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Internet-based learning in improving student digital literacy

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ABSTRACT

Internet-based education has become an integral aspect of contemporary education and plays a crucial role in enhancing the digital literacy of elementary school students. With learning tools and applications, elementary school kids can enhance their digital abilities and comprehend topics and principles in a more dynamic, entertaining, and efficient manner. In addition, internet-based learning helps students prepare for an increasingly technological future and improves their teamwork and communication abilities. Nonetheless, schools and educational institutions must ensure that students receive the required training and direction to enhance their digital literacy through internet-based learning. The purpose of this research is to identify factors that influence the digital literacy of elementary school students through internet-based learning, analyze the information synthesis, and provide recommendations and suggestions for schools and educational institutions to improve the digital literacy of elementary school students through internet-based learning, namely the development of internet-based learning media in an effort to evaluating and comprehending how internet-based learning influences the digital literacy of elementary school students is necessary for research purposes to determine the function of internet-based learning in enhancing the digital literacy of primary school students.

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INTRODUCTION

Knowledge and mastery of internet-based learning is essential for teachers and students. The advancement of information technology makes learning simpler, more efficient, and more enjoyable. Internet, learning software, and mobile devices enable students and teachers to learn and teach at any location and time. Teachers and students can access instructional resources from

anywhere and at any time via internet-based learning(Fauzi et al., 2023; Muhammad Wali et al., 2023; Sudipa, Kharisma, et al., 2023). This simplifies the teaching and learning process and increases the flexibility and efficiency of learning. Internet-based education also facilitates student and instructor access to a variety of educational resources, including videos, documents, and learning applications.

The development of information technology also helps make learning more interactive and fun(Sudipa, Rahman, et al., 2023). Internet-based learning applications offer a more enjoyable learning experience and help students understand concepts and principles in an easier way. Internet-based learning or better known as e-learning has a very important role in increasing students' digital literacy. In today's digital era(Sagena, 2020)The ability to use technology and information is needed by students to be able to compete and adapt to the times.

There are various kinds of internet-based learning which have various benefits for students and teachers in increasing the digital literacy of elementary school students(Virgana et al., 2022). The benefit for students is that internet-based learning helps students strengthen their digital skills, understand concepts and principles in a more interactive and fun way, and prepare for a future that is increasingly connected to technology.

The benefit for teachers is that internet-based learning helps teachers increase the effectiveness of their learning by providing applications and technologies to help understand concepts and principles in a more interactive and fun way. Collaboration and communication skills: Internet-based learning helps students and teachers strengthen their collaboration and communication skills through interaction with digital environments and with their peers and teachers. Information-seeking skills: Internet-based learning helps students and teachers strengthen information-seeking skills and understand how to use technology to find the information they need(Sagena, 2017). Improved learning outcomes: Internet-based learning helps improve student and teacher learning outcomes in a more interactive, fun and effective way.

Internet-based learning, for example, E-learning can be an alternative learning media in offering various advantages for students, such as time and place flexibility, easy access to learning resources, and the availability of various types of interactive and interesting learning media. With internet-based learning, students can study material at their own pace and easily repeat material that is poorly understood.

To increase students' digital literacy, e-learning must be equipped with various facilities and features that make it easier for students to understand and apply technology and information. Several things that need to be considered in internet-based learning include quality learning content, user-friendly interfaces, as well as discussion and question and answer facilities that allow students to interact with teachers and classmates. In addition, e-learning must also be supported by development students' soft skills such as critical thinking skills, communication, and cooperation. In internet-based learning, students not only learn the material, but also must have the ability to apply and apply the material in everyday life.

Several studies related to internet-based learning for school students in an effort to increase digital literacy, namely by(Elfaki et al., 2019; Jawad & Shalash, 2020; Sandybayev, 2020)which shows that internet-based learning has a positive impact on achievement and motivation of elementary school students. Other research by(Sumadi et al., 2022; Wardhani, 2020)which shows that internet-based learning is effective in improving the learning outcomes of primary school students and strengthening their digital skills. Other research shows that internet-based learning has a positive impact on elementary school students' reading and writing skills(Andhini & Sakti, 2021; Lestari et al., 2023). Research by(Abdurrahmansyah et al., 2022; Kraugusteeliana et al., 2022)this shows that internet-based learning has a positive impact on students' cognitive development and understanding of digital literacy in elementary schools(Soulisa et al., 2022).

Previous research has shown that internet-based learning has a positive impact on elementary school students and helps students improve digital literacy. However, it is important

for schools and educational institutions to ensure that they provide sufficient access and resources, as well as ensure that students receive the appropriate training and guidance to use technology properly and effectively(Muhammadiah et al., 2021).

Based on previous research, this study aims to identify the factors that influence elementary school students' digital literacy through internet-based learning. as well as To identify challenges and obstacles in the implementation of internet-based learning and provide solutions to solve these problems. To provide recommendations and suggestions for schools and educational institutions to improve digital literacy of elementary school students through internet-based learning(Abdullah, Sastraatmadja, et al., 2023). So that it can provide research benefits to know the role of internet-based learning in increasing digital literacy of elementary school students is to evaluate and understand how internet-based learning affects digital literacy of elementary school students.

RESEARCH METHODOLOGY

The method in this study uses a literature review approach, which is a research method that can be used to evaluate literature and other resources related to internet-based learning in increasing elementary school students' digital literacy. There is a process of identifying problems and research objectives followed by looking for references from previous research related to internet-based learning in increasing digital literacy of elementary school students, such as journals, books, and online databases(Sugiyono, 2016). The next process is to carry out the synthesis and analysis of important information related to research problems and objectives, the final stage is to make conclusions from the synthesis of information in order to answer the problems and research objectives(Sugiyono, 2019). The research flow can be seen in figure 1 below.
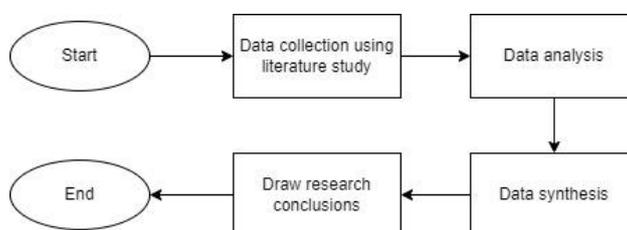

Figure 1. Research Flow

RESULTS AND DISCUSSIONS

3.1. The Importance of Understanding and Mastering Internet-Based Learning Media

Knowledge and mastery of internet-based learning is very important for teachers and students. There are several important things for teachers and students in understanding and mastering the use of learning media Internet-based namely:

a) Preparation for the future: The world of education and work today is very much connected to technology, so it is very important for teachers and students to prepare themselves with the right skills and understanding of internet-based learning.

b) Collaboration and communication skills: Internet-based learning helps teachers and students strengthen their collaboration and communication skills through interaction with digital environments and with their friends and teachers.

c) Information seeking skills: Internet-based learning helps teachers and students strengthen information seeking skills and understand how to use technology to find the information they need.

d) Problem-solving skills: Internet-based learning helps teachers and students strengthen their problem-solving skills through interaction with learning technologies and applications.

e) Improved learning outcomes: Internet-based learning helps improve teacher and student learning outcomes in a more interactive, fun and effective way.

As such, knowledge and mastery of Internet-based learning are critical skills and understandings for teachers and students and help prepare them for a future that is increasingly connected to technology. Therefore, it is important for schools and educational institutions to ensure that teachers and students receive appropriate training and guidance to increase their knowledge and mastery of internet-based learning.

3.2. The Role of Internet-Based Learning with Increasing Student Digital Literacy

Internet-based learning has a close relationship with increasing digital literacy in elementary school students. The following are several ways that internet-based learning can help improve digital literacy of elementary school students, namely:

a) Access to information: Internet-based learning gives students access to search and find information online, helping them improve their information-seeking skills and use of technology.
b) Digital skills: Internet-based learning helps students strengthen their digital skills, such as using technology tools, applications, and software, helping them prepare for a future that is increasingly connected to technology.
c) Understanding of concepts: Internet-based learning helps students understand concepts and principles in more interactive and fun ways, such as through simulations, animations and games.
d) Collaboration skills: Internet-based learning helps students learn to cooperate and coordinate with other students online, helping them strengthen collaboration and communication skills.

Thus, internet-based learning has an important role in helping elementary school students improve their digital literacy. However, it is important for schools and educational institutions to ensure that students receive the proper training and guidance to use technology properly and effectively.

3.3. Examples of Platforms in Internet-Based Learning in Elementary Schools

Here are some examples of internet-based learning applications that can be used to improve digital literacy of elementary school students, namely Kahoot. This application allows students to create and take interactive quizzes and assignments. This helps increase motivation and makes learning more enjoyable. Scratch: This app helps students learn programming concepts and create interactive projects via a drag-and-drop interface. Prodigy Math Game: This app helps students learn math in a fun way through interactive games and assignments. Quizlet: This app helps students learn concepts and principles through interactive flashcards, quizzes, and assignments. Code.org: This app helps students learn programming through interactive tutorials and hands-on projects. Duolingo: This app helps students learn a foreign language through games and interactive assignments. These apps help improve elementary school students' digital literacy by making learning more interactive, fun, and effective. However, it is important for schools and educational institutions to ensure that the application chosen meets the stated learning objectives and is appropriate to the level of understanding and skills of students.

3.4. Internet-Based Learning Recommendations in Technology and Innovation

The development of internet-based learning in the era of society 5.0 will continue and experience significant developments, this research can recommend types of internet-based learning that can be implemented in an effort to increase digital literacy in students, namely:

a) Interactive learning: Augmented Reality (AR) and Virtual Reality (VR) allow students to interact with virtual environments and make learning more fun and engaging. Students can explore virtual environments, interact with objects, and try out experiments and simulations

that are not possible in a real environment. Improved practical skills: AR and VR allow students to carry out practicals and exercises in a virtual environment, helping them improve their practical skills. This could include skills such as cooking, repairing machines or running business simulations. Situational learning: AR and VR can help students understand concepts and principles by creating learning situations that are more realistic and based on real situations. This can help students understand concepts better and improve their understanding. Individual learning: AR and VR allow students to move at their own learning level, helping them understand the material better and minimizing anxiety and stress. The development of internet-based learning using AR and VR helps create a more interactive, fun, and effective learning environment for student. It also helps prepare students for a future that is increasingly connected to technology.

b) The development of internet-based learning using gamification (learning using game elements) is one of the newest trends in education. The following are some developments in internet-based learning using gamification: Fun learning: Gamification makes learning more fun and engaging for students. Students can learn through games, solving puzzles, and interacting with virtual environments. Increase motivation: Gamification helps increase student motivation by providing rewards and challenges that motivate them to learn more and deeper. Improvement of digital skills: Gamification helps students improve their digital skills through interaction with technology and gaming applications. This helps prepare students for a future that is increasingly connected to technology. Individualized learning: Gamification allows students to move at their own learning level, helping them understand the material better and minimizing anxiety and stress. The development of internet-based learning with the use of gamification helps make learning more fun and effective for students. It also helps prepare students for a future that is increasingly connected to technology and games. However, it is important for schools and educational institutions to ensure that the game element in learning does have a positive impact on student learning outcomes and meets the stated learning objectives.

3.5. Challenges and Solutions in the implementation of internet-based learning for digital literacy improvement

For schools and educational institutions, it is very necessary to utilize the internet to improve digital literacy skills for teachers and students, but in reality there are several challenges for schools in implementing the internet as a means of supporting the learning process.Here are some challenges in implementing digital literacy in students through the internet:

a) Unequal internet access: Many students do not have stable and fast enough internet access at home, making it difficult for them to participate in online learning.

b) Lack of technology devices: Some students may not have the necessary technology devices such as computers or tablets to participate in online learning.

c) Inability to use technology: Many students lack the ability to use technology effectively, such as operating a computer or using online learning applications.

d) Lack of social interaction: Online learning can make students feel less connected to their peers and teachers.

e) Lack of motivation: Some students may feel less encouraged to learn due to the absence of direct interaction with their teachers and peers.

f) Lack of quality of learning resources: Many online learning resources do not meet quality standards and cannot be relied upon to provide quality learning.

g) Security and privacy: Online learning can pose security and privacy issues, such as identity theft or misuse of personal information.

Many variables, such as infrastructure preparation in schools, human resource readiness, security guarantees and privacy of user credential data, and usage monitoring, can surely shed light on a number of the difficulties that contribute to the failed implementation of the Internet.

Clearly, problem-solving solutions are required when implementing internet usage in relation to enhancing digital literacy; therefore, this research can offer different problem-solving solutions connected to issues that schools in various areas may experience. Table 1 outlines the difficulties and solutions associated with increasing digital literacy through Internet usage.

Table 1.
Challenges and Recommended Solutions for Internet Utilization

Challenges	Recommended Solutions
Limited internet access	Provide free or low-cost internet facilities for students in need, use offline technology that allows students to access learning materials without having to be connected to the internet, or use the school network to facilitate online learning.
Lack of technology devices	Procure technology devices for students in need, provide computer facilities at school, or cooperate with private parties to provide technology devices for students
Lack of ability to use technology	Provide training or guidance to students to use technology well, create video tutorials or easy-to-understand guides, or provide technical assistance facilities for students in need
Lack of social interaction	Provide platforms that allow students to interact online, such as discussion forums, group chats, or video calls.
Lack of motivation	Pprovide challenging and fun tasks and activities, provide online support and guidance to help students stay motivated to learn, or hold online competitions to motivate students.
Lack of quality learning resources	Filtering learning platforms that can be used by students to support learning.

Teachers and students must prepare themselves with the necessary abilities and understanding of internet-based learning, according to research by (Arifin et al., 2023) (Riyanti, 2022). The ability to find relevant information can support teachers and students in implementing internet-based learning to strengthen problem-solving skills (Muliadi et al., 2022) (Taryana et al., 2023) through interaction with technology and learning applications and can improve learning outcomes with Internet-based learning (Kamaruddin et al., 2022) (Abdullah, Poetri, et al., 2023; Yusuf et al., 2022)

According to (Widianto et al., 2022) , internet-based learning helps primary school students improve their digital literacy by providing access to online information, enhancing digital skills, fostering a more interactive understanding of concepts, and fostering collaboration and communication abilities. While implementing technology, schools and educational institutions must guarantee that students receive the required training and direction to use it effectively (Sudipa, Rahman, et al., 2023; Supatmin et al., 2022; Sutarwiyasa et al., 2022).

According to (Lapasau et al., 2022), internet-based learning applications such as Kahoot, Scratch, Magic Math Game, Quizlet, Code.org, and Duolingo can be used to improve the digital literacy of elementary school students by making learning more engaging and interactive (Muhammadiah et al., 2022). However, schools and educational institutions must ensure that the applications selected are suitable for the learning objectives and the students' level of comprehension and skills (Adnyana et al., 2019; I. N. T. A. Putra et al., 2021).

The function of schools and educational institutions in utilizing the internet to promote digital literacy among instructors and students can be carried out concurrently with substantial technical advancements

(Nastiti & Ni'mal'Abdu, 2020; Soesana et al., 2022). Internet-based learning using AR and VR is recommended as an effort to improve students' digital literacy, which is supported by research by (Solehatin et al., 2023) (Aditama et al., 2022; Rachmadtullah et al., 2023; Sudipa et al., 2022b), with benefits including interactive learning, practical skills improvement, situational learning, individual learning, and a more interactive, fun, and effective learning environment in (I. N. A. S. Putra, 2021; Sudipa et al., 2022a; Yusa et al., 2021). Using gamification for internet-based learning is the latest trend in education, according to the findings of a study (Wu, 2018). According to studies (Karagiorgas & Niemann, 2017; Syah et al., 2023), gamification makes learning more enjoyable and engaging, boosts student motivation and digital abilities, and allows personalised learning (Sari et al., 2019). Nonetheless, schools and educational institutions must guarantee that game components positively impact learning outcomes and achieve learning objectives.

In implementing internet-based learning in support of digital literacy, there are always problems and impediments for schools and educational institutions. According to research, school dedication in facilitating both infrastructure and technology-based learning is crucial for its successful operation (Alfiyanto & Hidayati, 2022). In addition, the readiness of human resources, including teachers, students, and school administrators, to grasp the use of technology merits consideration, as shown by research (Iswatiningsih, 2021). Government attempts to equalize broadband networks in rural areas so that they can support internet-based learning technologies are also crucial (Dewantara et al., 2022). In this study, recommendations are made for overcoming the obstacles faced by schools, including preparing infrastructure and human resources, which can be done by conducting training and transferring knowledge about the benefits and drawbacks of using the internet for learning, and providing learning platforms that are in line with learning and teaching objectives (Ahsani et al., 2021).

CONCLUSION

Internet-based education has a significant impact on the digital literacy of elementary school children. By utilizing learning technologies and applications, students can enhance their digital abilities, gain a more dynamic and enjoyable understanding of topics and principles, and prepare for a future that is increasingly dependent on technology. Nonetheless, schools and educational institutions must ensure that students receive the required training and direction to enhance their digital literacy through internet-based learning. Internet-based education plays a crucial role in enhancing the digital literacy of elementary school kids and preparing them for future success. The contribution of this study is to evaluate and comprehend how internet-based learning affects the digital literacy of elementary school students in order to recommend the development of internet-based learning media in an effort to improve students' digital literacy, specifically through the use of AR/VR in learning and gamification in learning media. Using diverse learning material with the usage of AR/VR visualization or gamification components is suggested for future research. Suggestions for future research regarding the implementation of the Internet in digital literacy include conducting an evaluation survey regarding the benefits of using the Internet in supporting the understanding of digital literacy for students and teachers, in order to obtain solutions that can be evaluated for their usefulness in the learning process.

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