

# Implementation of Artificial Intelligence Technology-Based Learning Media at SD Negeri Kotagede 1 Yogyakarta

Femi\*, Didi Supriadi

Universitas Sarjanawiyata Tamansiswa, Indonesia

\*Corresponding author Email: [femi10177@gmail.com](mailto:femi10177@gmail.com)

*The manuscript was received on 19 June 2024, revised on 20 August 2024, and accepted on 29 November 2024, date of publication 2 January 2025*

## Abstract

In the digital era, the field of education is witnessing the transformation that occurs through the integration of artificial intelligence (AI). With artificial intelligence's (AI) potential to revolutionize various sectors, it presents itself as a material or tool that can enhance the teaching and learning experience. Its features align with our thinking, enabling us to progress according to our desired content. Artificial intelligence (AI) is today's most important tool in education. Artificial intelligence (AI) plays a crucial role in enabling the use of AI-based learning media, facilitating the learning process in education. Artificial intelligence (AI)-based learning media in education will aid teachers and students in learning. This study aims to provide insight to all of us regarding implementing learning media based on artificial intelligence (AI) technology at SD Negeri Kotagede 1 Yogyakarta. This study employs a descriptive-qualitative approach. In the current educational landscape, particularly at SD Negeri Kotagede 1 Yogyakarta, artificial intelligence (AI) plays a crucial role. Artificial intelligence (AI) can facilitate the learning process flow using learning media based on artificial intelligence technology. Teachers can utilize artificial intelligence to design programs and learning processes, while students can enhance their comprehension of the material and cultivate their critical thinking skills. Implementing learning media based on artificial intelligence (AI) technology can benefit educational institutions through a more enjoyable, innovative, effective, and creative learning process.

**Keywords:** *Learning Media, Artificial Intelligence, Education, Technology, Digital Era.*

## 1. Introduction

Education is a learning activity that occurs throughout the ages in human life. Without education, humans cannot live their lives according to their life goals. The success of education is highly dependent on the teaching and learning process that involves several interrelated components. These components include teachers as educators, students as learners, teaching materials, learning models, and learning media that teachers use to capture students' attention during the learning process [1]. Teachers are central to education as facilitators who guide students to understand the teaching material well.

Meanwhile, students play an active role in the learning process, where they receive information and engage in discussion, exploration, and collaboration. Relevant teaching materials appropriate to students' needs are crucial to creating a practical learning experience. Varied learning models, such as project-based learning or group discussions, also contribute to deeper understanding [2]. In addition, the use of captivating and interactive learning media is crucial in the teaching and learning process. This media can be digital technology, teaching aids, or other learning resources, which can enhance students' understanding of concepts. By effectively integrating all these components, education can significantly impact the development of individuals and society, helping students achieve their life goals and contributing to the progress of the nation [3].

In the digital era, the field of education is witnessing a significant transformation through the integration of artificial intelligence (AI). With the potential of AI to revolutionize various sectors, this technology is now present as a tool that can improve the teaching and learning experience. Teachers can tailor various AI features to their learning needs, enabling them to create more relevant and engaging content for students [4]. AI features, such as data analysis, learning personalization, and more responsive interactions, help teachers

understand students' individual needs. For example, AI can identify areas where students struggle and provide additional materials to strengthen their understanding. In addition, this technology allows for adaptive learning, where students can learn at their own pace, adjusting to the learning style that is most effective for them [5]. By leveraging AI, education becomes not only more efficient but also more inclusive. Students from various backgrounds and abilities can access quality learning materials equally. This makes AI vital in creating a progressive learning environment and encouraging innovation and collaboration in education. Therefore, we expect the integration of AI in education to enhance students' readiness to tackle future challenges [6]. Artificial intelligence (AI) is a term that emerged in the context of Industrial Society 4.0 and Society 5.0, which refers to "computer programs, machine learning, and hardware and software" designed to mimic and amplify human cognitive abilities. Hardware and software solutions inspired by the reverse engineering of the neuron patterns in the human brain build AI [7]. This approach allows AI to learn from data and experience to perform tasks that usually require human intelligence, such as speech recognition, natural language processing, and image analysis. Education widely utilizes products from Industry 4.0 to enhance the teaching and learning process. AI can help educators develop more effective and engaging teaching methods, as well as create learning experiences that are based on differentiation. AI enables educators to customize education to each student's needs and abilities, allowing them to learn according to their preferred learning style. For example, AI can provide real-time feedback, help students identify areas for improvement, and offer additional relevant learning resources. Thus, the application of artificial intelligence in education focuses on technological development and fostering a more inclusive and responsive learning environment. AI has the potential to provide a more dynamic and adaptive learning experience, support the holistic development of students, and prepare them to face challenges in the digital era [8].

Learning media is one of the crucial learning resources in the education process, functioning to convey messages and direct teachers and students in carrying out more varied learning. Using media enhances the innovativeness and interest of the teaching process, ensuring students receive the delivered material more effectively. Learning media helps convey information and enrich students' learning experiences, making them more active in the learning process. Research has proven that using media in learning enhances the effectiveness and efficiency of information delivery [9]. With suitable press, students can more easily understand the contents of the material because the information presented becomes more precise and structured. You can use various forms of media, including books, posters, videos, or teaching aids. In addition, technological developments have opened up opportunities to use artificial intelligence (AI)-based media, which offers interactive features and personalization in teaching and learning. AI-based learning media can provide a more adaptive learning experience, allowing students to learn according to their own pace and learning style.

For example, AI can analyze student progress and provide customized materials to strengthen their understanding [10]. Thus, the use of various learning media, both conventional and AI-based, is essential to create a compelling and exciting learning environment and support the achievement of better educational goals. Artificial intelligence (AI) technology-based learning media in education can significantly contribute to teachers and students, making learning more effective and optimal. With AI's ability to analyze data, this technology can identify individual students' skills and interests, enabling more personalized and targeted learning. This improves students' understanding and encourages them to be more actively involved in the learning process. AI can provide various tools and resources that support the learning process, such as interactive platforms, adaptive learning applications, and material recommendation systems [11]. By utilizing these features, teachers can design more relevant and exciting learning experiences according to the needs and development of each student. For example, AI can help identify areas where students may have difficulty and provide appropriate additional materials to help them overcome these challenges. In the context of society 5.0, the application of AI in education is in line with the need to create a more inclusive and responsive learning environment. With the support of AI, the learning process can be more dynamic, allowing students to learn in a way that aligns with technological developments and the demands of the times. We expect this to equip students with the necessary skills to tackle future challenges and develop them into competent individuals prepared to contribute to an increasingly complex society [12].

People describe Society 5.0 as a state in which artificial intelligence (AI) technology places humans at the center of society, enabling them to solve various life problems. In education, teachers play a crucial role as the primary mentors, fostering progress in the learning process. We expect teachers to implement interactive and relevant learning media in line with the development of AI technology. AI-based learning media enhances students' learning experiences, making them more meaningful, engaging, and interactive. AI technology enables the delivery of materials customized to each student's needs and abilities, enabling them to learn by their unique rhythm and learning style [10]. In addition, interactive learning media can increase student engagement, allow them to actively participate in the learning process, and encourage collaboration among classmates. The implementation of AI-based learning media not only provides more dynamic and contextual information and promotes the development of 21st-century skills, such as problem-solving, critical thinking, and creativity [12]. Thus, teachers are essential in preparing students to adapt and contribute to an increasingly complex society where technology and humans work together to create better solutions to various challenges. Integrating artificial intelligence (AI) technology in education provides numerous benefits for teachers in diverse areas. Teachers can use AI as a tool to create more engaging and interactive learning media, assisting them in creating teaching materials and modules that meet the needs of their students. With the help of AI, teachers can also develop more objective and targeted assessment rubrics so that the evaluation process becomes more efficient [13]. In addition, AI technology can create a more effective learning environment. AI can analyze student learning data, provide appropriate feedback, and recommend additional materials that suit the abilities and interests of individual students. This makes it easier for teachers and students to learn, allowing students to learn in a way that aligns with their rhythm and learning style. We hope that utilizing AI technology will enhance the efficiency and enjoyment of the learning process, offering a contemporary and profound learning experience. This will help create a better-prepared generation to face future challenges and adapt to rapid changes in the world of technology and information [14].

The teaching and learning activities at SD Negeri Kotagede 1 Yogyakarta directly reflect the explanation above. Several issues arise, including the lack of implementation of artificial intelligence (AI) technology-based learning media by some teachers, their confusion in selecting suitable learning materials, and the lack of understanding among teachers regarding the use and application of these AI-based learning media in the classroom. This, in turn, diminishes the significance of the learning process for students, preventing them from fully achieving their learning objectives, as the learning process does not align with their interests and content. Based on the problems above, the researcher aims to review the implementation of artificial intelligence (AI) technology-based learning media at SD Negeri Kotagede 1 Yogyakarta, examine the impact of this technology in the field of education, and identify the competencies required of teachers in implementing AI technology in education or the learning process.

## 2. Research Method

This study employs a descriptive qualitative approach, where researchers serve as critical instruments to examine the conditions of natural objects. We carry out the data collection process using triangulation techniques, which combine various methods with inductive data analysis. Qualitative research emphasizes meaning over-generalization to understand the studied phenomena better. We conducted the research at SD Negeri Kotagede 1 Yogyakarta. We plan to conduct the research in August 2024, with teachers and students as subjects. Teachers act as teachers who implement artificial intelligence (AI)-based learning media, while students act as learners who use the media in the learning process. The relationship between teachers and students is crucial in implementing AI-based learning media, as it is a valid data source for the research. The research procedure involves several essential steps in data collection to achieve research objectives. Researchers use observation, interview, and documentation techniques. Researchers directly observed the use of AI-based learning media in the classroom, then recorded, analyzed, and made conclusions regarding its implementation. We conducted interviews with teachers and students to gather direct data about their experiences using the media. Meanwhile, documentation techniques include notes and images of the media used during the learning process. Data analysis techniques follow four stages, namely data collection, data reduction, and data display.

**Fig 1.** Components in Data Analysis (Interactive Model) According to Miles and Huberman

At the data collection stage, researchers focus on finding and collecting data from various sources related to implementing artificial intelligence (AI) technology-based learning. Researchers carry out this process using a combination of interview, observation, and documentation techniques, known as triangulation. At this stage, the data is still raw and unorganized, encompassing the results of interviews with informants, specifically teachers and students, as well as observations and documentation related to implementing AI-based learning in the school. After the data is collected, researchers reduce it by summarizing and selecting information that is considered essential and relevant to the study. During this process, researchers analyze interview results, sorting and simplifying information to extract only data that aligns with the research discussion. By examining the data, researchers can draw conclusions that provide more focused and relevant information. Organizing the collected information into an interconnected pattern facilitates the data presentation stage, making it easier to understand. Researchers choose to present data in a brief description that summarizes the results of observations and interviews regarding implementing AI-based learning. Furthermore, at the conclusion-drawing stage, researchers confirm the data analysis by concluding findings that were initially temporary. Valid evidence supports the conclusion, making it credible; otherwise, further data may lead to revisions.

## 3. Result And Discussions

### 3.1. Implementation of Artificial Intelligence Technology-Based Learning Media at SD Negeri Kotagede 1 Yogyakarta

When implemented in education, artificial intelligence (AI) serves as a system that fosters and supports a more creative and innovative learning process. In the context of education, it is crucial to have learning media that cater to the needs of students, as this can stimulate their interest in learning more actively. The presence of AI can improve the quality of learning by offering more intriguing and relevant methods for students. By using AI, teachers have the convenience of creating more creative and innovative learning media. The AI system can assist in tailoring learning content to students' abilities, learning styles, profiles, and experiences. This allows education to be more personalized, where each student can learn in the most effective way, thereby improving learning outcomes. In addition, AI can help identify areas that need improvement in the learning process so that teachers can provide more targeted feedback and support individual student development. We hope to utilize this technology to make learning more enjoyable and productive, boosting students' motivation and academic achievement. Artificial intelligence (AI) dramatically influences the learning process based on creativity, effectiveness, and innovation, making it easier for teachers and students to understand and explain learning materials. In the context of education in the 5.0 era or the 21st century, the main focus is on students, including consideration of the abilities, backgrounds, and profiles of each individual. This is important to create a relevant and meaningful learning experience for each student. With AI, students can undergo a learning process that suits their needs through learning media applied by teachers in the classroom. AI can help adjust learning content, making it more captivating and easier to understand. For example, by using an algorithm that can analyze students' learning styles and levels of understanding, AI can recommend suitable material for each individual. Therefore, the application of artificial intelligence in education increases the effectiveness of the learning process and supports the development of each student's potential to the maximum. With AI as a companion, students can learn in the way that suits them best, ultimately improving the overall quality of education.

In the past, teachers have typically only used lecture and demonstration methods, which frequently lack the use of varied learning media. This makes the learning process monotonous and less engaging for students. However, using learning media based on artificial intelligence (AI) technology has significantly improved students' understanding and explanation. The presence of interactive learning media based on AI enables teachers to deliver materials more effectively, facilitating students' understanding of the learning content. Several teachers have started implementing the learning process using AI-based media. These teachers show initiative in seeking information and adapting to the latest technology to create a more captivating learning environment. They actively explore platforms

such as Instagram, YouTube, Facebook, TikTok, and other media as reference sources to find practical, interactive, and innovative learning media. Through this approach, teachers can design learning experiences that suit the needs and interests of students, increasing their involvement and motivation in the learning process. With the support of AI-based learning media, teachers can provide materials more excitingly and create a more dynamic learning atmosphere. This enables students to actively participate in the learning process actively, thereby enhancing their understanding and skills. This transformation shows how vital technology integration in education is to prepare students to face the challenges of today's digital era.

At SD Negeri Kotagede 1 Yogyakarta, teachers use various artificial intelligence (AI)-based learning media to enhance students' learning experiences. One example of a popular medium is PowerPoint (PPT). Although PPT has been a presentation tool for a long time, this platform has undergone significant developments along with technological advances and educational needs in the era of society 5.0. Today, PowerPoint serves as a visual presentation tool and incorporates advanced features that foster creativity and visually appealing designs. Teachers can utilize various design elements, images, and colors to create more interactive and engaging presentations. In addition, PPT allows users to design materials according to their specific needs to be more relevant and exciting to students. This new capability transforms the use of PowerPoint in the classroom from a mere tool to a flexible learning medium that caters to students' learning styles. Teachers use PPT to create learning materials that are not only informative but also visually attractive so they can attract students' attention and increase their involvement in the learning process. In the 5.0 era, many teachers are already familiar with the Canva application, a design platform allowing users to express their creativity freely. Canva design will enable users to create attractive designs tailored to their preferences, making it an ideal tool for educational contexts. Teachers and students can easily access this application online via the web or by downloading it. Canva offers a variety of intriguing features, such as customizable templates, graphic elements, and intuitive design tools. This capability enables teachers to create engaging and topic-relevant learning media effortlessly. By using Canva, teachers can make learning materials that are informative and enjoyable for students. Attractive visual designs can help students understand and remember the material more efficiently and increase their involvement in the teaching and learning process. This makes Canva one of the most valuable tools for implementing AI-based learning in the classroom.

One of the most popular platforms among educators and non-educators, YouTube offers a variety of information that caters to their individual needs, particularly in education. Through YouTube, teachers can easily search for and sort materials by the content and context of the ongoing learning. This platform's learning videos facilitate students' comprehension of the material, thereby enhancing the efficacy of the teaching and learning process. The Dictionary is an application that serves as a valuable tool for students studying foreign languages. This application assists students in translating foreign language vocabulary, particularly when learning English, a subject covered in the Merdeka curriculum. By using a Dictionary, teachers and students can more easily understand English learning materials so that students can participate more actively in the learning process and overcome the language barriers they face. Wordwall is a website-based application that allows teachers to create interactive learning media. Teachers can use Wordwall to create quizzes, games, and other activities that align with their teaching material. We designed this application to encourage students to think critically and develop reasoning skills. Interactive activities like this can increase student involvement and make learning more enjoyable. Artificial intelligence powers CorelDRAW, a design application that customizes various features to meet user needs. However, this application is best suited for individuals with expertise and patience in design, as it requires specific skills to design using CorelDRAW.

Therefore, we recommend using a more straightforward and intuitive design application for beginners to avoid experiencing difficulties when creating learning media. Teachers widely use Quizizz as an application in the learning process. This application allows teachers to create quizzes or daily tests in a fun and game-based way (gamification). Using Quizizz, students can learn while playing, making them more enthusiastic and motivated to learn. Google's Gemini and Gamma App applications are also considered innovative tools. Google's Gemini helps teachers design conversations and learning materials. At the same time, the Gamma App offers a variety of materials that can be easily accessed, assisting teachers to determine the topics to be taught quickly and efficiently.

### **3.2. The Impact of the Implementation of Artificial Intelligence Technology in the Field of Education, Especially at SD Negeri Kotagede 1 Yogyakarta**

The application of artificial intelligence (AI) technology-based learning media in education offers many advantages for teachers and students. Using AI, teachers can access tools and resources that help them deliver material more interactively and interestingly. By tailoring learning content to their individual needs, learning styles, and abilities, students also receive a more personalized learning experience. For example, AI-based learning applications can provide direct feedback, allowing students to learn at their own pace, thereby increasing the effectiveness of the learning process. However, using AI-based learning media also has negative impacts that must be considered. One of the issues that emerges is students' over-reliance on technology, potentially diminishing their capacity to think critically and solve problems independently of technology.

Additionally, there is a risk of a lack of social interaction in a traditional learning environment, as students tend to focus more on their devices than on interacting with peers and teachers. This can result in a reduction in critical social skills in everyday life. Everyday life also feels the impact of AI on the learning process. Artificial intelligence affects the way we communicate, work, and learn. With the increasing use of technology in education, students are learning to adapt to digital tools that become an integral part of their lives. However, it is essential to find a balance between the use of technology and direct involvement in learning. Therefore, teachers and educators must carefully integrate AI into the learning process to maximize its benefits and minimize its negative impacts. The positive effects of implementing artificial intelligence (AI) technology are very diverse and significantly contribute to the learning process. First, AI helps make learning activities easier for teachers and students by adjusting the material's content according to individual needs. This allows students to get relevant and relevant information in accordance with their level of understanding. Second, AI technology enhances the learning experience by offering engaging and impactful learning materials. This facility increases student motivation and creates a more interactive learning environment.

Additionally, AI assists teachers in preparing learning materials more efficiently, thereby reducing the preparation time. Furthermore, AI allows students to learn independently according to their respective abilities. More flexible access enables students to revisit previously understood material or delve into new topics beyond class hours. This technology also makes it easier for teachers to design active, creative, and innovative learning media, thereby improving the quality of learning. Another advantage of implementing AI is that it provides freedom of access without time constraints. Students can learn anytime and anywhere, which is very helpful in creating a more comfortable learning atmosphere.



Additionally, AI provides various tools and features that enable teachers to create learning media more quickly and creatively. Finally, the use of AI makes learning more fun and exciting. Attractive designs, images, and other creative elements can increase student engagement in the learning process. AI facilitates the creation of learning assessments, enabling more efficient evaluation of student understanding. Overall, implementing AI technology improves access to education and provides a better learning experience for students. Implementing artificial intelligence (AI) technology also has negative impacts that must be considered. First, using AI can make teachers less confident in their work. Dependence on technology to produce captivating learning media can reduce teachers' creativity and confidence in creating teaching materials. Second, teachers and students can become dependent on using AI-based learning media. This dependence can potentially reduce their ability to learn independently and think critically because they rely too much on technology in the learning process.

Additionally, as AI increasingly assumes the roles of traditional teachers, it may lead to a rise in unemployment within the education sector. Furthermore, the application of AI technology in learning can strain social relationships between teachers and students. The learning system's emphasis on technology use can diminish direct interaction between individuals, thereby hindering students' capacity to develop social skills. In this context, the over-reliance on artificial intelligence-based learning media can also reduce the critical thinking skills of teachers and students. Furthermore, excessive use of AI can eliminate students' social skills when discussing and working together on learning projects. Students who interact too much with technology and need more face-to-face discussions may need help collaborating and communicating well. In addition, there are issues related to privacy and data security. Excessive or frequent use of AI can increase the risk of data breaches. Finally, it is essential to note that AI only works according to its predetermined program. This implies that AI cannot adapt or innovate beyond its predefined parameters. Without sufficient internet access, it becomes possible to access AI-based learning applications, thereby impeding the learning process.

### **3.3. Competencies That Must Be Possessed by a Teacher and Student in the Implementation of Artificial Intelligence Technology in the World of Education or the Learning Process**

Implementing artificial intelligence (AI) technology in education requires specific competencies from teachers to ensure that implementing AI-based learning media is effective. One critical competency is a deep understanding of the technology itself. Teachers must recognize the various AI-based applications and platforms available and how to use them to enhance students' learning experiences. Knowledge of the features offered by each application allows teachers to choose the media that best suits students' needs and learning contexts. Furthermore, teachers must possess skills in designing creative and innovative learning strategies. This includes creating interactive and engaging learning activities using AI-based applications. For example, teachers can utilize interactive quizzes, educational games, or AI-based simulations to make the learning process more enjoyable. This will increase students' motivation and engagement in learning, enhancing their comprehension of the material. In addition, teachers must be able to adapt learning to each student's learning style and abilities. AI can provide in-depth data analysis of student performance so that teachers can adjust their teaching approaches. Utilizing this data allows teachers to provide more personalized feedback and help students overcome the challenges they face in the learning process. Another critical competency is managing the class and creating a positive learning environment. Teachers must use AI-based media to guarantee equal access to technology for all students, ensuring students stay caught up. This includes monitoring the use of technology in the classroom and providing additional support to students who may have difficulty using the tool. Finally, teachers also need to continue to develop themselves and adapt to the rapid development of technology. Attending training, workshops, or seminars on educational technology and AI can help teachers stay up-to-date with the latest trends and methods. Thus, teachers will not only improve their competencies but can also provide more relevant and effective learning for students in today's digital era.

When implementing AI-based learning media, teachers must possess several competencies to ensure an effective teaching and learning process. First, teachers must always keep up with the latest developments in the era and technology, including educational trends and AI-based tools. Up-to-date knowledge enables teachers to create engaging and innovative video content akin to that on the YouTube platform, thereby igniting students' enthusiasm for learning. Additionally, the ability to edit videos and create engaging content using applications like Canva and PowerPoint (PPT) is crucial for engagingly presenting learning materials. In addition, teachers need to utilize social media such as WhatsApp, Instagram, TikTok, and Facebook to keep up with the latest developments in learning platforms. Through these platforms, teachers can post the media they have created, provide insights to others, and develop broader interactions with colleagues and students. We also need good classroom management, where teachers can use design tools like CorelDRAW to create a classroom atmosphere that aligns with the desired teaching method. Skills in creating interactive quizzes using applications such as Quizizz and Wordwall will help students be more engaged in learning. In the digital era, the ability to manage remote classes through platforms such as Zoom and Google Meet is becoming increasingly important. Applications like Gamma and Gemini enable teachers to present learning materials comprehensively, enhancing students' understanding of the subjects they teach. Finally, the ability to publish work and detect plagiarism using tools such as Sinta.com is essential to maintaining academic integrity. By mastering these competencies, teachers can create a more engaging and beneficial learning experience for students.

In applying artificial intelligence (AI) technology in education, the competencies students need to possess are crucial for supporting an effective learning process. Initially, we expect students to cultivate a critical, creative, and communicative mindset. This ability will help them analyze the information received, ask relevant questions, and contribute to group discussions. By honing critical thinking skills, students can filter information in the digital world and make better decisions. Additionally, students must exhibit positive personalities and behaviors in their thinking, literacy, writing, arithmetic, and science skills. These skills are crucial as they aid in a deeper understanding of the subject matter. Students must also be able to use digital media wisely to access various sources of information and participate in technology-based learning. Increasing curiosity is vital to encouraging them to continue learning and exploring further knowledge, which will develop their potential. By creating these competencies, students will become good learners not only in terms of academics but also in terms of morals and behavior. AI-based education can provide opportunities for students to interact with technology to learn how to use these tools productively and ethically. In doing so, they will be ready to face future challenges with the right skills and attitudes.

## 4. Conclusion

Artificial intelligence (AI) has become a critical technology in the current 5.0 era, especially in education. The implementation of AI in education offers various conveniences for teachers and students. With AI, teachers can plan learning more effectively, create creative and innovative learning media, and develop strategies to increase student interaction and engagement in the classroom. This enriches the learning experience and provides a more inclusive impression for all students. Teachers can tailor various resources and tools to the class's specific needs through AI-based learning media. This way, the learning process becomes more relevant and engaging for students. Interactive and varied learning media can increase students' interest in learning, encourage them to participate more actively and help them understand the concepts taught better. In addition, this approach can help students develop critical thinking skills, which are very necessary in this changing world. Thus, the application of AI technology in education increases the effectiveness of the learning process and contributes to the development of 21st-century skills in students. By integrating AI into learning, we can create a more dynamic, responsive, and engaging learning environment, allowing students to learn holistically and meaningfully. The skills and knowledge gained through this enhanced learning experience will better prepare students for future challenges.

## References

- [1] Abidin, M. A. (2023). Implementation of Artificial Intelligence (AI) Technology to Support Student Learning at the Krembung District Elementary School, Sidoarjo. *Jurnal Madrasah Ibtidaiyah*, 2(1), 80–95.
- [2] Ruswan, A. et al. (2024). The Influence of Using Technology-Based Learning Media in Improving Elementary School Students' Digital Literacy Skills. *Program Studi Pendidikan Guru Sekolah Dasar, Universitas Pendidikan Indonesia*, 8(1), 4007–4016. <https://doi.org/10.31004/jptam.v8i1.13009>
- [3] Amanda, A., Rahayu, A., Mariana, D., Wahyuni, I., & Dwi Romadhoni, R. (2023). Implementation of Artificial Intelligence in Creating Learning Media Based on Augmented Reality Amelya. Seminar Nasional FPMIPA 2023 IKIP PGRI Bojonegoro, 2022, 240–243.
- [4] Astawa, N. L. P. N. S. P., & Permana, P. T. H. (2020). Learning Media with Artificial Intelligence in Generation-Z English Learning. *Jurnal Sains Sosio Humaniora*, 4(2), 756–767. <https://doi.org/10.22437/jssh.v4i2.11540>
- [5] Eriana, E. S., & Zein, D. A. (2023). Artificial Intelligence. *Angewandte Chemie International Edition*, 6(11), 951–952., 26.
- [6] Hikmawati, N., Sufiyanto, M. I., & Jamilah. (2023). Concept and Implementation of Artificial Intelligence in Elementary School Curriculum Management. *Abuya: Jurnal Pendidikan Dasar*, 1(1), 1–16. <https://jurnalinkadha.org/index.php/abuya/article/view/278>
- [7] Khoiriah, S. U., Lubis, L. K. L. U., & Anas, D. K. N. (2023). Analysis of the Development of Educational Management Systems in the Era of Society 5.0. *JISPENDIORA: Jurnal Ilmu Sosial, Pendidikan Dan Humaniora*, 2(2), 117–132. <https://doi.org/10.56910/jispendiora.v2i2.650>
- [8] Lukman, L., Riska, A., & Rihadatul, A. (2024). Problems of Using Artificial Intelligence (AI) for Learning Among Students of STIT Pematang. *Madaniyah*, 13(2), 242–255. <https://doi.org/10.58410/madaniyah.v13i2.826>
- [9] Mahyudi, A. (2023). Effectiveness of Using Technology in Learning Indonesian. *ARMADA: Jurnal Penelitian Multidisiplin*, 1(2), 122–127. <https://doi.org/10.55681/armada.v1i2.393>
- [10] Maso, K., Sesay, A., Lee, S., Hargreaves, E., Belecanech, R., Nguyen, C., Dellinger, R., & Schorr, C. (2022). The Role of Artificial Intelligence (AI) to Support Learning During The Covid-19 Pandemic. *Critical Care Medicine*, 43(1), 267. <https://doi.org/10.1097/01.ccm.0000474893.34162.5c>
- [11] Pandawangi, S. (2021). Research Methodology. *Journal Information*, 4, 1–5.
- [12] Ratnaningrum, I., Jazuli, M., Raharjo, T. J., & Widodo, W. (2023). Proceedings of the National Postgraduate Seminar on Innovation in Artificial Intelligence-Based Art Learning Media in the Era of Globalization. Prosiding Seminar Nasional Pascasarjana UNNES, 1975, 1204–1209. <http://pps.unnes.ac.id/pps2/prodi/prosiding-pascasarjana-unnes>
- [13] Diantama, S. (2023). Utilization of Artificial Intelligence (AI) in the World of Education. *DEWANTECH Jurnal Teknologi Pendidikan*, 1(1), 8–14. <https://doi.org/10.61434/dewantech.v1i1.8>
- [14] Zahara, S. L., Azkia, Z. U., & Chusni, M. M. (2023). Implementation of Artificial Intelligence (AI) Technology in the Field of Education. *Jurnal Penelitian Sains Dan Pendidikan (JPSP)*, 3(1), 15–20. <https://doi.org/10.23971/jpsp.v3i1.4022>