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Use of Interactive Multimedia to Improve Digital Literacy in Elementary Schools

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ABSTRACT
Objective: *Technological developments in the industrial era 4.0 have had a significant impact on the transformation of education. The use of interactive multimedia in elementary schools is one of the important steps to prepare students to face the demands of the digitalization era.* ***Method:*** *This research uses descriptive qualitative methods with stages including data collection, data reduction, data display, and conclusion drawing or verification. The data collection technique carried out is secondary data, namely data collected indirectly on the object being studied in the form of several national and international journals that can be accounted for. The purpose of this study is to explain how the use of interactive multimedia can improve learners' ability in digital literacy skills. Keywords such as interactive multimedia, concept understanding, and digital literacy were used to select this research article.* ***Results:*** *The result of this study is that the use of interactive multimedia in learning can improve digital literacy skills in elementary school students. The use of interactive multimedia in improving digital literacy in elementary schools brings many novelties that can provide a more dynamic and effective learning experience.* ***Novelty:*** *By continuing to integrate this interactive learning multimedia innovation in basic education, it is expected that students can be better prepared to face the demands of digital literacy in today's digital era.*

INTRODUCTION

Industry 4.0 is developing rapidly and spreading to various societies. The development of technology such as the Internet is very important for the world of education (Ketut Sudarsana et al., 2019; Li, 2021). With the internet, the world of education can provide services anytime and anywhere (Radhika, 2023; Sharma, 2023). Since the internet is easily accessible, students can utilize it for various purposes, such as finding learning resources to increase their knowledge and getting a learning experience different from the usual ones in the classroom, where learning resources are only limited to teachers and books.

Based on the results of the Indonesian Internet Service Providers Association (APJII) Survey, internet penetration in Indonesia has reached 78.19 percent in 2023, or penetrated 215,626,156 people from a total population of 275,773,901 people. Chairman of APJII, Muhammad Arif, said that when compared to the survey of the previous period, Indonesia's internet penetration rate this year increased by 1.17 percent. The use of the internet and the ability of many people to assess the truth of media information sources through digital technology is still minimal. This ability is known as digital media literacy. Without digital media literacy, Indonesian internet users are overwhelmed with fake news on various social media platforms (Yati, 2023).

According to Hamalik stated that the use of media in learning is a learning and teaching process that can trigger student desires and interests, provide motivation and stimulate the learning process, and have a psychological impact on students (Kustandi &

Darmawan, 2020). According to Kristanto learning media is anything that can be used to channel the message, so it can stimulate the attention, interest, thoughts, and feelings of students in learning activities to achieve learning objectives (Kristanto et al., 2017). According to Kristanto learning media is anything that can be used to channel the message to achieve learning objectives (Kristanto et al., 2018). This is in line with Kustandi & Sutjipto (2019) revealed that learning media is a tool to improve teaching and learning activities by clarifying the meaning of the message conveyed, thus enabling the achievement of learning objectives better and more precisely.

The digital revolution has created a new reality that affects every aspect of our lives, including education (Didmanidze et al., 2023; Padmanabhan, 2023; Steriu & Stănescu, 2023; Stuart et al., 2021). In this era, children in primary school are in the midst of a stream of change that shapes their future. The digital age is characterized by easy access to information, global connectivity, and continuous technological developments. For students in primary school, this is not just a change, but a new challenge and opportunity. They grow and learn amidst unprecedented technological advances, creating a unique learning dynamic.

Learners in primary school today grew up in a culture where digital devices, the internet, and apps blend into their daily lives. They must not only be consumers of information, but must also be intelligent, critical, and creative producers of content. Therefore, digital literacy is a must so that they can face challenges and seize opportunities in this era (Castañeda & Villar-Onrubia, 2023; Marín & Castañeda, 2023).

In this context, digital literacy is no longer an option, but an essential skill that needs to be mastered by every learner (Papadakis & Kalogiannakis, 2022). Digital literacy is not just about using technology, but also the ability to understand, evaluate, and actively participate in the digital world. Therefore, the development of digital literacy skills in primary schools is not only the responsibility of teachers, but also a joint effort between schools, parents, and communities (Carroll et al., 2023; Levinsen & Sørensen, 2015).

In an effort to equip students with digital literacy skills, the use of interactive multimedia can be one of the effective learning tools (Abdul Salam et al., 2013; Rachmadtullah et al., 2019; Son & Simonian, 2016). Interactive multimedia can not only enhance the appeal of learning but also provide a learning experience that matches the digital reality faced by today's learners.

With awareness of the challenges and opportunities in the digital age, primary schools play an important role in creating learning environments that support the development of digital literacy skills (Pöntinen & Räty-Záborszky, 2020). Through joint efforts and sustainability, we can guide learners to become smart, safe, and responsible individuals in using technology in the future.

Interactive multimedia is a media that can be used to clarify the learning process if supported by learning media that can attract student interest and attention so that it can provide an adaptive and varied learning environment, students can also control and determine for themselves the order of learning material as desired. By combining various components (text, graphics, audio, video/animation) and using a

computer/laptop to illustrate a concept through animation, sound, and interesting demonstrations, interactive multimedia in learning can produce effective learning that allows students to develop according to their respective abilities (Bintas & Gelibolu, 2010; Kustandi & Sutjipto, 2019).

There are several things that educators must pay attention to in implementing interactive multimedia in learning, such as: 1) Analyze the need to understand students' digital literacy levels and learning needs in elementary schools and identify digital literacy competencies that need to be improved; 2) Set learning objectives that are clear and in accordance with the applicable digital literacy curriculum. Educators ensure that learning objectives cover critical aspects of digital literacy, such as information understanding, credibility evaluation, and digital security; 3) Choose content that is relevant to the learning material and the age level of the student. Ensure that content supports the development of digital literacy skills; 4) Design interactive multimedia using relevant multimedia technologies, such as animation, video, and simulation, to support learning. Design interactions that encourage active student participation, such as online quizzes, simulations, or online discussions; 5) Adapting according to multimedia design to the age level of students. Use an approach that is interesting and appropriate to their experience; 6) Ensure the multimedia developed is accessible to all students, including those with special needs or a variety of cultural backgrounds; 7) Conduct internal testing to ensure that multimedia works properly and achieves learning objectives. Apply periodic evaluations to measure student progress and the effectiveness of interactive multimedia; 8) Involve parents and teachers in the development process and guide them to support digital literacy learning at home and at school; 9) Integrate interactive multimedia into the existing digital literacy curriculum in elementary schools. Ensure that the use of multimedia supports the achievement of curriculum standards; 10) Maintain multimedia regularly and update its content with technological developments and changes in digital literacy.

It is important to involve various stakeholders, such as teachers, students, parents, and digital literacy experts, in the development and implementation of interactive multimedia based on digital literacy in elementary schools. Thus, a learning environment can be created that supports the development of digital literacy skills that are important for the future of students.

RESEARCH METHOD

Research Design

This study uses a qualitative approach, especially in the type of phenomenology, meaning that researchers try to give meaning to the phenomenon in the focus of Creswell & Creswell (2017) and Barnawi & Darojat (2018) book. Qualitative research produces data in the form of written or spoken words. The type of research uses the literature study research method, namely by collecting data and information from various related scientific sources (Mantra, 2008).

The main object of this research is literature such as journals, books, and scientific articles. Using comparisons between different data sources, data triangulation is used to

check the validity of the data. Journals, e-books, and theses are searched through the internet to get data. To search for keywords like education, digital literacy, character, or character education, use Google Scholar and Publish or Perish. The selected journal is a journal that has a relationship with keywords. As a result, researchers selected twenty journals to analyze, summarize, and classify. to generate new ideas and concepts that are still relevant to the topic of discussion. The research published in the journal aims to find ways that can be done to improve and develop education, especially to improve the digital literacy of students in elementary schools living in the era of globalization.

RESULTS AND DISCUSSION

Results

Based on the results of the research found, the use of interactive multimedia can improve the digital literacy of students in elementary school. Interactive multimedia can be used to design learning to be more effective and efficient so that it can help students in constructing learning. In addition, interactive multimedia can also increase student motivation and help students in learning mathematics. The results of Nurcahyo (2020) research show that the use of interactive multimedia can improve students' digital literacy. In addition, another study showed that study was conducted by Rahmah et al., who also used a class V sample of elementary school, the results found that there was an increase in digital literacy by 38% from the first meeting to the last meeting (Rahmah et al., 2021). Therefore, the use of interactive multimedia in the context of digital literacy in elementary schools has a positive impact and can be one of the effective approaches to improving students' digital literacy skills.

Interactive multimedia is a form of media that combines many elements, such as text, graphics, audio, video, and interactivity, and is equipped with controlling tools. Fatmawati (2015) suggests that interactive multimedia is learning by using computers as a medium to deliver material by combining text, images, graphics, sound, animation, and video, and in presenting it students interact directly with computers to get the desired response. In addition, students are allowed to find and process reading information from the internet to solve problems that exist in interactive multimedia. To understand technology means children must not only learn how programs are used but also how technology impacts them and society (Bekker et al., 2015).

According to Mustaji (2013) explained that teachers must be able to choose media according to existing criteria. These criteria include:

Purpose

The selected media is adjusted based on the learning objectives to be achieved. So knowing the learning objectives will lead us to determine certain types of media used in the learning.

Media characteristics

Before choosing a media we must know the characteristics of the media. We must understand the weaknesses and policies of these media so that we can choose which media is good for the desired learning objectives.

Educator Goals

Students are the target of the media to be used, therefore the media must be adjusted to the conditions of students so that the media can be useful in accordance with choices and knowledge is easy to understand.

Time

The media created must be adjusted to the length of time for making and using it in learning, lest its use is not in accordance with the allocation of learning time in class.

Cost

Cost is important in making media. The use of media is intended to increase the efficiency and effectiveness of learning, therefore the use of costs must be balanced which is expected Do not incur large costs but their use is not effective.

Availability

In obtaining media we consider the availability of facilities and infrastructure in the surrounding environment

Technical Quality

Media selection also pays attention to technical quality in delivering material

Context of use

Various media must be able to be used by students in the learning process.

According to Surjono (2017), interactive multimedia has five elements, namely:

Text

Text is a basic element in multimedia. Text is a combination of various words to convey a message. With the correct choice of words, it will facilitate the delivery of messages or information between the conveyor and recipient of the message. In multimedia presentations, the use of text is very widely used as well as in presenting content material, explanations such as menus, and others.

Picture

Images are images with two / flat dimensions that are manipulated using computers such as photos, diagrams, graphs, and others. In multimedia presentations, images can have a function to visualize verbal concepts, with the use of this element can clarify the delivery of information and make it easier for users to understand the information available.

Voice

Sound is a wave produced from a vibrating object in the air. The vibrating object causes the molecules contained in the air to stretch and spread, if it reaches the human ear will sound a sound. Sound in multimedia presentations can be in the form of human voice narration, background music, sound effects and others. Sound can be useful for the delivery of text or image information.

Animation

Animation is a series of sequential moving images to present a certain process that is usually equipped with explanatory text and narration. This element is one of the preferred and interesting multimedia elements if used to present material in learning. The use of animation plays an important role in making it easier for students to understand complex and abstract learning.

Video

Video is the result of recording the process of events containing sequential images accompanied by sound. When compared to animation, video is more realistic. Although it takes up a lot of storage, video is a popular multimedia element because of its easy processing using a computer.

In addition, interactive multimedia provides opportunities to students to explore and express their creativity. They can create multimedia projects, presentations, or other

interactive content, which can improve critical and creative thinking skills. Students can also collaborate in groups to complete assignments or projects. It helps improve social, communication, and cooperation skills among students.

Interactive multimedia allows teachers to present learning materials in a variety of ways. As Coyne argues, it takes understanding and practice from teachers in their ability to integrate technology effectively into the learning environment (Coyne et al., 2010). It allows customization of learning according to the individual learning styles of students, helping those who learn better through visual, auditive, or kinesthetic learning styles. The use of multimedia elements, such as images, diagrams, and videos, can help students to more easily understand difficult concepts. Information presented in diverse ways can help improve student memory.

Using interactive multimedia allows students to develop their understanding of digital media, including how to filter information, recognize reliable sources, and understand the messages conveyed by the media. In accessing various sources of information from the media and the internet, they can learn how to find information, evaluate the reliability of sources, and use the information found wisely. By making good use of interactive multimedia, primary schools can create a more dynamic and relevant learning environment, which supports the development of students' digital literacy from an early age.

Interactive multimedia has a significant role to play in improving digital literacy in primary schools. Some of the roles of interactive media can make learning more interesting and fun for students. The use of images, animations, videos, and other interactive elements can make learning materials easier for students to understand and remember. Through the use of interactive multimedia, students can develop technology skills early on. They can learn how to use software, hardware, and apps more easily, which in turn improves their digital literacy.

Sujana said that with their digital literacy skills, one can implement it in everyday life, both in the community, family, school, workplace and other environments (Sujana & Rachmatin, 2019). In addition, digital literacy enables students to access and critically assess information, use information more usefully, and access information effectively and efficiently. This is what students get when using interactive media in the learning process. Digital literacy of primary school students refers to the ability of students to use information and communication technology (ICT) effectively and intelligently. It involves an understanding of how to use computer hardware and software, the ability to access online information wisely, as well as the skills to communicate and collaborate digitally. Here are some aspects of students' digital literacy at the elementary school level:

Understanding Hardware and Software

Students need to understand the basics of using computers, laptops, tablets, and other devices. It includes knowledge of how to operate the operating system, install software, and use applications.

Access and Evaluation of Information

Students must be able to search, evaluate, and use information online. They need to learn how to assess the reliability of information sources and recognize reliable information.

Digital Security Awareness

Digital literacy includes an understanding of the importance of digital security. Students need to be informed about online security threats, including malware, phishing, and how to maintain their privacy when using the internet.

Critical Thinking Skills

Students should be able to develop critical thinking skills in using digital information. They need to learn to assess, compare, and infer the information they encounter online.

Digital Communication Skills:

Digital literacy involves the ability to communicate effectively using digital media. This includes email writing, use of social platforms, and online collaboration.

Digital Ethics

Students need to understand the norms and ethics of using technology. This includes ethical online behavior, copyright protection, and responsibility when using social media.

Troubleshooting Capabilities

Digital literacy involves students' ability to solve technical problems they may encounter. They need to be able to address issues that arise while using hardware or software.

Adaptability to Technological Change

Students need to be trained to be adaptive to changes in technology. The ability to understand and use new devices and apps is essential.

Effective education programs need to include digital literacy learning in the curriculum for elementary school students. This can include specialized training, the use of appropriate educational software, and an emphasis on safe and ethical practices when using digital technology.

The use of interactive multimedia to improve digital literacy in elementary schools brings many novelties that can provide a more dynamic and effective learning experience. Here are some of the innovations and novelties that have emerged from the application of interactive multimedia:

Engaging and Experiential Learning

Interactive multimedia can provide more engaging and experience-based learning for students. Through elements such as drawings, animations, and videos, complex concepts can be illustrated in a way that is easier for children to understand.

Simulation and Virtual Experience

Interactive multimedia allows the integration of simulations and virtual experiences in learning. Students can experience certain concepts practically through simulations, providing a deeper understanding.

Increased Interactivity

Interactive elements such as multiple choice, buttons, and navigation controls allow students to actively participate in learning. This can increase student engagement and provide a more personalized learning experience.

Personalizing Learning

Interactive multimedia allows for a more personalized approach to learning. Students can learn at their own rate, and content can be tailored to individual needs and abilities.

Technology Skills Development

The use of interactive multimedia helps students to develop their technology skills early on. They learn not only as passive users, but also as content creators and active technology users.

Collaboration and Social Learning

Interactive multimedia supports collaborative and social learning. Students can work together in groups to complete assignments, share ideas, and learn from each other through interactive platforms.

Increased Media Literacy

The use of interactive multimedia helps students better develop media literacy. They can learn how to filter information, identify trustworthy sources, and understand the messages conveyed by various media.

Troubleshooting Capabilities

Interactive multimedia often requires students to think critically and solve problems. They must overcome challenges or interactive tasks, which improve their problem-solving abilities.

Improved Memory through Multi-Sensory Use

The use of multimedia elements such as images, sounds, and movements can help improve students' memory as it involves various senses.

Integrating Digital Literacy in the Curriculum

Interactive multimedia enables the more effective integration of digital literacy into the curriculum. Teachers can teach digital literacy concepts through relevant and interesting multimedia content.

By continuing to integrate these innovations in basic education, it is hoped that students can be better prepared to face the demands of digital literacy in today's digital era.

Discussion

Interactive multimedia has a significant role to play in improving digital literacy in schools (Ahmad, 2020; Dong et al., 2024; Preradovic et al., 2016). There is a close relationship with the development of interactive multimedia in elementary school learning (Putra et al., 2019). The digital transformation that has taken place has affected education by creating new opportunities to enhance the student learning experience (Gürbüz, 2020).

There are several relationships between the digital era and the use of interactive multimedia in elementary school learning in improving digital literacy: 1) Primary schools can take advantage of this to provide interactive multimedia for students (Zhang & Zhu, 2016).; 2) The development of Access Technology that brings technological advances in easier access to digital devices, the internet, and applications (Choudrie et al., 2017). Educational software has grown a lot and has produced a variety of educational software that supports interactive learning. Teachers in elementary schools can utilize this software to enrich learning; 3) There is an increase in student engagement so as to create a more engaging learning experience and actively engage students (Girdzijauskienė et al., 2022). This is in line with the characteristics of the generation that grew up in the digital age, which is accustomed to various interactive media; 4) The era of digitalization demands an increase in digital literacy (Wang & Liu, 2024). The use of

interactive multimedia in elementary schools can help students develop critical digital literacy skills, including the ability to filter information and participate in digital environments wisely; 5) With technology, teachers can adapt content and learning methods to fit students' individual learning styles (Wilkin et al., 2013); 6) Interactive multimedia can stimulate student participation and engagement, creating a more active and practical learning experience (Skaik & Tumpa, 2022). This contrasts with the traditional, more passive approach; 7) More effective monitoring and evaluation of student progress. Teachers can use data and analysis to understand individual student needs and devise more effective learning strategies (Hebbecker et al., 2022); 8) Interactive multimedia can support collaboration and communication among students, utilizing digital tools for joint projects, online discussions, collaborative learning, impacting the level of assimilation of training material (Vezirov et al., 2019); 9) Helping students in primary school to be better prepared for the challenges of this digital age, preparing them with relevant skills for the future (Neokleous, 2023); 10) Can stimulate interest in lifelong learning. Students become more accustomed and motivated to continue learning and adapt to the continuous development of technology (Anthonysamy et al., 2020).

By integrating multimedia interactive learning in elementary schools, education can harness the positive potential brought by the digital age to enhance learning, prepare students for a digitized future, and create more dynamic and relevant learning experiences. Overall, interactive multimedia has the potential to support learning approaches related to the Merdeka Curriculum, by helping to create an active, student-centered, collaborative, and relevant learning environment.

CONCLUSION

Fundamental Finding: The importance of interactive multimedia development, especially to improve students' digital literacy skills in facing the challenges of the digitalization era. In the era of digitalization, it demands an increase in digital literacy among elementary school students. The use of interactive multimedia can be an effective tool for developing such digital literacy skills. Then the development of interactive multimedia needs to take into account the primary school context, student needs, and relevance to the applicable digital literacy curriculum. This is key to producing products that can be effectively integrated with the learning environment. Different types of interactive media including text, animation, or comics, content from YouTube, and Microsoft PowerPoint, provided by teachers, information from the internet, Kahoot, Edmodo, Canva, Powtoon, Quipper, Google Classroom, quizziz, e-books, and others that can be used as digital literacy to help students and readers understand it. The easiest interactive media to use is Microsoft PowerPoint. Interactive multimedia allows the active participation of students in the learning process. This can increase student motivation, engagement, and understanding of digital literacy materials. In addition, teacher and parent support is critical in the successful development of interactive multimedia. Their involvement in the development and implementation process can ensure the product's suitability to the needs of students. As well as multimedia design needs to be adapted to the age level of students. The use of interesting and appropriate elements can increase the attractiveness and effectiveness of learning. **Implication:** The development of digital literacy-based interactive multimedia in primary schools is an

investment in the future of education. By supporting teachers, engaging students, and integrating technology wisely, digital literacy learning in elementary schools can become more dynamic and relevant to the demands of the times. **Limitation:** This study has not seen its application in the field because it only discusses literature studies. **Future Research:** The expected results of the application and development of interactive multimedia in elementary school learning will be published.

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