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The Effectiveness of AI-Assisted Interactive Learning Media to Improve Elementary School Students' Digital Literacy

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Abstract: *The development of digital technology and artificial intelligence (AI) has brought major changes in the world of education, including at the elementary school level. However, students' digital reading and writing skills remain a problem because the use of technology in the teaching and learning process has not been running well. This study aims to see how effective AI-supported interactive learning media is in improving the digital literacy skills of elementary school students. The method used is a Systematic Literature Review (SLR) that follows the PRISMA 2020 guidelines. Data was taken from scientific publications registered in Google Scholar between 2020 and 2025 using keywords related to interactive learning media, educational technology, AI-based learning, and innovation in learning. The results of the study from 10 articles that met the criteria showed that AI-supported interactive learning media provides good benefits in improving digital literacy, conceptual understanding, learning motivation, critical thinking skills, and also student engagement in the learning process. The integration of AI makes learning more personal, customizable, and interactive by using technologies such as interactive multimedia, digital comics, Augmented Reality, Virtual Reality, and automated assessment systems. Furthermore, AI also helps teachers manage learning more efficiently. Therefore, AI-assisted interactive learning media has proven effective as a learning innovation that can help improve digital literacy in elementary school students and align with the educational needs of the digital age.*

Keywords: *Artificial Intelligence, Interactive Learning Media, Digital Literacy, Elementary School, Educational Technology.*

Introduction

In an era of rapid change, the world of education cannot be separated from the influence of the digital revolution, which has touched nearly every aspect of human life. Technological advances over the past few decades have brought fundamental changes to the way society accesses information, interacts, and conducts learning. The transition from conventional learning systems to digital technology-based learning presents both new opportunities and challenges that have the potential to transform the face of education globally. One of the most visible changes is the increasing ease of access to information through digital technology. Entering the 21st century, known as the digital era, the increasingly rapid development of technology has had a significant impact on educational

advancement. Education has now become a primary need for every individual, playing a crucial role in improving the quality of human resources. Furthermore, education is a key foundation for building a nation's civilization while preserving the values of societal life. On the other hand, the use of technology in education also presents various challenges that require serious attention. Technology use is closely linked to ethical issues, personal data security, and cybersecurity, which must be managed effectively. Therefore, teacher training in digital technology is crucial for their optimal use in the learning process. Furthermore, developing technological infrastructure is a strategic step to support educational transformation in the digital era.

According to Al-Hattami et al. (2025), digital literacy is an individual's ability to understand and utilize information available in various formats through digital devices, particularly computers. Digital literacy is not limited to the ability to use technological devices, but also includes reading, writing, critical thinking, and the ability to understand various forms of information representation that appear in digital media. Thus, digital literacy involves cognitive, motor, social, and emotional skills so that a person can function effectively in a digital environment. One of the main benefits of digital literacy is preparing students to face the demands of a future that is increasingly dependent on technology. According to Taridala and Anwar (2023), digital literacy skills provide a strong foundation for students to use technology effectively, analyze information critically, and develop innovations according to their interests. Furthermore, digital literacy also helps students improve their critical thinking skills so they can sort out accurate information and avoid the spread of fake news or hoaxes (Hajri, 2023). Technology can also encourage students' creativity and innovation through the creation of digital works that can develop their ideas and imagination.

Literacy plays a crucial role in creating an effective and efficient learning process. In addition to broadening horizons, literacy also helps improve students' vocabulary, writing skills, and reading interest from an early age (Muftiroh & Atqia, 2022; Shavab, 2020). Therefore, strengthening digital literacy in elementary schools extends beyond using the internet for entertainment or information seeking, but can also be implemented in various learning and extracurricular activities. The low level of digital literacy in Indonesia's education sector has prompted the government to launch various programs, one of which is the National Literacy Movement, which is integrated into the school curriculum (Dewi et al., 2022). This program further emphasizes the importance of digital literacy by reinvigorating ICT learning in schools (Rahmawati, Cholily , & Zukhrufurrohmah , 2023). However, the program's implementation has not been evenly distributed, particularly in the 3T (Frontier, Outermost, and Disadvantaged) regions. The 3T (United Territories) regions still face various obstacles in improving the quality of education, one of which is the low digital literacy skills of teachers and students. Digital literacy is a crucial skill in modern education. This low level of proficiency has widened the educational gap between 3T regions and other regions, particularly in the implementation of technology-based learning. Furthermore, limited access to technology, limited educational facilities, and a lack of

understanding of the stages of digital literacy contribute to worsening educational conditions in these regions.

Many students reported that technology not only helps them obtain information more easily but also improves their critical and creative thinking skills. Various digital resources enable students to broaden their horizons, conduct independent research, engage in discussions through digital platforms, and exchange information with classmates (Fitriyani & Teguh , 2022). This suggests that digital literacy skills directly impact students' critical thinking skills, particularly in completing assignments that require in-depth analysis (Cynthia & Sihotang , 2023). Furthermore, students with strong digital literacy skills tend to be more confident in utilizing digital platforms for collaboration (Aisyah & Dewi, 2022). Rapid technological developments have made it a vital part of everyday life, including education. The use of technology can create more interactive, engaging, and enjoyable learning experiences. With the internet and digital devices, students no longer rely solely on textbooks but can access a variety of learning resources, such as videos, articles, and online tutorials. This provides opportunities for students to learn more independently and in-depth.

In the context of modern education, the previously teacher-centered learning method, or Teacher-Centered Learning (TCL), is shifting toward Student-Centered Learning (SCL), where students are required to be more active in the learning process. The Indonesian education curriculum is also adapting to technological developments through the use of digital teaching materials such as e-books and other technology-based learning media. However, the implementation of technology in education still faces various obstacles, such as limited access to technology, the digital divide, and low digital literacy skills among teachers and students. Furthermore, not all educational institutions understand how to effectively integrate technology into the learning process. One method considered relevant in the digital era is blended learning, a combination of face-to-face and online learning. The success of technology use in education is determined not only by the technology itself, but also by the learning design, the quality of the materials, the teacher's ability to utilize technology, and the support of educational institutions (Wajong et al., 2020). Furthermore, student-centered learning theory and problem-based learning are also important foundations for optimizing technology use in education (Desrinelti et al., 2021).
Artificial Intelligence (AI) is a branch of computer science that focuses on developing intelligent systems capable of mimicking human thought. According to Fauziyati (2023), AI is designed to perform various tasks such as learning from experience, solving problems, and making decisions based on available information. In education, AI opens up significant opportunities for creating more effective, interactive, and adaptive learning processes.

The application of AI in education enables the creation of more personalized learning experiences tailored to each student's individual needs. Using machine learning algorithms, AI can analyze student abilities and tailor learning materials accordingly. Furthermore, AI can be used in the learning evaluation process through automated assessment systems that deliver more objective and consistent results. The development of AI in education has brought about various innovations, such as adaptive learning systems, personalized

learning platforms, automated assessments, and predictive analytics (Zhai et al., 2021). The presence of AI also helps reduce the administrative burden on teachers, allowing them to focus more on the learning process and interactions with students (Al-Zyoud , 2020; Guilherme, 2019). This rapid development of AI has given rise to various discussions regarding the potential transformation of education in the future (Tedre et al., 2021; Yue et al., 2022). In Indonesia, the development of AI in education is also growing rapidly. The government has even designated 2025 as the year for a campaign to promote AI in education, designing a coding and AI curriculum from elementary school to university. One of the advantages of AI in education is its ability to provide a more personalized learning experience than traditional, uniform learning. Despite its enormous potential, the application of AI also poses various challenges, such as threats to data privacy and the potential misuse of personal information. Furthermore, AI-based automation is also impacting the workplace, as some human tasks are being replaced by technology. Therefore, the use of AI in education must be carried out wisely and responsibly, with attention to security and ethical aspects to ensure its benefits are optimally realized without causing negative impacts.

Rapid advances in digital technology have brought significant changes to the education sector, especially in the way learning is done in elementary schools. However, the use of technology in the teaching and learning process has still not reached an optimal level. Many students at the elementary level are already familiar with digital devices, but have not mastered adequate digital literacy skills, such as searching, understanding, analyzing and utilizing digital information wisely and responsibly. Apart from that, in some schools, the learning methods used are still conventional, which causes students to tend to be passive, quickly feel bored, and have little interest in participating in lessons. On the other hand, teachers also face various challenges in integrating technology into learning, both due to limited digital skills and a lack of innovative and easy-to-use interactive learning media.

Methodology

This study uses a Systematic Literature Review (SLR) approach with reference to the PRISMA 2020 guidelines (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) to ensure transparency, traceability, and objectivity in the literature selection process (Alwanda 2025). This method was chosen because it allows researchers to thoroughly review previous research findings related to the subject of the effectiveness of interactive educational media in increasing the scientific literacy of elementary school students. The main source of information in this research comes from Google Scholar, with a publication coverage between 2020 and 2025. This time period was chosen so that the results of the study can show the latest progress and patterns in the use of digital-based interactive media for science learning at the elementary school level. Keywords used in the search procedure include: "interactive learning media", "educational technology", "AI-based learning", "learning innovation". Searches are conducted by combining keywords with Boolean operators ("AND," "OR") to expand relevant findings. To support data collection and processing, several applications are commonly used in literature reviews.

Publish or Perish retrieves basic article information from Google Scholar, including title, author, year of publication, and publication name. The information obtained from the search is then organized using Microsoft Excel for initial filtering, removal of duplicates, and selection based on entry and exit criteria. Subsequently, Mendeley is used to support reference and citation management to facilitate more organized and structured citation activities.

Results and Discussion

Based on research conducted by M. Agung Alwanda in 2025, this study shows that interactive learning materials are very effective in increasing the scientific literacy of lower school students. From a review of 17 articles published between 2020–2025, it was found that all studies showed an increase in scientific literacy efforts through various interactive materials based on digital technology, such as interactive multimedia, digital comics, e-modules, flipbooks, educational games, interactive PowerPoint, Kodular applications, and virtual laboratories. A total of 9 articles (53%) showed the very impressive category, 7 articles (41%) fell into the impressive category, and only 1 article (6%) was categorized as quite impressive. impressive. Interactive materials have been proven to be able to significantly increase students' understanding of scientific concepts, interest in learning, and their ability to think scientifically. The use of visual elements, animation, sound and interactive simulations provides an enjoyable learning experience, making it easier for students to understand abstract scientific concepts. Of the various types of materials studied, interactive multimedia emerged as the most dominant material used in 4 studies (24%), followed by digital comics in 3 studies (18%). These two types of material are considered the most impressive because they are able to combine visual, narrative and interactive aspects in a balanced way. Digital comics play an important role in increasing students' motivation and scientific attitudes, while interactive multimedia is effective in strengthening critical thinking skills and scientific reasoning. Apart from that, virtual laboratories, flipbooks, and interactive e-modules have also been proven to support scientific exploration and data analysis skills. Further analysis shows that the aspect of scientific literacy that is most improved is understanding scientific concepts (64.7%), followed by scientific processes (23.5%), and the context of scientific applications (11.8%). This shows that interactive materials are more oriented towards strengthening concepts and basic scientific thinking skills as the basis of science learning.

Putri Haryani's 2025 study showed that digital learning media using artificial intelligence (AI) significantly contributed to improving the quality of science and science learning in elementary schools. Innovative media such as Augmented Reality, Smart E-Comics, Creating Apps, interactive videos, and digital evaluation platforms have been proven to help students understand concepts better, increase learning interest, and encourage activeness through more flexible, visual, and interactive learning experiences. AI technology also makes learning more personalized by adjusting the level of material difficulty to each student's ability, thus supporting equitable improvement in learning outcomes. However, the use of AI still faces obstacles, particularly in teachers' digital skills,

limited technological resources, and the need for more complex teaching preparation. Therefore, adequate infrastructure and training support are needed for optimal implementation in science and science learning.

Research conducted by Rahmat Saputra in 2025 stated that the integration of Artificial Intelligence (AI) in education has been proven to significantly increase student learning motivation. AI is not only a tool for automation, but also a driver that can provide a more interactive, personal, and customizable learning experience compared to traditional learning media. Key features such as immediate feedback, customized learning paths, and intelligent gamification elements have been proven to meet students' psychological needs for freedom and ability. This directly reduces academic burnout after the pandemic and revitalizes students' interest in understanding lessons.

Research conducted by Arda Purnama Putra in 2024 stated that the use of Artificial Intelligence (AI) in education, particularly at the elementary school level, has had a significant positive impact. AI allows learning to be tailored to each student's needs, increases their interest in learning, and provides fast and accurate feedback. Furthermore, AI helps teachers manage classes more efficiently and reduces administrative tasks, allowing them to focus more on direct interactions with students.

Based on research conducted by Ndah Aulia Putri in 2025, the synthesis results showed that integrating AI platforms can help teachers become more efficient, facilitate access, and increase student learning interest through interactive visualizations. However, the use of AI is still limited by teachers' digital capabilities, the need for support from teachers, and the inability of AI to replace emotional support provided by teachers. Nevertheless, existing uses of AI show positive developments, such as the spread of inclusive education access and the integration of immersive technology to enhance sensory experiences and responsiveness.

Research conducted by Arnolus Juantri E. Oktavianus in 2023 stated that the use of AI in learning and assessment in today's digital age has great potential to improve the quality of education, enhance students' learning experiences, and help them develop skills relevant to future needs. Wisely and sustainably, the use of this technology can have a significant positive impact in preparing the next generation to face challenges worldwide.

Based on research conducted by Dane Keisya Purnama in 2025, it was stated that the use of artificial intelligence (AI) in education offers many opportunities, but also brings significant challenges. Some of the opportunities offered include the ability to customize the learning process to suit the needs of each student, increase efficiency in educational administration by automating routine tasks, expand access to online learning, especially for students living in remote areas, and provide analytical support and early intervention for teachers to help identify obstacles faced by students in learning.

Research conducted by Dhiya Ulfah Fathin in 2024 stated that the use of AI technology in education offers many important benefits, especially in improving the quality of learning in elementary schools. AI can adapt learning materials and teaching methods. Teaching is tailored to the needs, learning styles, and level of understanding of each student. This makes the learning experience more tailored and effective. AI can also act as a virtual

teacher to help students understand difficult concepts. The positive impact of AI use is seen in improved student learning outcomes, who can learn at their own pace and style. This helps strengthen understanding, memory, interest, and motivation to learn. With AI's ability to analyze learning data, teachers can discover learning styles, assess students' strengths and weaknesses, and provide more appropriate and effective guidance.

Based on research conducted by Ika Ratnaningrum in 2023, it was stated that the use of technology in art learning in elementary schools to teach theory involves the use of AI media with educational games, which can also help find materials and answer questions. In addition, AR is used to provide written homework and animated images. For practical materials, AI media is used through educational games or games, so students can play while learning. With AR media, students are invited to create interactive works of art, and with VR media, they can see the artwork in real life. The use of AI media in art learning in elementary schools can utilize five applications: Virtual Mentor, Voice Assistant, Smart Content, Presentation Translator, and Automatic Assessment.

Research conducted by Muhammad Hidayatullah in 2025 stated that AI has a significant positive impact on education. This technology helps students more easily search for information and develop their understanding independently. However, the use of this technology can be problematic for students without proper supervision and guidance. The main problem that may arise is dependence on AI and a decline in students' thinking skills. Therefore, students' use of AI needs to be directed so that it is not only practical, but also educational, reflective, and focused on developing critical thinking skills and digital literacy.

Based on the article selection process using the *Systematic Literature Review* (SLR) method, 10 articles were found relevant to the research focus on the use of interactive learning media based on *Artificial Intelligence* (AI) in Elementary Schools (SD). The literature analysis shows that the use of digital interactive learning media has a significant impact on improving elementary school students' cognitive abilities and basic literacy. The integration of AI technology into interactive learning media brings about a significant transformation, from static-linear media to personalized, adaptive, and immersive media.

Conclusion

Based on the results of data analysis and synthesis using the *Systematic Literature Review* (SLR) approach to relevant literature, it can be concluded that the use of interactive learning media assisted by *Artificial Intelligence* (AI) has proven to be very effective in improving digital literacy, motivation, and conceptual understanding of students at the Elementary School (SD) level. AI integration transforms conventional interactive learning media into more dynamic ones through three main contributions Personalized Learning: AI is able to adapt the material and learning pace to the individual abilities of students (*adaptive learning*). Immersive Experience and Content Quality: The use of technologies such as *Augmented Reality* (AR), *Virtual Reality* (VR), digital comics, and AI-based interactive multimedia has succeeded in concretizing abstract material and increasing students' sensory engagement. Classroom Management Efficiency: AI assists teachers through virtual

assistant features and automated assessments, allowing teachers to focus more on students' emotional engagement.

References

Azmi, K., Mukhtar, L., & Burhan, LI (2025). Improving the Quality of Elementary School Education through a Digital Literacy Approach in 3T Regions. Journal of Community Service and Appropriate Technology Innovation, 1(01), 1-11.

Effendi, D., & Wahidy, A. (2019, July). Utilization of technology in the learning process towards 21st-century learning. In Proceedings of the National Seminar on Postgraduate Programs, PGRI University, Palembang (Vol. 4, pp. 125-129). Suyuti, S., Ekasari Wahyuningrum, PM, Jamil, MA, Nawawi, ML, Aditia, D., & Ayu Lia

Hariyasasti, Yayuk. "Technological literacy and the use of digital tools in elementary schools." IJOSPOL-International Journal of Social, Policy and Law 6.3 (2025): 13-29.

Hasnida, SS, Adrian, R., & Siagian, NA (2024). Educational transformation in the digital era. *Indonesian Education Star Journal* , *2* (1), 110-116.

Intaniasari, Y., & Utami, RD (2022). Cultivating a Reading Culture in Students Through Digital Literacy in Learning and School Literacy Programs. Basicedu Journal, 6(3), 4987–4998.

Khosibah, SA, Rahmaningrum, A., & Kusumawardani, CT (2025). Potential and practice of artificial intelligence (AI) literacy in early childhood education in Indonesia: Systematic literature review. JEA (Jurnal Edukasi AUD), 11(1), 55-69.

Kurniawan, H., WU, AS, & Tambunan, RW (2024). The potential of AI in enhancing creativity and literacy in Indonesian language learning. JAMI: Jurnal Ahli Muda Indonesia, 5(1), 8-15.

Naila, I., Ridlwan, M., & Haq, MA (2021). Digital literacy for elementary school teachers and students: Content analysis in learning. Elementary Education Review Journal: Journal of Educational Studies and Research Results, 7(2), 166-122.

Pratama, S., Ashari, M., Zulkarnain, SAB, & Sabrina, E. (2025). The importance of digital literacy in education: Transforming learning in the digital era. Journal of Educational Science Studies (JKIP), 6(2), 554-561.

Rusmayani, NG (2023). Analysis of the effectiveness of technology use in education on improving learning outcomes. Journal on Education, 6(1), 1-11.

Saba, SS (2024). Optimizing the use of technology in the learning process to increase student effectiveness. JME Journal of Management Education, 2(02), 57-63.

Sadriani, A., Ahmad, MRS, & Arifin, I. (2023, July). The role of teachers in the development of educational technology in the digital era. In *National Seminar on the 62nd Anniversary* (Vol. 1, pp. 32-37).

Saputra, IA, Ramadhani, A., Khairunnisa, MZ, & Ainiyah, N. (2024). The influence of digital literacy on academic achievement of senior high school students. Journal of Educational Sciences and Learning, 3(1), 25-31.

Septia, T., & Wahyu, R. (2023). Students' Digital Literacy in Geogebra-Integrated Geometry Learning. Plusminus: Journal of Mathematics Education, 3(1), 51–60.

Subhan, A. (2023). Ethics of Using Technology in Learning. Al Qalam: Journal of Religious and Social Sciences, 17(5), 3723-3730.

Sucianingtyas, R., Falistya, LR, Pujiana, S., Prayogi, A., & Laksana, SD (2025). A Study of Various Artificial Intelligence (AI) in Education. Madani: Multidisciplinary Scientific Journal, 3(2), 232-243.

Widyawati, AD, & Karina, C. (2025). The importance of digital literacy in elementary schools: Equipping students for the future. Scientific Journal of Elementary Education (JIPDAS), 5(2), 917-923.

Yulianti, G., Bernardi, B., Permana, N., & Wijayanti, FAKW (2023). Transforming Indonesian education: Implementing the potential of artificial intelligence (AI). Journal of Information Systems and Management (JISMA), 2(6), 102-106.

Zakiyah, NU, Ameera, V., Ritonga, AE, Aisah, N., Lingga, SA, & Akmalia, R. (2024). The use of AI in education. Mahira, 4(1), 1-16.