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ANALYSIS OF THE USE OF ARTIFICIAL INTELLIGENCE TECHNOLOGY IN PAI LEARNING AT SMPN 3 WONOSOBO

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ABSTRACT

The development of 21st-century technology has brought significant changes to the world of education, including in Islamic Religious Education learning. However, the use of Artificial Intelligence technology in Islamic Religious Education learning is still not optimal and has not been systematically integrated. This study aims to analyze the use of Artificial Intelligence technology in Islamic Religious Education learning at SMPN 3 Wonosobo. This study uses a qualitative descriptive approach with data collection techniques through observation, interviews, and documentation. Data analysis is carried out through the stages of data reduction, data presentation, and conclusion. The results show that the use of Artificial Intelligence technology in Islamic Religious Education learning at SMPN 3 Wonosobo is quite developed, although it is still in the development stage. Artificial Intelligence is used by students to search for materials, answer questions, and create summaries, thereby increasing the effectiveness of learning and student learning independence. From the teacher's perspective, the use of Artificial Intelligence has been quite good in compiling teaching materials, creating questions, and planning lessons. However, the use of Artificial Intelligence has not been formally integrated into learning tools. In addition, there are several obstacles, such as limited student facilities, technical constraints, and lack of training for teachers. Therefore, facilities and training are needed to optimize the use of Artificial Intelligence technology in Islamic Religious Education learning.

1. INTRODUCTION

Islamic Religious Education (PAI) currently faces several challenges that limit its effectiveness, particularly in terms of student engagement, access to learning resources, and instructional personalization. Many PAI classes still rely on traditional lecture-based and text-heavy methods, which often lead to passive learning and low student motivation, especially among digital-native learners who are more responsive to interactive and multimedia-based instruction. In addition, disparities in access to quality learning resources mean that not all schools can provide enriched or up-to-date Islamic educational materials, resulting in unequal learning experiences across different contexts. Another key issue is the limited ability of teachers to customize learning

due to large class sizes and time constraints, which makes it difficult to address individual differences in students' abilities and learning needs. Assessment practices also tend to remain conventional, focusing on standardized tests rather than continuous and adaptive feedback. These challenges indicate the need for innovation, where AI can play a significant role by enhancing engagement through interactive tools, improving access to diverse learning resources, and supporting personalized learning pathways tailored to individual students (Faiza & Wardhani, 2024; Pare & Sihotang, 2023). This transformation is marked by the presence of the Industrial Revolution 4.0 era which integrates digital technology, the internet, and intelligent systems in various human activities (Mardiana et al., 2024; Sirait, 2022). In the context of education, this change encourages a shift from conventional learning methods to technology-based learning that is more flexible, interactive, and student-centered (Ghazy et al., 2025; Kesuma et al., 2025; Riyadi & Khuzaemah, 2025). Therefore, educational institutions are required to be able to adapt to technological developments in order to create a learning process that is relevant to current developments (Ismunandar, 2025; Manan, 2023).

One of the technological innovations that has developed rapidly in recent years is Artificial Intelligence (AI) (Afandi & Kurnia, 2023; Mahadipta & Aditya, 2024; Zaenudin & Riyan, 2024). This technology has the ability to imitate human intelligence in processing information, making decisions, and providing responses automatically (Dede et al., 2025; Pratama et al., 2023). The increasingly massive development of Artificial Intelligence has opened up huge opportunities in the world of education, especially in creating adaptive and personalized learning systems (Apriadi & Sihotang, 2023; Tubagus et al., 2025). Artificial Intelligence enables the delivery of material tailored to students' abilities and provides rapid feedback, making the learning process more effective and efficient (Rifky, 2024).

One form of application of Artificial Intelligence that is widely used in learning is chatbots (Santoso et al., 2021; Sucianingtyas et al., 2025). Chatbot is an artificial intelligence-based program that is capable of interacting with users in real-time (Anindyati, 2023). In the context of education, chatbots can be used as learning assistants that help students understand material, answer questions, and provide explanations instantly (Amalia et al., 2024). The use of chatbots in learning provides easy access to information and increases students' learning independence, because students can learn anytime and anywhere without relying entirely on teachers.

In Islamic Religious Education learning, the use of Artificial Intelligence technology, including chatbots, has enormous potential in strengthening the understanding of Islamic values (Sholihah, 2024). So far, Islamic Religious Education learning tends to use conventional methods that do not involve active student participation (Risana et al., 2025; Wijaya & Makraja, 2024). With the presence of Artificial Intelligence, Islamic Religious Education learning can be developed to be more interactive and contextual, so that students not only understand the material cognitively, but are also able to explore religious values in more depth (Anggraeni, 2025). Thus, the use of Artificial Intelligence in Islamic Education learning not only functions as an aid, but also as a means to improve the quality of learning.

However, previous studies on the use of Artificial Intelligence in Islamic Religious Education learning have generally focused on specific aspects, such as the impact of technology use, teacher readiness, or user experience, separately. Few studies have examined the implementation of Artificial Intelligence, teacher readiness to integrate it, and supporting and inhibiting factors in a single analysis, particularly at the junior high school level. Therefore,

research is needed that can provide a more comprehensive picture of the use of Artificial Intelligence in Islamic Religious Education learning.

Based on this, this study aims to analyze the use of Artificial Intelligence technology in Islamic Religious Education learning at SMPN 3 Wonosobo. The focus of the study includes the implementation of AI use in the learning process, teacher readiness in integrating the technology, and supporting and inhibiting factors that influence its implementation. SMPN 3 Wonosobo was chosen as the research location because it is one of the schools that has begun to integrate Artificial Intelligence technology into learning activities, although its implementation still requires further development. This research is expected to contribute to the development of technology-based Islamic Religious Education learning that is more innovative, adaptive, and relevant to current developments.

2. METHOD

This study applies a qualitative descriptive approach, which aims to describe in depth the use of artificial intelligence technology in Islamic Education learning at SMPN 3 Wonosobo (Risnita, 2024). This approach was chosen because it aligns with the narrative, contextual nature of the data, and emphasizes a deep understanding of naturally occurring phenomena in the school environment. Through this approach, researchers sought to gain a more comprehensive understanding of the application of Artificial Intelligence technology, teacher readiness, and supporting and inhibiting factors in Islamic Religious Education learning. The flow of the qualitative descriptive research method can be seen in Figure 1 below.

2.1. Data Collection

Data collection in this study was carried out through three main techniques: interviews, observation, and documentation. Interviews were conducted using a semi-structured approach with the principal, Islamic Religious Education teachers, and students at SMPN 3 Wonosobo who were directly involved in the implementation of technology-based learning. These interviews were intended to obtain more comprehensive data regarding the implementation of Artificial Intelligence, teacher readiness in integrating technology, and obstacles encountered in its implementation. In addition, direct observations were made of the Islamic Religious Education learning process in the classroom to see how Artificial Intelligence technology was used in teaching and learning activities. These observations helped researchers obtain factual data regarding the interactions between teachers, students, and the technology used. The entire data collection process was conducted at SMPN 3 Wonosobo, the research location.

2.2. Data Reduction

After the data is collected, the next stage is data reduction, namely the activity of selecting, focusing, simplifying, and organizing raw data so that it is arranged in a more systematic form (Miles & Huberman, 2014). This process involved selecting data relevant to the research focus, such as information on the application of Artificial Intelligence in Islamic Religious Education learning, teacher readiness in using technology, and supporting and inhibiting factors. Irrelevant or repetitive data was eliminated to sharpen the analysis's focus. Furthermore, the data was

categorized based on key themes to facilitate interpretation, such as learning implementation categories, teacher readiness, and various factors that support and inhibit the implementation of Artificial Intelligence technology.

2.3. Data Presentation

The data presentation is arranged in a coherent and organized descriptive form to facilitate understanding of the research findings. The reduced data is arranged coherently according to the research focus, so as to clearly illustrate the relationship between the use of Artificial Intelligence technology and the Islamic Religious Education learning process at SMPN 3 Wonosobo. This data presentation aims to present the research findings in a complete and comprehensive manner, thus providing a clear picture of the actual conditions in the field, particularly regarding the implementation of Artificial Intelligence, teacher readiness, and factors that influence the success of its use in learning.

2.4. Conclusion Drawing and Verification

The final stage in the data analysis process is the formulation of conclusions, which are drawn by considering the patterns, relationships, and trends evident in the data presented. In this study, the conclusions focused on how the use of Artificial Intelligence technology is applied in Islamic Religious Education learning, the extent of teachers' readiness to integrate it, and the supporting and inhibiting factors that influence its implementation. The conclusion-drawing process was carried out continuously throughout the analysis process, allowing for adjustments to the findings obtained. Thus, the resulting conclusions are expected to provide an accurate picture and serve as a basis for providing recommendations for the development of technology-based Islamic Religious Education learning in the future.

3. RESULTS AND DISCUSSION

3.1. Implementation of the Use of Artificial Intelligence in Islamic Education Learning

The research results show that the implementation of Artificial Intelligence technology in Islamic Religious Education learning at SMPN 3 Wonosobo has been quite successful, although it is still in the development stage. The use of Artificial Intelligence in learning is carried out through the use of various platforms such as ChatGPT, Gemini, and Dola, which are used by students as alternative learning resources. The presence of this technology facilitates fast access to information, making the learning process more effective and efficient.

The implementation of Artificial Intelligence in Islamic Religious Education learning is implemented in various forms. First, students use Artificial Intelligence to search for materials, such as explanations of Islamic concepts, verses from the Quran and Hadith, and examples of the application of Islamic values in everyday life. Second, Artificial Intelligence is used to assist students in answering questions or completing assignments given by teachers. Third, Artificial Intelligence is used to create summaries of learning materials, so students can easily understand

the core material. This usage pattern demonstrates that Artificial Intelligence functions as a learning aid that supports students' independence in acquiring knowledge.

This is reinforced by the findings of an interview with one of the eighth-grade students of SMPN 3 Wonosobo, who stated: "When given an assignment by Mrs. Anis and allowed to open my cellphone, I usually use Artificial Intelligence technology; the names of the applications that I often use are ChatGPT and Gemini to answer questions." In addition, Syifa, a seventh-grade student of SMPN 3 Wonosobo, also said: "Usually I use ChatGPT, but besides that, I use Dola to help answer questions."

Student responses indicated that the use of Artificial Intelligence in Islamic Religious Education learning had a positive impact. Students became more active and understood the material. The learning process became more flexible because students could access information at any time as needed. Furthermore, the use of Artificial Intelligence also increased learning effectiveness, as students could receive explanations instantly and with a wider variety of information compared to conventional methods. These findings indicate that Artificial Intelligence can create a more interactive and adaptive learning environment.

Students use Artificial Intelligence in Islamic Religious Education learning both at school and at home. At school, students utilize personal devices such as mobile phones with internet access (Wi-Fi) provided by the school. The use of Artificial Intelligence in the classroom tends to be more focused because it is under the supervision and guidance of teachers. During learning activities, students use Artificial Intelligence to search for materials, answer questions, and create summaries, resulting in a more active and independent learning experience. Observations and documentation of the use of Artificial Intelligence in schools can be seen in Figure 1 below.



Figure 1. The use of Artificial Intelligence in Islamic Education Learning in School Environments

Meanwhile, students' use of Artificial Intelligence at home is also an important part of supporting learning. Teachers actively guide students to utilize Artificial Intelligence technology as a supplementary learning resource outside of class hours. This allows students to review

material, deepen their understanding, and complete assignments more flexibly. However, teachers still impose limitations on the use of Artificial Intelligence, such as prohibiting direct copying and pasting and emphasizing that Artificial Intelligence is used only as a reference. This rule aims to maintain academic honesty and encourage students to continue to understand the material independently. Documentation of the use of Artificial Intelligence at home can be seen in the image below.

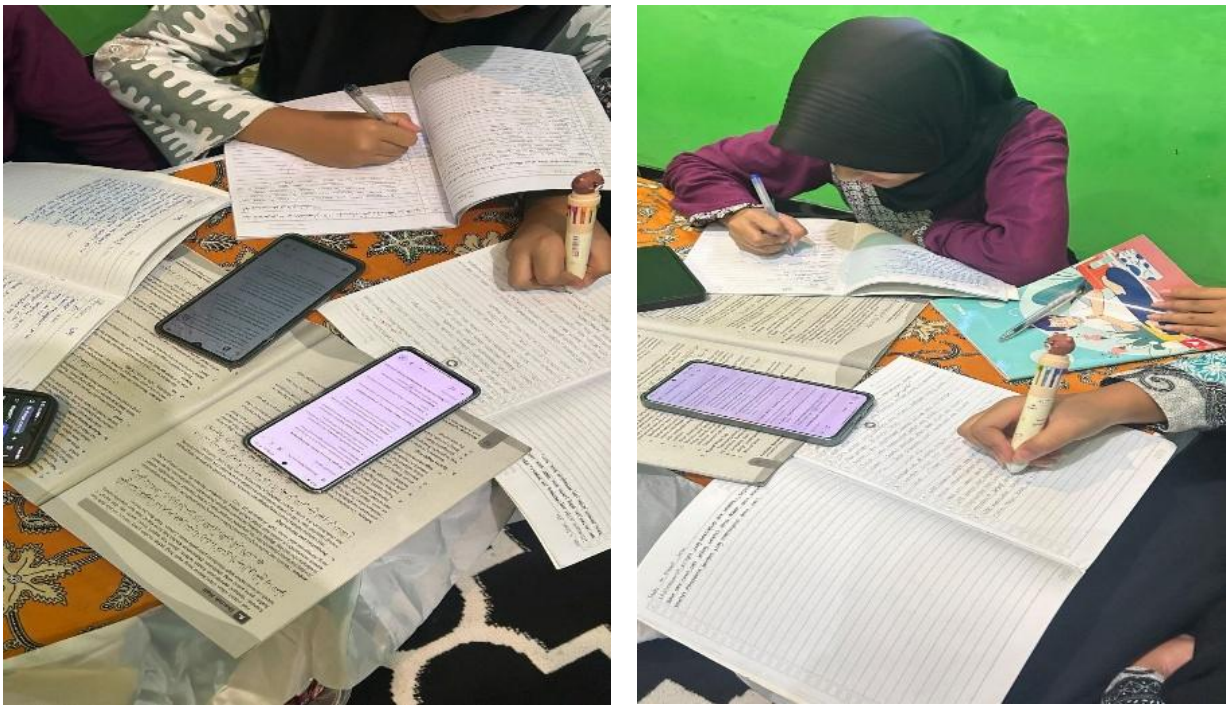


Figure 2. The use of AI in Islamic Education Learning in the Home Environment

The role of teachers in implementing Artificial Intelligence technology is crucial, particularly in guiding and mentoring students in its use. Teachers not only provide students with the freedom to utilize AI but also actively guide them to ensure its use is appropriate and responsible. This is evident in the guidance provided regarding the use of Artificial Intelligence for learning purposes, such as finding relevant sources, verifying information, and avoiding over-reliance. Thus, the use of Artificial Intelligence not only expands access to information but also develops digital literacy skills in students.

In addition to student use, research findings also indicate that teachers actively utilize Artificial Intelligence technology as part of learning planning and implementation. Teachers use Artificial Intelligence tools such as ChatGPT, Gemini, and Dola to assist in compiling teaching materials, creating evaluation questions, and designing Lesson Plans (RPPs). This utilization is carried out routinely in learning activities, so that Artificial Intelligence is not merely used as a supporting tool but has become integrated as part of the learning strategies implemented by teachers. This demonstrates teachers' efforts to adapt to technological developments in order to improve the quality of Islamic Religious Education learning.

This is proven by the results of an interview with one of the teachers of SMPN 3 Wonosobo, namely Mr. Abdul Chalim, S.Pd.I who stated: "I also use artificial intelligence technology to help compile students' PAI learning outcomes, at the end of PAI learning I usually give questions using the quizizz application". Not only Mr. Abdul Chalim, Mrs. Anis, M.Pd.I as a PAI subject teacher

also said: "Up to the evaluation I also use Artificial Intelligence technology to provide final results to students".

The use of Artificial Intelligence by teachers has a positive impact on efficiency and creativity in designing lessons. Teachers can access a wider range of reference materials and develop more varied questions tailored to students' needs. Furthermore, Artificial Intelligence also helps teachers develop more contextual learning approaches, particularly in connecting Islamic Religious Education material to common experiences. Thus, teachers' use of Artificial Intelligence not only improves the quality of lesson planning but also enriches students' learning experiences.

Analytically, the implementation of Artificial Intelligence in Islamic Religious Education learning aligns with the concept of technology-based learning, which emphasizes a student-centered learning approach, placing students as active participants in all learning activities. Artificial Intelligence acts as a facilitator, assisting students in constructing knowledge independently. However, this implementation still requires further development, particularly in terms of optimizing technology use and improving teacher competency. This is crucial so that the use of Artificial Intelligence is not merely a supporting medium but can be systematically integrated into the design of Islamic Religious Education learning.

Thus, it can be concluded that the implementation of Artificial Intelligence in Islamic Religious Education learning at SMPN 3 Wonosobo has positively contributed to the effectiveness and quality of learning. However, ongoing development efforts are still needed to ensure optimal use of this technology and support more effective, innovative, adaptive, and relevant PAI learning.

Overall, the integration of Artificial Intelligence (AI) use by teachers and students demonstrates a synergy in learning activities, with teachers acting as facilitators and guides, while students utilize technology as a learning tool that supports independence. This pattern reflects the effective implementation of technology-based learning, where AI does not replace the role of teachers but rather enhances interaction and the quality of learning. Therefore, the continued development of AI use is necessary to provide optimal benefits in Islamic Religious Education learning.

3.2.Teacher Readiness in Integrating Artificial Intelligence Technology in Islamic Religious Education Learning

Research findings indicate that the planning for the use of artificial intelligence in Islamic Religious Education learning at SMPN 3 Wonosobo has not been fully formally integrated into the lesson plan (RPP) learning tools. The use of artificial intelligence is mostly carried out at the level of direct classroom practice, particularly in core learning activities. This indicates that although the use of technology has been implemented, the planning aspect still tends to be implicit and has not been clearly and systematically documented in the learning tools. This condition indicates an opportunity for developing a more structured integration of artificial intelligence in Islamic Religious Education learning design.

In classroom implementation, teachers have been able to utilize Artificial Intelligence as part of their learning strategies, particularly in core activities such as material exploration, completing assignments, and discussions. The use of Artificial Intelligence at this stage allows students to be more active in seeking information and processing knowledge independently. This

demonstrates that, although not yet formally incorporated into the planning, teachers already have a practical understanding of the potential of Artificial Intelligence to support the learning process.

The readiness of Islamic Religious Education teachers at SMPN 3 Wonosobo demonstrates a fairly good level of readiness to integrate Artificial Intelligence (AI) technology. This is evident in their ability to use various AI platforms and guide students in their effective use. This readiness is largely achieved through self-learning, where teachers actively explore the use of technology without relying on formal training. Teachers' open and supportive attitudes toward the use of AI are crucial for the successful implementation of this technology in classroom learning.

However, teachers face several obstacles in implementing Artificial Intelligence in learning. The main obstacles include a lack of formal training on the use of Artificial Intelligence technology and technical difficulties in its operation. These limitations have the potential to hinder the optimal use of Artificial Intelligence in learning, particularly in developing more innovative and integrated learning strategies. Therefore, institutional support in the form of training and mentoring is needed to continuously improve teacher competency.

Beyond technical aspects, teacher readiness is also reflected in their ability to integrate the use of Artificial Intelligence with Islamic values. Teachers not only guide students in the use of technology but also instill the importance of ethics in its use, such as verifying information sources and avoiding plagiarism. This approach indicates that the use of artificial intelligence in Islamic Religious Education learning is not solely focused on the cognitive domain but also considers the development of students' character and moral values.

Overall, teacher readiness for implementing Artificial Intelligence in Islamic Religious Education learning at SMPN 3 Wonosobo can be categorized as quite good, although it still requires strengthening in terms of planning and technical competency development. With the right support, the integration of Artificial Intelligence in Islamic Religious Education learning has the potential to be developed more systematically and sustainably, thereby improving the quality of learning that not only delivers innovation but also remains aligned with Islamic values.

3.3. Supporting and Inhibiting Factors in the Use of Artificial Intelligence in Islamic Education Learning

The implementation of Artificial Intelligence in Islamic Religious Education (PAI) at SMPN 3 Wonosobo is influenced by various interconnected factors, both supportive and inhibiting, which ultimately determine the extent to which AI can be effectively integrated into the learning process. One of the main challenges is the varying level of technological literacy among teachers and students, where not all educators are fully prepared to design or facilitate AI-supported learning activities, and some students may also lack the digital skills needed to use these tools optimally. In addition, resistance to change can emerge in the form of hesitation to move away from conventional teaching methods, especially when AI is perceived as complex or as a threat to established pedagogical practices. Limited infrastructure, internet stability, and access to appropriate devices may further restrict consistent implementation. Beyond these immediate challenges, there are also broader considerations regarding the long-term integration of AI into the curriculum, including the need to ensure that technology use remains aligned with Islamic educational values, ethical considerations, and the development of students' critical thinking and moral character rather than over-reliance on automated systems. These factors highlight that while

AI offers significant potential to enhance PAI learning, its successful adoption requires not only technological readiness but also pedagogical adaptation and continuous professional development for educators.

Support from the school, particularly the principal, is a crucial factor in the successful implementation of Artificial Intelligence. This support is reflected in the freedom given to teachers to innovate in teaching and the provision of supporting facilities, such as internet access (Wi-Fi) within the school environment. Furthermore, students' strong interest in using technology is also a significant driving factor. Students demonstrate enthusiasm for utilizing Artificial Intelligence as a learning resource, resulting in a more active and participatory learning process.

The availability of technological devices, particularly mobile phones, is also a supporting factor in the implementation of Artificial Intelligence. While not all students have devices with adequate specifications, most already have access to such technology. This allows the use of Artificial Intelligence to continue in learning, albeit with varying degrees of optimization. With a combination of institutional support, technological facilities, and student motivation, the implementation of Artificial Intelligence in Islamic Religious Education learning can run quite well.

Inhibiting factors that require attention: One major obstacle is limited facilities for some students, particularly those with devices that do not support the use of AI-based applications. Furthermore, technical challenges, such as application errors and difficulties in using the technology, also pose obstacles to the learning process. These conditions can disrupt the smooth flow of learning and reduce the effectiveness of AI use in the classroom.

The use of Artificial Intelligence (AI) from a student perspective also creates the potential for significant dependency. Some students tend to rely on the results provided by AI without further understanding the material. This has the potential to hinder the development of critical thinking skills and independent learning. Furthermore, there is the risk of plagiarism, where students copy AI results without further processing. This presents a serious challenge that must be addressed when utilizing technology in learning.

Meanwhile, from the teacher's perspective, challenges include difficulty controlling students' use of Artificial Intelligence during learning. Students' use of personal devices makes supervision more complex, necessitating specific strategies to ensure technology is used in accordance with learning objectives. Furthermore, limited training and technical understanding also hinder the optimal use of Artificial Intelligence in learning.

Overall, the factors supporting and inhibiting the implementation of Artificial Intelligence demonstrate that the successful use of technology in Islamic Religious Education learning depends not only on the availability of the technology but also on the readiness of human resources and existing support systems. Therefore, an integrated effort is needed between schools, teachers, and students to optimize the use of Artificial Intelligence while minimizing any potential negative impacts. With proper management, Artificial Intelligence technology can be a tool that optimally enhances the quality of innovative and character-based Islamic Religious Education learning.

4. CONCLUSION

The implementation of Artificial Intelligence (AI) in Islamic Religious Education (PAI) learning at SMPN 3 Wonosobo has shown positive development, although it is still in the early

stages. Teachers and students use AI platforms such as ChatGPT, Gemini, and Dola to support learning activities, particularly for finding information, answering questions, and creating summaries. This has helped improve learning effectiveness and student independence. Teachers have demonstrated a fairly good readiness to integrate AI by using it in preparing teaching materials, lesson plans, and assessments, although AI has not yet been formally incorporated into learning documents. The use of AI is also guided by Islamic values, emphasizing ethical technology use and information verification. However, several challenges remain, including unequal access to devices, technical difficulties, limited teacher training, risks of student dependence on AI, and concerns about plagiarism. Despite these obstacles, strong student interest and school support have encouraged continued AI adoption. To optimize AI use in PAI learning, schools should improve facilities and internet access, teachers should enhance their AI competencies and integrate AI more systematically into lesson planning, and students should be guided to use AI responsibly and critically. With proper support and management, AI has significant potential to enhance innovative, adaptive, and value-based Islamic Religious Education.

REFERENCES

Afandi, A. R., & Kurnia, H. (2023). Revolusi Teknologi: Masa Depan Kecerdasan Buatan (AI) dan Dampaknya Terhadap Masyarakat. *Academy of Social Science and Global Citizenship Journal*, *3*(1), 9–13.

Amalia, A., Fahmy, A. F. R., Sari, N. H. M., Nugroho, D. A., Prabowo, D. S., Pujiono, I. P., Faradhillah, N., & Syukron, A. A. (2024). *Pemanfaatan media pembelajaran berbasis Artificial Intelligence (AI) di sekolah*. Penerbit NEM.

Anggraeni, T. B. (2025). Integrasi artificial intelligence dalam pembelajaran Pendidikan Agama Islam: Studi eksploratif pada model chatbot Islami di era Society 5.0. *Journal of Educational Research and Community Service*, *1*, 125–131.

Anindyati, L. (2023). Analisis dan perancangan aplikasi chatbot menggunakan framework rasa dan sistem informasi pemeliharaan aplikasi (Studi kasus: Chatbot penerimaan mahasiswa Baru politeknik astra). *Jurnal Teknologi Informasi Dan Ilmu Komputer (Jtiik)*, *10*(2), 291–300.

Apriadi, R. T., & Sihotang, H. (2023). Transformasi mendalam pendidikan melalui kecerdasan buatan: Dampak positif bagi siswa dalam era digital. *Jurnal Pendidikan Tambusai*, *7*(3), 31742–31748.

Dede, D. L., Adityarini, E., & Madiansah, M. A. (2025). Analisis implementasi kecerdasan buatan (artificial intelligence) dalam optimalisasi proses bisnis. *Jurnal Sistem Informasi Dan Teknologi (SINTEK)*, *5*(1), 90–99.

Faiza, N. N., & Wardhani, I. S. (2024). Media pembelajaran abad 21: Membangun generasi digital yang adaptif. *Jurnal Media Akademik (JMA)*, *2*(0).

Ghazy, A. C., Ghozali, G., & Wibowo, K. A. (2025). Transformasi Pendidikan: Pengembangan Metodologi dan Media Pembelajaran di Era Digital. *Action Research Journal Indonesia (ARJI)*, *7*(4), 2974–2997.

Ismunandar, A. (2025). Strategi Peningkatan Kemampuan Sumber Daya Manusia di Era Digital: Tantangan dan Adaptasi pada Lembaga Pendidikan. *Bisma: Business and Management*

Journal, *3*(1), 27–36.

Kesuma, M. I. J., Fatoni, I., Ajir, I. C., Yazdi, M. I. K., Pahrudin, A., Murtadho, A., & Rinaldi, A. (2025). Transformasi pembelajaran pendidikan agama Islam berbasis teknologi digital di era society 5.0. *Pendas: Jurnal Ilmiah Pendidikan Dasar*, *10*(02), 306–317.

Mahadipta, N. G. D., & Aditya, I. M. W. (2024). Mendorong Inovasi: Peran Artificial Intelligence Dalam Akselerasi Industri Kreatif. *Jurnal Imagine*, *4*(1), 1–6.

Manan, A. (2023). Pendidikan Islam dan perkembangan teknologi: Menggagas harmoni dalam era digital. *SCHOLASTICA: Jurnal Pendidikan Dan Kebudayaan*, *5*(1), 56–73.

Mardiana, R., Fahdillah, Y., Kadar, M., Hassandi, I., & Mandasari, R. (2024). Implementasi transformasi digital dan kecerdasan buatan sebagai inovasi untuk UMKM pada era revolusi industri 4.0. *Jurnal Ilmiah Manajemen Dan Kewirausahaan (JUMANAGE)*, *3*(1).

Pare, A., & Sihotang, H. (2023). Pendidikan holistik untuk mengembangkan keterampilan abad 21 dalam menghadapi tantangan era digital. *Jurnal Pendidikan Tambusai*, *7*(3), 27778.

Pratama, A. S., Sari, S. M., Hj, M. F., Badwi, M., & Anshori, M. I. (2023). Pengaruh Artificial Intelligence, Big data dan otomatisasi terhadap kinerja SDM di Era digital. *Jurnal Publikasi Ilmu Manajemen*, *2*(4), 108–123.

Rifky, S. (2024). Dampak penggunaan artificial intelligence bagi pendidikan tinggi. *Indonesian Journal of Multidisciplinary on Social and Technology*, *2*(1), 37–42.

Risana, F., Hadi, A. I. M., Pratama, A., Rahmah, F., & Syafe'i, I. (2025). Transformasi metode pembelajaran pendidikan agama Islam: Dari konvensional ke pendekatan student-centered learning. *Pendas: Jurnal Ilmiah Pendidikan Dasar*, *10*(01), 619–632.

Risnita, R. (2024). Pendekatan penelitian kuantitatif dan kualitatif serta tahapan penelitian. *Jurnal Genta Mulia*, *15*(1), 82–92.

Riyadi, A., & Khuzaemah, E. (2025). Transformasi Pembelajaran Digital sebagai Respons Tantangan Pendidikan Era Society 5.0 di SMA. *Jurnal Pemikiran Pendidikan Dan Keguruan*, *1*(1).

Santoso, P. D. L., Riski, I., Kholik, N., Akbar, M. R., Saifudin, A., & Yulianti, Y. (2021). Penerapan artificial intelligence dalam aplikasi chatbot sebagai media informasi dan pembelajaran mengenai kebudayaan bangsa. *Jurnal Informatika Universitas Pamulang*, *6*(3), 579–589.

Sholihah, R. J. (2024). Penggunaan Artificial Intelligence (Ai) Dalam Peningkatan Kualitas Pembelajaran Pendidikan Agama Islam. *Jurnal Jaringan Penelitian Pengembangan Penerapan Inovasi Pendidikan (Jarlitbang)*, 207–218.

Sirait, F. E. T. (2022). Dampak Revolusi Industri 4.0 pada Industri Teknologi Komunikasi di Indonesia: Peluang dan Tantangan. *Jurnal Penelitian Dan Pengembangan Sains Dan Humaniora*, *6*(1), 132–139.

Sucianingtyas, R., Falistya, L. R., Pujiana, S., Prayogi, A., & Laksana, S. D. (2025). Telaah Ragam Artificial Inteligence (AI) Dalam Pendidikan. *Madani: Jurnal Ilmiah Multidisiplin*, *3*(2), 232–243.

Tubagus, M., Pramono, S. A., Junida, D. S., & Riyanti, A. (2025). Pendidikan 4.0: Mempersiapkan Siswa untuk Dunia Kerja di Era AI dan Otomasi. *Jurnal Kolaboratif Sains*, *8*(9), 5946–5954.

Wijaya, A., & Makraja, F. (2024). Implementasi Media Pembelajaran Berbasis Digital Dan Konvensional Pada Pembelajaran Pai Di Sdn 32 Rejang Lebong. *Jurnal Tarbiyah*

Almuslim, *2*(1), 38–54.

Zaenudin, I., & Riyan, A. B. (2024). Perkembangan kecerdasan buatan (AI) dan dampaknya pada dunia teknologi. *Jurnal Informatika Utama*, *2*(2), 128–153.