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The Role of Technology-Based Learning in Elementary Education: A Literature Review

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ABSTRACT

This literature review highlights the important role of technology-based learning in elementary education. Through the literature review method, this study presents the influence of technology on increasing student participation, creativity, and understanding. Educational technology, such as interactive software and audiovisual media, has been proven to attract active student participation, enrich creativity, and facilitate understanding of difficult concepts. Although useful, the application of technology in elementary education faces challenges such as limited access, infrastructure, and lack of training for teachers. This study recommends support from the government and related parties in providing access to technology and training for teachers to support effective and equitable technology-based learning.

Keywords: Technology-based learning, elementary education, creativity, student participation, conceptual understanding, digital literacy, infrastructure challenges, teacher training.

INTRODUCTION

Technology plays an essential role in supporting the learning process in elementary education, especially in today's digital era. Technology is not just a tool, but has become a main pillar in improving the quality and effectiveness of learning. Technology enables learning methods that are more interactive, interesting, and relevant to the needs of today's students. By utilizing digital devices, teachers can design more innovative learning activities, so that the learning process in the classroom becomes more dynamic and enjoyable (Aji Silmi & Hamid, 2023; Rohmah et al., 2023).

Technology-based learning approaches in elementary education have been shown to have great potential to increase student participation. This active participation is an important key in achieving learning goals. Technology, such as educational software, learning applications, and audiovisual media, helps

ELEMENTARY EDUCATION REVIEW
NUSANTARA
https://jurnal-nusantara.bangangga.com/
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Vol 1 No. 1, Desember, 2024
DOI:

students to be more actively involved in the classroom. Digital media makes the learning process more interactive so that students feel more comfortable and interested in learning. According to research Asmara et al., (2023) the presence of learning-based technology that utilizes visual and interactive elements has been proven to encourage students to be more active in asking questions, solving problems, and following teacher instructions better.

In addition to encouraging participation, the use of technology in learning is also effective in fostering student creativity in elementary education. Digital tools, such as creative applications and content development software, allow students to express themselves more freely and boldly. For example, with drawing applications or science simulations, students can explore their ideas directly through visualization, which enriches their imagination and critical thinking skills. Research shows that the integration of technology in early childhood learning plays a significant role in stimulating children's creativity through active interaction with visual, animated, and educational media (Asmara et al., 2023). Technology-based learning also allows students to learn independently, where they can explore new knowledge with little guidance from teachers, which ultimately enhances students' creativity and personal initiative (Rohmah et al., 2023).

Technology is also very useful in improving students' understanding of the subject matter. Through various media, such as images, videos, and animations, complex materials can be presented in a more interesting and easy-to-understand way. Several studies have shown that visual and audiovisual content makes it easier for students to digest information that is difficult to explain with text or speech alone. With the help of technology, abstract concepts that are usually difficult for students to understand become more concrete and easier to learn (Zahwa & Syafi'i, 2022). Further research also shows that students who learn using technology have better retention of the material they learn, because they not only receive information passively but are also actively involved through various forms of interactive media (Aji Silmi & Hamid, 2023).

However, although the benefits of technology-based learning are quite significant, its implementation in the field often faces a number of challenges. One of the biggest obstacles is the limited accessibility of technology, especially in remote areas or for students from low economic backgrounds. Another influencing factor is the lack of adequate infrastructure and training for teachers to optimally utilize technology in the teaching and learning process (Aji Silmi & Hamid, 2023). Some teachers still face difficulties in operating technological devices or designing learning materials that are appropriate to technology (Nangimah & Dharin, 2023). To overcome this, support and cooperation are needed from various parties, including government, schools, and the community, so that technology can be utilized optimally and evenly in all regions (Zahwa & Syafi'i, 2022).

Overall, technology-based learning offers a comprehensive approach to improving the quality of basic education in Indonesia. By ensuring equitable access to technology devices and training teachers to integrate technology effectively, schools can prepare students to face the challenges of the digital era with

ELEMENTARY EDUCATION REVIEW
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DOI:

adequate skills. Continued support from the government and education stakeholders is needed to create a modern, inclusive, and technology-based learning environment for the next generation (Zahwa & Syafi'i, 2022)

LITERATURE REVIEW

Technology in elementary education has been shown to increase active student participation. Technologies such as learning applications and interactive media encourage students to be more actively involved during the learning process. Studies show that through blended learning, students are more motivated to ask questions, answer questions, and complete assignments (Rohmah et al., 2023). The use of technology-based media provides students with the opportunity to develop creativity through digital tools that support the exploration of ideas and problem solving. Various studies indicate that technology allows students to learn independently and creatively, stimulates imagination and improves their critical thinking skills (Asmara et al., 2023).

Technology enables the presentation of material that is easier to understand through visualization and interaction. Learning media such as videos, animations, and simulations help students understand abstract concepts more concretely. The use of visual elements in learning also plays a role in increasing students' memory of the material (Aji Silmi & Hamid, 2023).

Despite its great benefits, there are various obstacles in implementing technology in primary education, such as limited access to technological devices and internet connections, especially in remote areas. In addition, the lack of training for teachers in utilizing technology effectively is a challenge in implementing it in the classroom (Rohmah et al., 2023). To optimize the benefits of technology in learning, support in the form of providing technology infrastructure and teacher training is essential. This support will ensure that teachers can integrate technology optimally in the classroom, so that students can feel the benefits of technology-based learning as a whole (Zahwa & Syafi'i, 2022). Technology-based learning provides a strong foundation for the development of 21st century skills among students. In addition to helping achieve learning objectives, technology equips students with future-relevant digital skills, preparing them for an increasingly technology-dominated world (Asmara et al., 2023)

METHOD

The method used in writing this article is the literature review method, which aims to identify, analyze, and synthesize various previous studies related to technology-based learning in elementary education. This method is carried out by collecting data from various scientific sources, such as journals, articles, and books, which are relevant to the research topic. The literature used comes from studies that discuss the role of technology in increasing student participation, creativity, and understanding, as well as the challenges faced in its implementation. This approach allows the author to present a comprehensive picture of the topic, by identifying patterns, trends, and problems that arise from various studies that have been conducted previously.

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NUSANTARA
https://jurnal-nusantara.bangangga.com/

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Vol 1 No. 1, Desember, 2024
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The data collection process was carried out systematically through searching relevant academic databases and journals. Each literature used has been selected based on its direct relevance to the topic and the actuality of the findings produced. The analysis technique used involves narrative synthesis, where findings from various literatures are combined in a coherent narrative to describe the influence of technology on learning in elementary education. The results of this literature review are expected to provide in-depth insight into the benefits and challenges faced in implementing technology-based learning, as well as provide recommendations for more effective development and implementation in the future.

RESULT AND DISCUSSION

The results of this literature review show that technology-based learning has a significant impact on improving the quality of basic education. One of the main results is increased student participation in the learning process. The study conducted byRohmah et al., (2023)on the use of technology-based learning media in elementary schools shows that technology can make students more actively involved. Interactive media that utilizes technology such as educational applications and digital visualizations, can create an interesting learning environment that encourages students to participate more enthusiastically. This involvement is key to improving understanding of the material and achieving learning objectives optimally (Asmara et al., 2023).

The review results also highlight the important role of technology in developing student creativity. Digital-based learning has the potential to improve students' understanding of learning content and motivation in elementary science lessons (Hussein et al., 2019). The use of technology in primary education can improve digital literacy in students (Kailani et al., 2021). The use of other technologies such as design applications and creative visual tools, allows students to experiment with new ideas and express their imagination through digital media. Several studies have found that technology can stimulate students' critical thinking and problem-solving skills through activities that allow them to explore independently (Asmara et al., 2023). By providing access to a variety of digital tools, technology supports students in developing creative skills that are useful for the future.

In terms of understanding the material, technology helps students digest complex learning content through various media, such as images, videos, and simulations. Various journals analyzed show that visual technology, such as animation or science simulations, makes it easier for students to understand abstract concepts more concretely and visually (Aji Silmi & Hamid, 2023; Zahwa & Syafi'i, 2022). Presenting material with technology helps students process information better, improves memory, and strengthens their long-term understanding. This shows that technology is not only a tool, but also a major component in the learning process that deepens students' knowledge.

However, despite the many benefits of technology, the results of this review also reveal several challenges in its implementation. The main obstacle that often arises is limited access to technological devices in some areas, especially in remote areas or for students from low-income economic backgrounds (Zahwa & Syafi'i, 2022), unstable internet connection and lack of availability of necessary devices (Kurniawati et al., 2022). In addition, there is still a gap in teacher competency in operating technology

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NUSANTARA
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effectively. Many teachers have not received adequate training to integrate technology into learning, which ultimately limits the effectiveness of technology use in the classroom (Vogt & Westerlin, 2021).

Overall, the results of this literature review emphasize that despite the challenges, technology has great potential to increase student participation, creativity, and understanding in primary education. To maximize the benefits of technology, support is needed in the form of increasing device accessibility and training for teachers. With this support, the implementation of technology in primary education is expected to provide a more equitable and sustainable impact, thus creating a modern and effective learning environment for all students.

CONCLUSION

Technology-based learning plays an important role in primary education with various benefits such as improving digital literacy and student engagement. Technology-based learning has great potential to improve students' understanding of content, motivation, and digital literacy in primary education. Despite challenges such as infrastructure and teacher training, technology integration in learning can provide significant benefits if implemented well. However, challenges such as infrastructure and teacher training need to be addressed to maximize the potential of technology in learning. Collaboration between teachers, principals, and parents as well as the development of technology-based curriculum and learning media are essential for the success of technology integration in primary education. Further research is needed to explore the effectiveness of various technology-based learning methods and overcome existing obstacles.

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ELEMENTARY EDUCATION REVIEW
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