potential (Huda, 2019). Islamic education also provides opportunities for students to acquire new knowledge. The goal of Islamic education is the embodiment of Islamic values in students, achieved through an education process focused on achieving outcomes. These goals include faith and piety to the One Almighty God, noble character, intelligence, creativity, independence, and becoming responsible and cultured citizens (Elmahjub, 2023). The goals of Islamic education also include the formation of noble ethics, preparing learners for success in the world and the future, developing learners' interest in science and standards, and preparing learners to specialize in technology fields (Aziz, 2023).

Artificial Intelligence has a wealth of potential that can be utilized in developing the Islamic education system. One of them is the ability to develop scientific literacy skills in the realm of Islamic education. Some segments of society, especially in Indonesia, have a relatively low level of literacy understanding. This is due in part to the lack of access to literacy. However, the presence of AI in society is a breath of fresh air for literacy enthusiasts and students. One popular AI among students is the reference search engine known as Publish or Perish.

Publish or Perish is an AI-based application that employs the concept of Machine Searching. The search engine in this PoP application focuses on searching for references, whether they are journal articles, popular articles, books, or other scholarly publications. Notably, in one search with predefined keywords, the PoP application can retrieve more than 1000 references from various sources in diverse formats. Publish or Perish is a significant tool in developing scientific literacy skills in the realm of Islamic education. In a scholarly context, literacy refers to the ability to read, understand, and organize scientific information or knowledge. This application provides facilities for quantitative analysis of published scholarly works, including journals related to Islamic education.

In its use, Publish or Perish utilizes artificial intelligence (AI) technology to collect, analyze, and present bibliometric data from various sources. This includes citation counts, h-index values, and various other important metrics used to assess the quality and academic impact of scholarly works. By using this application, researchers or academics in the field of Islamic education can gain deep insights into the significance and relevance of their scholarly works in the academic domain. Therefore, Publish or Perish serves as a valuable tool in enhancing scientific literacy skills among educators and researchers in the field of Islamic education. Through the bibliometric data analysis provided by this application, academics can measure and monitor the impact of their scholarly works, enrich knowledge in the realm of Islamic education, and ensure the academic integrity of their contributions.

AI Tools for Increasing Scientific Productivity in the Scope of Islamic Education

The impact of the existence of AI is felt among society. Especially for academics in higher education. This is proven by the large number of software that supports the validity of scientific works such as articles. Some examples of AI-based software that are often used in the process of preparing scientific papers include Mendeley, Zotero, Grammarly, Publish or Perish and many others. Artificial intelligence (AI) tools such as Mendeley, Zotero, Grammarly, and Publish or Perish have an important role in increasing scientific productivity in the scope of Islamic education.

First, Mendeley and Zotero are reference management applications that utilize artificial intelligence technology to help researchers organize and manage references from various sources. They enable users to store, organize, and organize references efficiently. Apart from that, both can also provide literature recommendations based on researchers' interests, speeding up the process of searching and collecting information relevant to research in the field of Islamic education. Second, Grammarly is a writing tool that utilizes AI to check grammar, spelling, and writing style. In the context of scientific research, Grammarly can assist researchers in ensuring that their scientific work has a proper language structure and is free from grammatical errors, enabling them to convey their ideas and findings clearly and effectively.

Lastly, Publish or Perish is an application that utilizes artificial intelligence technology to carry out bibliometric analysis of scientific works. These include measuring the academic impact, citation frequency, and h-index of scientific publications. By using Publish or Perish, researchers in the field of Islamic education can monitor and evaluate the impact of their scientific work in the academic community. Overall, Mendeley, Zotero, Grammarly, and Publish or Perish are examples of AI tools that play a key role in increasing scientific productivity in the realm of Islamic education. They help researchers manage references, improve the quality of writing, and measure the impact of their academic contributions. By utilizing this artificial intelligence technology, academics can speed up and improve their research and publication processes in the field of Islamic education.

AI Tools for Developing Critical Thinking Skills (Chatbot)

As previously discussed regarding the development of quality in productivity processes. This time the author will discuss the benefits of AI in developing individual self-quality. As is known, individual self-development in the field of Islamic Education is nothing more than the role of AI in the process. Especially for students. In certain curricula, students are required to be able to think critically, especially in developing their potential in academic fields and the like. By using AI, these abilities can be further developed. In a case where a student with limited abilities is able to produce a good work with the help of

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AI. However, this does not mean that the work is 100% done by AI. But in its application, AI occupies a central position rather than as a supporter.

The use of AI as a support for an individual in producing a work can be applied in various ways, one of which is as a "stimulus" for someone who is experiencing a mental block. This can be done by writing a *Prompt* that meets the needs in an AI such as a ChatBot like Chat GPT. The form of *Prompt* that can be used is to write about what is needed to break the mental block. However, it should be noted that the capabilities of AI are still limited, especially in terms of valid citations and references. However, there are some AIs that sometimes include the sources of what is needed, such as an AI named *Perplexity*. However, all AIs are likened to a double-edged sword, each having its own strengths and weaknesses depending on who is using them.

When an AI user is a wise individual, the individual is able to produce a high-quality work without being influenced by factors that could potentially become negative turning points for the creator of the work. Not only in the academic and Islamic education fields, the utilization of AI is starting to spread into various sectors of society and other fields. This is not impossible due to technological advancements and the Society 5.0 policy.

AI Tools to Complement Needs in the Scope of Islamic Education (Islamic Education Administration)

The development of technology can influence the effectiveness of society in managing the education system, especially the Islamic education system in public schools. It should be noted that in the current curriculum, there is a high level of educational administration that needs to be created to meet the requirements as an educator. For those unfamiliar with the world of technology, this can be a difficult task. However, for those who master technology, tasks such as organizing administration can be done in a relatively short time. Especially if the individual is able to harness the potential of AI, it is not impossible for these tasks to be easily resolved.

Some forms of educational administration, especially Islamic education, can utilize the potential of AI in developing the quality of administration, such as Lesson Planning Design (RPP), Preparation of teaching materials, learning analysis techniques, and so on. However, whether the use of AI is positive or negative cannot be separated from the wisdom of its users. Thus, it can bring positive benefits to those who use it. Some types of AI that can be utilized in the above fields include ChatGPT, Zendy, and others.

Specifically, the use of AI in the scope of Islamic education can be demonstrated by the existence of an application based on the Qur'an that may be known to some people, called the *Qur'an in Word* application. There is even a version from the Ministry of Religion itself. This application is integrated with Microsoft Office and only functions in various browsers with different operating systems such as Windows, MacOS, and others. *Qur'an in Word* has the function of automatically inserting Qur'anic verses based on the needs of a writer. The verses inserted are very neat and accompanied by their meanings and interpretations. Although the interpretations are not at the level of popular interpretation books such as Tafsir Al-Misbah, Tafsir Jalalain, Tafsir Ibn Katsir, and many others.

Development of Educator Knowledge Regarding the Utilization of AI in the Scope of Islamic Education

Based on interviews with several educators who utilize AI, most of them have experienced positive impacts. This is because the development of knowledge among educators, especially in the scope of Islamic

education, has greatly advanced due to their ability to utilize AI deeply (González-Calatayud dkk., 2021). The following is the result of an interview with one of the sources with the initials VS. It should be noted that VS is one of the educators who has dedicated himself as an educator and educational staff for several years at a public school in Kutai Kartanegara Regency, East Kalimantan Province. The following is the result of the interview with the source;

"The presence of AI has been deeply felt by me personally because AI has made my work easier. When preparing teaching materials, I sometimes feel stuck when faced with things that require reasoning, which causes my productivity and performance to decrease. However, after learning about the usefulness of AI such as ChatGPT and others, I am not too worried when stuck because with the help of AI as a catalyst for thinking, I can develop my thoughts more deeply."

The presence of artificial intelligence (AI) has brought significant changes in various aspects of human life. The use of AI such as ChatGPT has been proven to help streamline various tasks and job performance. In the context of preparing teaching materials, there are often situations where individuals have difficulty handling designs that require high reasoning abilities. This phenomenon often leads to reduced productivity and overall performance (Fahimirad & Kotamjani, 2018). However, thanks to the advancement of AI, such as the ChatGPT application and similar technologies, concerns about cognitive blockage situations can be overcome. AI emerges as a tool that can activate deeper thinking processes, facilitating the development of ideas more effectively. This concept is consistent with cognitive theory, which emphasizes the instrumental role of external tools in expanding human cognitive abilities, allowing individuals to achieve higher levels of achievement through comprehensive integration of human abilities and AI technology (Bai et. al., 2023).

It is important to note that the positive impact of integrating AI in the context of learning and intellectual functions has been widely recognized in academic literature. Recent studies indicate that using AI to support creative processes and intellectual analysis has opened new doors for innovation and idea development. Furthermore, research findings suggest that the interaction between humans and AI can yield better results compared to individual efforts. This aligns with the theory of cognitive collaboration, which emphasizes that collaboration between humans and technology can lead to greater intellectual achievements than what can be attained individually (Ma & Jiang, 2023). Therefore, personal experiences using AI as a thinking tool provide a tangible illustration of the positive contribution of AI integration to the development of human cognitive abilities. From a long-term perspective, understanding and harnessing the potential of AI as a tool to enhance intellectual performance and creativity in humans is becoming increasingly important in the era of information technology. These personal experiences also affirm that AI integration does not replace the role of humans but rather enriches and complements human cognitive abilities, thus creating synergy that aids in achieving higher levels of intelligence (Holmes & Tuomi, 2022).

In the data analysis, Piaget's theory of constructivism was applied to understand learners' learning processes. The experiences of informants, such as VS, show how AI can serve as a catalyst in overcoming cognitive barriers, such as mental blocks. Constructivism theory is applied by observing how informants assimilate new information through interaction with AI, as well as how they accommodate knowledge to create more effective learning strategies. This approach reinforces Piaget's cognitive theory by highlighting the contribution of AI in supporting cognitive adaptation and collaboration between humans and technology (Bearman et al., 2023).

It also identifies challenges such as limited access to technology, low digital literacy of educators, and potential misuse of AI. By integrating Islamic values, this research provides insights on how to utilize

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AI ethically, including in the development of AI-based learning materials that remain relevant to religious principles. This research was conducted in several Islamic educational institutions in Indonesia that have diverse characteristics, ranging from urban to rural, to provide more comprehensive insights into AI implementation. The characteristics of the research subjects include their educational background, level of experience with technology, and their position in the Islamic education system (Xu & Ouyang, 2022).

The Actualization of AI Usage in Developing Islamic Education

Developing Critical Thinking Skills

In the context of Islamic education, AI can assist in developing students' critical thinking skills in various ways. One of the most popular methods is through the use of chatbots. Chatbots are computer programs designed to mimic human conversations (Pratikno, 2017). In an educational context, chatbots can be used to help students solve problems and develop critical thinking skills. In some programs, students must be able to think critically, especially to develop their potential in academic and related fields. In this regard, chatbots can assist students in problem-solving and developing critical thinking skills by posing challenging questions that require logical and reasonable answers (Hamsah, 2024).

Additionally, AI can also help students develop critical thinking skills through data analysis. In the educational context, AI can be used to analyze data from various sources, such as books, magazines, and articles, to help students understand complex concepts and develop critical thinking skills. In this scenario, AI can aid students in identifying patterns and relationships among different concepts, enabling them to enhance critical thinking and solve problems more effectively. Therefore, AI can be an effective way to develop students' critical thinking skills in the context of Islamic education (Munir, 2022).

In the field of Islamic education, AI can assist in developing students' critical thinking skills in various ways. One of the most popular methods is through the use of chatbots. Chatbots can be used to pose questions and challenges that require students' critical thinking. Additionally, AI can help develop students' critical thinking skills through data analysis. In the educational context, AI can be utilized to analyze data from various sources, such as books, magazines, and articles, to help students understand complex concepts and develop critical thinking skills (Ghaly, 2024). Based on previous research, it is shown that the use of AI in education can enhance students' critical thinking skills. In this study, researchers found that using AI in learning can help students develop critical thinking skills more effectively (Idris, 2022).

Furthermore, the use of AI can also help students identify patterns and relationships among different concepts, enabling them to develop critical thinking skills more effectively. In this scenario, AI can assist students in developing critical thinking skills through the use of various AI sites on the Internet. In this way, AI can be an effective method to develop students' critical thinking skills in the field of Islamic education. By utilizing artificial intelligence technology, students can enhance their critical thinking skills more effectively and improve the overall quality of Islamic education (Pabubung, 2021).

Developing Problem-Solving Skills

In the context of Islamic education, AI can help students develop problem-solving skills in various ways. One of the most popular methods is through the use of chatbots. Chatbots are computer programs designed to mimic human conversation (Song dkk., 2024). In the educational context, chatbots can be used to assist students in problem-solving and developing problem-solving skills. In some programs, students

must be able to solve problems, including developing their potential in academic and other fields. In this regard, chatbots like ChatGPT can help students solve problems by asking difficult questions and requesting students to provide logical and reasonable answers (Suharmawan, 2023).

Furthermore, AI can also help students develop problem-solving skills through data analysis. In the educational context, AI can be used to analyze data from various sources, such as books, magazines, and articles, to help students understand complex concepts and develop problem-solving skills. In this case, AI can help students identify patterns and relationships between different concepts so they can solve problems more effectively (Bahari dkk., 2022). Additionally, AI can also help students develop problem-solving skills through simulation. In the educational context, AI can be used to create simulations that simulate real-world situations, allowing students to solve problems more effectively. Therefore, AI can be an effective way to develop students' problem-solving skills in the context of Islamic education (Fosso Wamba dkk., 2024).

Developing Creativity and Innovation in the scope of Islamic education

In Islamic education, AI can help develop students' creativity and innovation in various ways. One of the most popular methods is through the use of *augmented reality* (AR) and *virtual reality* (VR) technologies. *Augmented reality* and *virtual reality* can be used to create engaging and interactive learning environments, allowing students to develop their creativity and innovation. In this regard, AI can help students develop creativity and innovation through simulation. In the educational context, AI can be used to create simulations that simulate real-world situations, enabling students to develop creativity and innovation more effectively (Rozi dkk., 2022).

Additionally, AI can also help students develop creativity and innovation through data analysis. In the educational context, AI can be used to analyze data from various sources, such as books, magazines, and articles, to help students understand complex concepts and develop their creativity and innovation. In this case, AI can help students identify patterns and relationships between different concepts, thus enabling them to develop creativity and innovation more effectively. Furthermore, AI can also help students develop creativity and innovation by creating applications and computer programs. Therefore, AI can be an effective way to develop students' creativity and innovation in Islamic education (Rahadiantino dkk., 2022).

Based on these results, it is explained that AI can help scholars accelerate and enhance the research and publication process in the field of Islamic education. Additionally, AI can also help students develop critical thinking skills, including developing potential in the academic and related fields (G. Islam & Greenwood, 2024). Based on these results, it is also explained that the utilization of AI in education includes many elements, such as AI tools to develop scientific skills in Islamic education, AI tools to enhance scientific learning productivity within the framework of Islamic education, AI tools to develop critical thinking skills, AI tools to meet needs within the framework of Islamic education, and the ability to develop educators' knowledge about the use of AI in Islamic education (Çelik, 2023). Based on these results, it is explained that AI can help conduct quantitative analysis of published scientific works, including journals related to Islamic education. Additionally, AI can help collect, analyze, and present bibliographic data from various sources to evaluate the quality and scientific impact of scientific works. From the explanation, it can be concluded that AI can help develop critical thinking skills, problem-solving skills, as well as creativity and innovation in Islamic education through various different methods, such as the use of chatbots, data analysis, simulation, and the development of applications and computer programs (Latifah & Ngalimun, 2023).

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Developing Productivity in the Realm of Islamic Education

In the field of Islamic education, AI can help enhance the productivity of students and teachers in various ways. One of the most popular methods is by using reference management applications such as Mendeley and Zotero. These applications utilize artificial intelligence technology to assist teachers and students in organizing and managing reference materials from various sources. Additionally, AI can also help improve the productivity of students and teachers through data analysis. In the educational context, AI can be used to analyze data from various sources, such as books, magazines, and articles, to help students and teachers understand complex concepts and enhance their productivity. A study conducted by several researchers previously indicated that the use of AI in education can enhance the productivity of students and teachers. In this study, researchers found that the use of AI in learning can help students understand complex concepts more quickly and effectively (Jumari & Umam, 2022).

Furthermore, the use of AI can also assist teachers in managing time and resources more effectively, thereby enhancing productivity. In this regard, AI can help teachers identify areas that require more attention and offer appropriate solutions to enhance productivity. In this way, AI can be an effective tool for improving the productivity of students and teachers in the field of Islamic education. By utilizing artificial intelligence technology, students and teachers can expedite and enhance their learning and research processes, thereby increasing productivity and the overall quality of Islamic education (Khoirin & Hamami, 2021).

CONCLUSION

In the effort to enhance scientific literacy in Islamic education, Artificial Intelligence (AI) serves as an effective means. The use of Artificial Intelligence (AI) in developing Islamic education in the era of Society 5.0 can be done in various ways, such as using reference management applications like Mendeley and Zotero, chatbot applications to enhance critical thinking skills, and tools like Grammarly to improve grammar more effectively. Additionally, AI can help gather, analyze, and present bibliographic data from various sources to evaluate the quality and scientific impact of scholarly works. Thus, the use of AI can help enhance scientific literacy and scientific productivity in Islamic education. Moreover, in meeting administrative needs in Islamic education, AI can be utilized as a means to optimize educational administration. This includes schedule management, student records, and other administrative processes, enabling educational institutions to operate more efficiently. Finally, in order to develop understanding and utilization of AI in Islamic education, the development of knowledge among educators is crucial. Training and enhancing the skills of educators in utilizing AI technology are important steps in maximizing the learning potential in the Islamic education environment.

This study still requires further research on the specific utilization of AI in Islamic education. Considering the significant number of AIs created to date, the potential utilization of AI can be further maximized for the advancement of Islamic education in Indonesia and specifically as a field of da'wah for the development of a more moderate form of Islam.

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