Edu Cendikia: Jurnal Ilmiah Kependidikan
Volume: 4 | Nomor 03 | Desember 2024 |
DOI: 10.47709/educendikia.v4i03.5413

The Implementation of Artificial Intelligence in Islamic Education Learning at Elementary School

Author:
Najla Kamilia Marwa[1]
Saepul Anwar[2]
Mokh. Iman Firmansyah[3]

Afiliation:
Universitas Pendidikan Indonesia[1,2,3]

Corresponding email
najlakamilia.m@upi.edu

Histori Naskah:
Submit: 2025-01-25
Accepted: 2025-01-30
Published: 2025-02-08

This is an Creative Commons License This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License

Abstract:
The rapid development of technology, especially in the twenty-first century, driven by the exponential increase in artificial intelligence (AI) technology, has led humans to a new era that offers a variety of conveniences in various fields, including education. This study aims to analyze the practice of using AI in Islamic Education learning in schools, especially in elementary schools. The qualitative method used in this research uses a descriptive approach with purposive sampling as a reference for data collection to determine the use of artificial intelligence in Islamic Education learning. Respondents taken were Islamic Education teachers who have used AI in their learning with one year of experience and understand and use Artificial Intelligence during planning and learning. The study found that using AI in education is increasingly common in Indonesia. This is due to the support from the Education Department in conducting training on the use of AI, especially Gemini AI, in schools. Teachers have also integrated AI into Islamic Education learning by using AI at every stage of learning, starting from creating modules, teaching media, powerpoints, questions, quizzes, learning materials, and many more. In conclusion, AI has been used in teaching and learning, especially in Islamic Education learning at school.

Keywords: Artificial Intelligence; Implementation; Islamic Education

Introduction

The world we live in today is constantly undergoing changes, as well as advances in various fields. No exception in the world of education, significant transformations occur in education, marked by the emergence of various technological innovations that change the way we learn. One of the technological innovations is the presence of Artficial Intelligence in the 21st century. Artificial intelligence is very common today. The use of AI also extends to the world of education called AIEd (Artificial Intelligence in Education), which in its application has been the subject of academic research for more than 30 years (Luckin and Holmes 2016). AI itself is computer software designed to interact with the world in the same way that humans use their intellect. In other words, AI requires an understanding of the world and algorithms that can process that understanding intelligently.

In the context of education, AI has great potential to change the way we learn and teach. With advanced data analysis capabilities, AI can assist teachers and educational institutions in designing curriculum that is more adaptive and responsive to individual student needs (Apriadi and Sihotang 2023). The utilization of AI in education has penetrated a number of developed countries in recent years and continues to experience rapid development. The use of artificial intelligence in the context of education can already be identified in several countries. For example, in Australia, an Intelligent Tutoring System has been developed that helps overcome the problem of imbalance between the number of educators and students.

The development and utilization of AI in Indonesia's education sector has been carried out, especially since the COVID-19 pandemic forced teaching and learning activities to be carried out online. Various intelligent technologies have been implemented to support the education process, such as Intelligent Online Education that facilitates online learning effectively. In addition, hands-on activity-based training is increasingly attractive with the use of AR/VR-based Smart Course Content, while laboratory practicum activities can now be carried out through Virtual Laboratory. Adaptive Learning System technology is also applied to adapt learning to students' individual abilities, while the Adaptive Assessment System is used to measure students' abilities personally through customized questions. Teachers get support from Intelligent Student Classification, which helps group students based on their specific abilities so that materials can be delivered in a more targeted manner. To increase student engagement, Serious Game in Education is used in rote learning such as English and biology, as well as analytical subjects such as physics and math. Finally, the Precision Learning system is designed to meet the needs of learners with diverse learning styles, both auditorial and visual, so that learning materials, including textbooks, are customized to support student learning effectiveness (Grace et al. 2023).

Islamic Education is an important part of human life, which aims to instill life discipline and develop understanding and application of Islamic teachings. In facing the era of rapid technological development, education is required to adapt to these changes and utilize technology to improve the effectiveness of learning. For this reason, Islamic Education teachers need to adjust the curriculum to be in line with the needs of the industrial era 4.0 and society 5.0. This includes integrating information and communication technology in the learning process, developing digital skills, and teaching Islamic ethics and values that are relevant to today's challenges and contexts (Wibowo 2023). However, amidst the opportunities, we are also faced with challenges such as the digital divide and information overload. Therefore, it is important that we continue to adapt and utilize technology wisely so that learning can provide optimal benefits.

However, the use of AI, especially by teachers, is still not evenly distributed throughout Indonesia. This is in line with Deni Purbowati's statement, according to which the use of AI to design learning activities is still relatively new for some teachers. There are various barriers that make the utilization of AI technology in learning in Indonesia still limited. However, at the global level, the use of AI in education has become increasingly common (Deni Purbowati 2023). Infact that the integration of Artificial Intelligence (AI) into in Islamic Religious Education (PAI) learning, is still not widely practiced. This is due to many challenges such as limited infrastructure infrastructure and inadequate internet, as well as educators who do not have the skills to use AI. have skills in using AI. Whereas looking at the times that continue to modernize We must follow the flow of the times. With these problems, this study aims to examine how the implementation of the use of AI in PAI learning at school.

Literature Study

A literature search shows that the application of AI in an educational context can improve learning effectiveness by providing a more personalized and adaptive learning experience. For example, research conducted by Rahman Peliza highlights the effectiveness of AI in identifying students' learning styles, which is then used to customize teaching materials (Peliza 2024). Then, research by Nadia Islami, et al. examined teaching and learning activities using AI can create an interesting and innovative teaching and learning process that creates a sense of satisfaction and interest which then increases student motivation to learn (Desvita Dwi Hapsari, Gizza Yasmin Ramadhani 2024). Furthermore, Yusuf said that the use of AI in Islamic educational institutions can include adaptive learning, natural language recognition, student data analysis, and personalized guidance, even improving digital literacy (Yusuf 2024). However, these studies are still more focused on general subjects and rarely specifically explore the integration of AI in Islamic

Education learning. Sari, who discusses AI and Islamic Education but focuses more on learning the Quran, states that the utilization of AI in Quran learning is able to provide accurate and timely feedback on pronunciation, tajweed, and memorization of verses, thanks to the ability to analyze voice and text in real-time with high precision (Sari Prabandari and Suhardianto 2024). Thus, this study aims to fill this gap by specifically researching how AI can be applied in Islamic Education learning effectively. The latter research highlights the potential of AI in Islamic Education learning, but has yet to specifically assess its direct impact on Islamic Education learning in schools. This is the main difference with the research to be conducted, where the focus of the research is more focused on the practical implementation of AI technology in Islamic Education. Therefore, this gap underscores the urgency of this research to explore more benefits and challenges in implementing AI, especially in Islamic Education learning in schools.

Method

This research was conducted using a qualitative approach with a descriptive analysis method. A qualitative approach is a research method that seeks to understand in depth social phenomena and human behavior through descriptive and interpretive data collection. This approach aims to explore the meaning, experience, and point of view of individuals or groups in a particular context. In qualitative research, researchers usually use techniques such as in-depth interviews, observation, and document analysis to obtain data. Unlike the quantitative approach that focuses more on measurement and statistical analysis, the qualitative approach excels in providing richer and deeper insights into a phenomenon. In addition, this approach also offers high flexibility in the research process (Creswell 2014). According to Fiantika, et al, qualitative descriptive method is defined as research that intends to understand the phenomenon of what the research subject experiences thoroughly which produces descriptive data in the form of words or oral (Fiantika, et. al, 2022). Meanwhile, according to Wirartha, the qualitative descriptive analysis method is to analyze, describe, and summarize various conditions and situations from various data collected in the form of interviews or observations regarding the problem under study that occurred in the field (Wirartha 2006).

The reason researchers use analytical descriptive research methods is because this method is in accordance with the research title. The purpose of this analytical descriptive research is to make a description, description systematically, factually and accurately about the facts, properties and relationships between the phenomena being investigated (Moh. Nazir 2003). The qualitative descriptive research method is focused on the problem on the basis of facts carried out by means of observation, in-depth interviews, documentation and studying documents. After the research data is collected, the researcher then analyzes the data. The identification of informants/respondents carried out by researchers in this study is a purposive sampling technique. According to Sugiyono, purposive sampling is a sampling technique from data sources with certain considerations. This particular consideration, for example, someone who is considered to know best about what is expected, or perhaps rules that can help researchers explore objects or social situations in research more easily (Sugiyono 2013). In this case, the person chosen is a teacher who teaches Islamic Education with 1 year of experience and understands and uses Artificial Intelligence both during planning and during learning. This method was chosen as one of the writing methods in order to obtain an overview in the field and the Implementation of the Use of AI in Islamic Education Learning at School.

Result

The current hype around AI may seem sudden, but scientists have been creating it since the 1950s. AI involves the imitation of human intelligence by machines or computer systems. It involves the development of algorithms and computational models that allow machines to perform tasks similarly related to human cognition, such as problem solving, learning, and decision making (Ng et al. 2023). The historical development of artificial intelligence began in the 1950s when scientists such as Alan Turing and John

McCarthy introduced the idea of intelligent machines and artificial intelligence. Over time, there were significant advances in computing and algorithms, which enabled the development of more sophisticated and effective AI systems (Rifky 2024).

Tabel 1. Some definitions of Artificial Intelligence

No	According to	Year	Category	Definition
1	Haugeland	1985	*Thinking Humanly*	*"The exciting new effort to make computers think ... machines with minds, in the full and literal sense."*
	Bellman	1978	*Thinking Humanly*	*"[The automation of activities that we associate with human thinking, activities such as decision-making, problem solving, learning ..."*
2	Kurzweil	1990	*Acting Humanly*	*"The art of creating machines that perform functions that require intelligence when performed by people."*
	Rich and Knight	1991	*Acting Humanly*	*"The study of how to make computers do things at which, at the moment, people are better."*
3	Charniak and McDermott	1985	*Thinking Rationally*	*"The study of mental faculties through the use of computational models.*
	Winston	1992	*Thinking Rationally*	*"The study of the computations that make it possible to perceive, reason, and act."*
4	Poole et al	1998	*Acting Rationally*	*"Computational Intelligence is the study of the design of intelligent agents."*
	Nilsson	1998	*Acting Rationally*	*"AI . . . is concerned with intelligent behavior in artifacts."*

Based on the table above, it can be seen that the definition of Artificial Intelligence is organized into four categories, namely thinking like a human (Thinking Humanly), acting like a human (Acting Humanly), thinking rationally, and acting rationally (Russell 2014). Artificial intelligence or AI is not limited to human intelligence, but is also applied to tools or systems. Therefore, artificial intelligence is the ability of a tool or system to adapt and achieve certain goals in an environment that can affect the behavior of the system (Abdul Rozaq 2019). Experts continue to develop artificial intelligence (AI) technology so that it can develop rapidly. H. A. Simon states that artificial intelligence allows computers to perform tasks that are superior to humans. Knight and Rich agree with Simon, stating that artificial intelligence is a branch of computer science that allows computers to perform tasks that humans usually do, or even better. The creation of artificial intelligence aims to create software or robots that can help humans in their daily routines. The presence of AI is expected to make machines smarter than before, so that they can really help humans solve complex problems, such as through the development of smart calculators that are able to calculate quickly (Melvinda Dewi Kirana et al, 2024).

The use of AI has penetrated in various fields, there are 14 fields that are affected by AI, including 1) Education: Artificial intelligence has been used in the field of education to support personalized learning, instructed systems, learning analytics, and so on. 2) Healthcare: helps in diagnosing diseases, personalized

medicine, and drug delivery. 3) Finance: used by financial institutions to detect fraud, trading, as well as improve services provided to customers in banks. 4) Retail services: improving retail services by enabling recommendation systems, demand forecasting, and supply management. 5) Autonomous vehicles: the emergence of self-driving cars, drones with navigation. 6) Manufacturing: improving maintenance procedure prediction, quality control, and process optimization. 7) Customer service: improving interaction with customers with the use of chatbots and virtual assistants. 8) Marketing: improving marketing strategies with targeted advertising, social media analysis, and customer segmentation. 9) Cyber security: Used to detect threats, anomalies, and secure digital systems. 10) Human Resources: helps companies with employee engagement, talent acquisition, and workforce analysis. 11) National language processing: used in chatbots, language translation, and sentiment analysis. 12) Entertainment: AI is used in games, virtual reality experiences and content recommendations. 13) Agriculture: improving precision agriculture, crop monitoring and yield prediction. 14) Energy: AI is used for smart grid management, preventive maintenance, and energy consumption optimization. (Agatha Aballa Nkechi et al, 2024).

In the 21st century, artificial intelligence plays a role in creating a modern educational environment. Artificial intelligence can help teachers develop their skills, disseminate learning materials to students, communicate with them, and evaluate their performance through a series of tests. In addition, artificial intelligence also allows teachers to create content that suits students' needs by ensuring learning, sharing opinions, asking questions, and discussing answers.

SDN 032 Tilil is one of the schools that is able to realize the use of artificial intelligence in the school environment. Based on the results of interviews and observations that have been conducted, Islamic Education teachers at the school have integrated Islamic Education and AI into the learning process. In its implementation, the teacher has a good understanding and perception of AI, especially Gemini AI. In the teacher's view, AI is very helpful, easy, and useful in the teaching and learning process. In the context of education, AI is also considered relevant to Islamic Education because it is able to provide fast and accurate results in accordance with the Merdeka Curriculum used now. Teachers who teach in schools have also recognized and used various kinds of AI, such as Gemini AI, Gamma AI, ChatGPT, Quizziz AI, OneDrive AI and other AI to support learning more effectively and fun.

Tabel 2. Results of Interview and Observation Research

No	Research Aspects	Research Results
1	Teachers' Understanding and Perception of AI	From interviews and observations, it was found that teachers understand and know about AI.
2	Implementation of AI in Islamic Education Learning	In its implementation, AI has been used by teachers during the teaching and learning process. This is evidenced by teachers already using various kinds of AI such as Gamma AI, ChatGPT, Gemini AI, Onedrive AI, Quizziz AI, and other AI that support the teaching and learning process.
3	AI Impact on Students	The use of AI in Islamic Education learning has a positive impact on students such as increasing their enthusiasm and understanding, especially in diversity material. AI

		technology is also able to motivate students to be more enthusiastic in learning.
4	Teacher and Resource Readiness	In terms of readiness, teachers feel ready to use AI. This is because teachers have received support from the Government, especially teachers who have participated in *PPG*.
5	Ethical and Religious Perspectives	The use of AI in Islamic Education learning is seen as positive, especially because it can strengthen Islamic values in the digital era if used carefully.
6	Teachers' Expectations and Recommendations	Teachers hope that AI technology will continue to develop to further support Islamic Education learning, with the application of more specific innovations according to the needs of the teaching materials. In addition, greater support is needed from the government and educational institutions, such as the provision of training, facilities, and policies that support the effective implementation of AI in religious education.

Discussion

In its implementation, AI is used in planning, learning and evaluating learning. In the planning stage, the AI used is Gamma AI, which can help in making media in the form of powerpoints that will be used during learning later. In the learning stage, Gemini AI is very helpful in finding teaching materials because Gemini AI is connected to the textbook used, which is none other than the *Merdeka Curriculum* Islamic Education package book. And in the learning evaluation stage, the AI used is AI in Quiz. This Quiziz AI can directly create questions very easily. Then all data is accommodated in Onedrive AI which can be used on any device (Yuliana, 2024). Supported by Mr. Majid, that AI is used in making modules, *CP*, *ATP*, and questions for exams.

AI has a positive impact on students, such as increasing their enthusiasm and understanding. Because in AI, students can directly learn while listening to the material presented on the projector, both in the form of writing and interactive videos. Therefore, this technology is also able to motivate students to be more enthusiastic in learning. However, the use of AI still requires supervision and needs to be reviewed to ensure that spiritual values in Islamic Education learning are maintained and not neglected (Hanifah, 2024).

In terms of readiness, teachers feel technically ready to use AI in learning, supported by training (workshops) that have been held through school programs through the Education Office's direction to all teachers regarding Gemini AI. The statement is supported by the Google Indonesia Blog where Indonesia is one of the first countries to equip teachers with Gemini AI in improving the efficiency and effectiveness of work (Indonesia, 2024). There are also directions from the *PPG program*, or teachers' independent initiatives. In addition, facilities such as computer labs are also freely used, and the full support of the school principal also facilitates the implementation of AI technology in the education process. The use of AI in Islamic Education learning is viewed positively, especially because it can strengthen Islamic values in the digital era if used carefully. However, ethical challenges arise if users are unable to filter the information produced by AI, so teachers are expected to be wise and not rush in adopting the results.

Teachers hope that AI technology will continue to develop to further support Islamic Education learning, with the application of more specific innovations according to the needs of the teaching materials, especially in Arabic, there is a need for a Qur'an synchronization feature to match the original. In addition, more support is needed from the government and educational institutions, such as the provision of training, facilities, and policies that support the effective implementation of AI, especially in Islamic religious education (Majid, 2024).

This is supported by the opinion of several experts related to AI, according to which a series of artificial intelligence applications have emerged that contribute significantly to the education sector and play a key role in transferring scientific content to students and have overcome all the challenges they face and formed a new direction of effect for education and changed the rules of play and roles in the educational process. The following are the top ten applications provided by artificial intelligence that can be used in Education. Artificial intelligence (AI) has various applications in education, one of which is smart content creation which is used to update data and create digital content, such as digitizing books according to user needs (Ahmed and Ganapathy 2021). With this technology, users can easily search, categorize, and find digital materials or books by simply entering certain keywords. AI automatically works according to programmed instructions, so that books and other references can be accessed more efficiently. This technology is applied in various digital libraries, ranging from schools, universities, to public libraries.

In addition, AI also enables the implementation of profiling and prediction features that are beneficial for teachers and lecturers. With these features, they can schedule lessons, create tests, and measure student performance. These features help teachers understand students' weaknesses as well as their learning needs (Luan and Tsai 2021). Profiling enables the identification of students' learning styles, while prediction helps estimate the most effective learning methods for them. Both support the personalization of learning, making the learning process more optimal. Not only that, intelligent robots have also begun to be utilized in education to help lecturers manage teaching. These robots can present scientific material more engagingly to students (Cox 2021). Furthermore, intelligent tutoring systems are another important feature, where subject matter is provided in a structured way, students' strengths and weaknesses are diagnosed, and feedback is provided to support their development (Guo et al. 2021). AI also plays an important role in assessment and evaluation through automated assessment features. Teachers can easily prepare quizzes or exams without the need for manual correction, simply by selecting the subject type, level, and difficulty of the questions (Azis, Abou-Samra, and Aprilianto 2022). This feature allows assessment of student understanding to be done quickly and efficiently, helping teachers focus on other aspects of learning.

The e-scheduling and predictive analysis features also make it easier for lecturers to organize study schedules. AI can track the lecturer's habits and create a schedule that matches those habits, without experiencing fatigue like humans (Hu and Li 2021). In addition, AI also supports the creation of an adaptive educational environment. With this technology, lecturers and students can interact in digital platforms that resemble traditional learning environments, creating a more structured and convenient teaching experience (El-Sabagh 2021). Furthermore, AI supports interactive teaching through the action of virtual reality. This technology is able to transform traditional content into virtual reality, creating an immersive and realistic learning experience for students (Yin and Tsai 2021). It also helps lecturers identify student weaknesses through analyzing the impact of tests conducted to study the effectiveness of scientific material delivered (Johnson I. E., Nkanu C. U. 2021).

Teacher awareness is also important in using artificial intelligence applications and how to interact with these technologies, as well as their impact on students. In addition, the government is also advised to provide

productive technologies to teachers to support their work, set standards that serve the e-learning sector, and organize more training and workshops needed to spread the culture of artificial intelligence and e-learning, and how it contributes to the development of a new generation capable of serving the country now and in the future (Mijwil et al. 2022). The presence of Artificial Intelligence provides many benefits for teachers in organizing the learning process. Through AI, teachers can process data efficiently. With sophisticated AI algorithms, teachers can collect various data ranging from academic records, assessments to student personal information. Thus, it helps teachers to make decisions about which students need more attention and can adjust the learning process according to the student's learning model based on the information obtained through the AI algorithm (Mambu et al. 2023).

The implementation of new technologies inherently brings both positive and negative impacts on human life. Similarly, the application of artificial intelligence (AI) in education has its own set of implications. On the positive side, AI offers numerous benefits that facilitate teaching and learning activities for both educators and students. One notable advantage is its ability to streamline repetitive tasks, reducing the workload for educators by automating routine processes. AI-powered systems provide virtually unlimited data storage, enabling educators and students to access information efficiently without the risk of losing critical data. Additionally, these systems are accessible anytime, offering unparalleled flexibility in the learning process. As a result, educational tasks can be accomplished more efficiently and effectively, ultimately improving the overall quality and productivity of learning (Abidin 2023).

The implementation of artificial intelligence (AI) in education, while offering numerous advantages, also poses negative impacts that warrant attention. One significant concern is the potential dependency of students on AI. Excessive reliance on AI for accessing knowledge and completing assignments may lead to diminished learning motivation and a reduced initiative for independent thinking. Since AI can effortlessly and instantly fulfill their learning needs, including completing tasks, students may develop habits of passivity and overdependence. This reliance could also negatively affect literacy levels, as students may prefer quick information searches over engaging with comprehensive resources, such as thoroughly reading books or in-depth study of materials.

Dependency on AI also increases the risk of plagiarism among students. Various AI-based applications, such as ChatGPT, enable students to complete essays or papers by generating content automatically based on given instructions. This creates opportunities for misuse, such as submitting assignments that are not their own original work. As a result, students' critical thinking skills may deteriorate, as they become overly focused on convenience rather than engaging in deep thought processes. Such habits conflict with the fundamental goals of education, which aim to foster creativity and analytical thinking skills (Fauziyati 2023) . Another negative impact is the overall decline in the quality of students. Dependence on AI and the tendency to seek instant solutions can lead to students becoming increasingly reluctant to think critically and unwilling to face intellectual challenges. Yet, education is meant to develop critical thinking skills and prepare high-quality human resources. If not properly supervised, the advancement of AI technology, which should serve as a supportive tool, has the potential to hinder students' development. Therefore, it is crucial for students to use AI wisely to minimize such negative effects and ensure it enhances rather than detracts from their growth (Eka Puji Astutik 2023).

Conclusion

The use of artificial intelligence (AI) has become increasingly common in today's world, driven by significant technological advancements across various fields, including education. In the context of Islamic Education, the utilization of AI tools such as Gamma AI, Gemini AI, and Quizizz AI demonstrates immense

potential in enhancing the effectiveness and efficiency of the learning process. During the planning phase, Gamma AI assists in creating learning media, such as PowerPoint presentations, making it easier for teachers to deliver material effectively. In the teaching phase, Gemini AI serves as an integrated information source aligned with the Islamic Education Merdeka Curriculum textbooks, simplifying the search for relevant teaching materials. For the evaluation phase, Quizizz AI allows educators to create quizzes quickly and efficiently, streamlining the assessment process. Additionally, all generated data and learning materials can be stored and accessed via OneDrive AI, enabling flexibility across various devices. Overall, the integration of AI into every stage of the learning process not only enhances teaching quality but also simplifies access to and management of educational materials. However, AI also has both positive and negative impacts on daily life. Therefore, it is crucial for users to approach this new technology with wisdom and caution to ensure its benefits are maximized while minimizing potential drawbacks.

References

Abdul Rozaq. (2019). *Artificial Intelligence Untuk Pemula*. 1st ed. ed. Estuning Dewi Hapsari. Madiun: UNIPMA Press.

Abidin, Moh. Anang. (2023). Implementasi Teknologi Artificial Intelligence (AI) Untuk Mendukung Pembelajaran Siswa Di Madrasah Ibtidaiyah Kecamatan Krembung Sidoarjo. *Jurnal Madrasah Ibtidaiyah* 2(1): 80–95.

Agatha Aballa Nkechi, Akintayo O. Ojo and Obinna A. Eneh. (2024). Impact of Artificial Intelligence in Achieving Quality Education. In *IntechOpen*, Nigeria: IntechOpen, 2–3. https://www.intechopen.com/books/advanced-biometric-technologies/liveness-detection-in-biometrics.

Ahmed, Alim Al Ayub, and Apoorva Ganapathy. (2021). Creation of Automated Content With Embedded Artificial Intelligence: A Study on Learning Management System for Educational Entrepreneurship. *Academy of Entrepreneurship Journal* 27(3): 1–10.

Apriadi, Robert Tanduk, and Hotmaulina Sihotang. (2023). Transformasi Mendalam Pendidikan Melalui Kecerdasan Buatan: Dampak Positif Bagi Siswa Dalam Era Digital. *Jurnal Pendidikan Tambusai* 7(3): 31742–48. https://news.republika.co.id/.

Azis, Abdul, Reem Abou-Samra, and Anadika Aprilianto. (2022). Online Assessment of Islamic Religious Education Learning. *Tafkir: Interdisciplinary Journal of Islamic Education* 3(1): 60–76.

Cox, A. M. (2021). Exploring the Impact of Artificial Intelligence and Robots on Higher Education through Literature-Based Design Fictions. *International Journal of Educational Technology in Higher Education* 18(1): 1–19.

Creswell, J. W. (2014). *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches.* 4th ed. SAGE Publications.

Deni Purbowati. (2023). Mengajar Menjadi Lebih Mudah Dengan AI. *AkuPintar.id*. https://akupintar.id/info-pintar/-/blogs/mengajar-menjadi-lebih-mudah-dengan-ai.

Desvita Dwi Hapsari, Gizza Yasmin Ramadhani, Nadia Islami Ikramullah. (2024). Literature Review : Pengaruh Artificial Intelligence (Ai) Terhadap Motivasi Belajar Peserta Didik. 13.

Eka Puji Astutik, Nur Afif Ayuni, Ayunda Mahdalena Putri. (2023). Artificial Intelligence: Dampak

Pergeseran Pemanfaatan Manusia Dengan Kecerdasan Buatan Bagi Dunia Di Indonesia. *Sindoro Cendekia Pendidikan* Vol. 1(10): 101–12.

El-Sabagh, Hassan A. (2021). Adaptive E-Learning Environment Based on Learning Styles and Its Impact on Development Students' Engagement. *International Journal of Educational Technology in Higher Education* 18(1): 1–24.

Fauziyati, Wiwin Rif'atul. (2023). Dampak Penggunaan Artificial Intelligence (AI) Dalam Pembelajaran Pendidikan Agama Islam. *Jurnal Review Pendidikan dan Pengajaran* 6(2): 2180–87. http://journal.universitaspahlawan.ac.id/index.php/jrpp/article/view/21623.

Fiantika, Wasil M, Jumiyati, Honesti, Wahyuni, Jonata, Et.al. (2022). Rake Sarasin *Metodologi Penelitian Kualitatif. In Metodologi Penelitian Kualitatif*. Edisi Revi. Bandung: PT Remaja Rosdakarya. https://scholar.google.com/citations?user=O-B3eJYAAAAJ&hl=en.

Grace, Yulianti, benardi, Ngadi Permana, and Fitri Wijayanti. (2023). Transformasi Pendidikan Indonesia: Menerapkan Potensi Kecerdasan Buatan (AI). *Journal of Information Systems and Management* 2(6): 102–6.

Guo, Lu et al. (2021). Evolution and Trends in Intelligent Tutoring Systems Research: A Multidisciplinary and Scientometric View. *Asia Pacific Education Review* 22(3): 441–61.

Hanifah, A. (2024). The Challenges of Using AI. (N. K. Marwa, Interviewer)

Hu, Jingnan, and Hui Li. (2021). Composition and Optimization of Higher Education Management System Based on Data Mining Technology. *Scientific Programming* 2021: 1–10.

Indonesia, G. (2024). Indonesia jadi negara pertama yang membekali para guru melalui Gemini Academy. Retrieved from blog.google: https://blog.google/intl/id-id/gwg2023/

Johnson I. E., Nkanu C. U., and Udo A. L. (2021). Checkmating the Weaknesses Associated with Information and Communication Technologies in Education for Improved Effectiveness and Efficiency. *Journal of Education and Practice* 12(8): 80–85.

Luan, Hui, and Chin Chung Tsai. (2021). A Review of Using Machine Learning Approaches for Precision Education. In *Educational Technology and Society*, International Forum of Educational Technology & Society, 250–66.

Luckin, Rose, and Wayne Holmes. (2016). UCL Knowledge Lab: London, UK. *Intelligence Unleashed:An Argument for AI in Education*. https://www.pearson.com/content/dam/corporate/global/pearson-dot com/files/innovation/Intelligence-Unleashed-Publication.pdf.

Majid, A. (2024). Expectations in AI development. (N. K. Marwa, Interviewer)

Mambu, Joupy G Z et al. (2023). Pemanfaatan Teknologi Artificial Intelligence (AI) Dalam Menghadapi Tantangan Mengajar Guru Di Era Digital. *Journal on Education* 06(01): 2689–98.

Melvinda Dewi Kirana, Masduki Asbari, Risma Rusdita. (2024). Anak Indonesia Pencipta AI Untuk Pendidikan. *Journal of Information Systems And Management* 3(2).

Mijwil, Maad M. et al. (2022). The Position of Artificial Intelligence in the Future of Education: An Overview. *Asian Journal of Applied Sciences* 10(2): 102–8.

Moh. Nazir. (2003). Rake Sarasin *Metodologi Penelitian*. 3rd ed. Jakarta: Ghalia Indonesia.

Ng, Davy Tsz Kit et al. (2023). A Review of AI Teaching and Learning from 2000 to 2020. *Education and Information Technologies* 28(7): 8445–8501.

Peliza, Rahman. (2024). Penerapan Teknologi Artificial Intelligence (Ai) Terhadap Peningkatan Efektivitas Pembelajaran Mahasiswa. *International Conferences on Islamic Studies (ICIS)* 2(1): 82–95.

Rifky, Sehan. (2024). Dampak Penggunaan Artificial Intelligence Bagi Pendidikan Tinggi. *Indonesian Journal of Multidisciplinary on Social and Technology* 2(1): 37–42.

Russell, Peter Norvig and Stuart J. (2014). *Artificial Intelligence: A Modern Approach*. 3rd ed. London: PEARSON.

Sari Prabandari, and Suhardianto. (2024). Pemanfaatan Artificial Intelligence Untuk Mendukung Pembelajaran Vokasi. *ENCRYPTION: Journal of Information And Technology* 2(2): 62–68.

Sugiyono. (2013). Metode Penelitian Kualitatif R&D, Alvabeta, Bandung *Memahami Penelitian Kualitatif R&D*. Bandung: Alfabeta.

Wibowo, Agus. (2023). Penerbit Yayasan Prima Agus Teknik *Revolusi Industri 4.0 Dan Society 5.0*. https://penerbit.stekom.ac.id/index.php/yayasanpat/article/view/457.

Wirartha, I Made. (2006). Andi *Pedoman Penulisan Usulan Penelitian Skripsi Dan Tesis / Oleh I Made Wirartha ; Editor, Dhewiberta Hardjono*. Yogyakarta: ANDI. https://opac.perpusnas.go.id/DetailOpac.aspx?id=569119.

Yin, Ziyan, and Sang Bing Tsai. (2021). Research on Virtual Reality Interactive Teaching under the Environment of Big Data. *Mathematical Problems in Engineering* 2021: 1–11.

Yuliana, D. (2024). AI used in Learning. (N. K. Marwa, Interviewer)

Yusuf, M. (2024). Penggunaan Artificial Intelligence (AI) Dalam Meningkatkan Literasi Digital Pada Lembaga Pendidikan Islam. *AKSI: Jurnal Manajemen Pendidikan Islam* 2(2): 109–18.