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The Effectiveness of Technology-Based Learning at the Elementary School Level

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ABSTRACT

Education plays a vital role in preparing the quality of future generations. With the rapid technological growth the educational system must make changes by leveraging the role of the technology in order to effectively achieve the educational goals. Learning by utilizing current technology is often used across all education levels, especially in elementary school. But that would not necessarily be effective in elementary school, as students who do not yet have sufficient age to understand and operate technology. To ensure its effectiveness in the matter, we conducted a study using qualitative methods and took a sample of 32 respondents. The reason for using this method is to know first hand the condition of the subject. The research instrument used is a form with questions about how effective technological use is in learning. Based on the research that has been done, most of the students have used technology during learning activities. Until the respondents revealed that they had not yet mastered the right technology. This is the result of several factors, which leads to the conclusion that technology-based learning has not been effectively used in elementary school.

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1. INTRODUCTION

Education plays a crucial role in preparing the quality of the nation's future generations. Education needs to be wary of the impact of life in countries that are currently seeking change in various fields and the global changes known as the process of globalization. Education, in this case, requires the management of modern knowledge and skills, as well as subtle differences in the use of technology.

Through the rapid development of science and technology, the education system must constantly change by utilizing the advances in science and technology to achieve educational goals effectively and efficiently. The presence of technology provides broad, fast, effective, and efficient access to various aspects, including education. Learning is essentially a communicative interaction process. The essence of learning must be present in every learning element, including technology-based learning.

Based on 21st-century learning, students are expected to be more skilled in using technology (Arifin, 2023). However, the main problem with the use of technology in learning is that many students still do not fully understand how to use technology properly, especially students at the elementary school level. Additionally, many teachers cannot utilize technology to facilitate the learning process. This is because many teachers believe that technology complicates learning.

Based on the above explanations, the purpose of this research is to determine "whether technology-based learning has been effectively implemented at the elementary school level?"

Learning is essentially an interaction process between teachers and students, which can be direct interaction, such as face-to-face activities, or indirect interaction, through the use of various learning media. Based on these differences in interaction, various learning modes can be used for learning activities.

Based on Law Number 20 of 2003 concerning the National Education System Article 1 Paragraph 20, learning is the process of interaction between students, educators, and learning resources in a learning environment.

Rusman (2015: 10) states that learning activities are an educational process that provides opportunities for students to develop their potential into abilities that increasingly improve in attitudes, knowledge, and skills needed for their lives and for society, nation, and contribute to the welfare of human life.

Effectiveness is the achievement of goals accurately or determining perfect goals based on a series of alternatives or options and determining the choice from the other options. Effectiveness can also be said as a measurement of success in predetermined goals.

The word "technology" comes from the Greek language, namely 'techne' means skill and 'logia' means knowledge. Based on the Big Indonesian Dictionary, technology is the whole means to provide goods needed for human survival.

Rusman, et al. (2012) states that technology in a narrow sense refers to objects or items used to facilitate human activities, such as machines, tools, or hardware. According to an article on Kompas.com quoting from the Encyclopaedia Britannica (2015), technology in a broad sense is the application of scientific knowledge for practical purposes in human life or in the change and manipulation of the human environment. Technology in a broad sense includes knowledge of systems, organizations, and technology. However, with the development and progress of the times, the concept of technology has become increasingly

common, so that technology has now become a concept related to the types of tools used in science, and how it affects human ability to control and change things around them.

As time progresses, the advancement of technology becomes increasingly rapid. Technological knowledge is divided into several disciplines and used as discoveries in various fields of study by creating sophisticated tools for research in those fields. Consequently, many scientific journals have emerged for the publication of scientific findings, and if a discovery is considered outstanding, it may receive a Nobel Prize.

In today's life, many things can be easily accomplished with the assistance of technology. We can harness the rapid development of technology and bring innovations to the field of education ([Kediri Regency Information and Communication Office: 2020](#)). The roles of technology in the world of education are as follows: (1) replacing human roles by automating a task or process; (2) strengthening human roles in presenting information, tasks, or processes; (3) restructuring or making changes to a task or process; (4) as skills and competencies; (5) as educational infrastructure; (6) as a source of teaching materials; (7) as educational aids and facilities; (8) as support for educational management; (9) as a decision support system; and (10) as controlling on smartphones.

The use of technology in education can be applied in various ways, such as: (1) computer-based learning; (2) sharing research findings; (3) consulting with experts via the internet; (4) online libraries; and (5) online discussions.

There are also advantages to using technology in education, including: (1) the faster and easier retrieval of necessary information for educational purposes; (2) the increasing innovation in learning to facilitate the educational process; and (3) the possibility of developing virtual classes based on teleconferencing, thus not requiring educators and students to conduct teaching and learning activities in the same room. However, the disadvantages of using technology in education include the need for internet access and adequate infrastructure, the lack of educators or students fully understanding how to operate technology correctly, the limited number of students in good economic conditions to support learning using technology, and the continued lack of schools facilitating educators and students in utilizing technology during learning.

Effective learning is learning that facilitates students' acquisition of knowledge and skills through the presentation of information and activities designed to help them easily achieve the learning goals that have been set. To achieve effective learning, educators need a suitable learning model for their students' conditions. The learning model commonly used today is computer-based or technology-based learning. The emergence of this learning model is due to the ideas of experts in the field of education to create applied technology devices that allow learners to engage in learning activities individually by applying technological principles. Rusman, in his book titled "Learning Models," states that B.F Skinner, a behaviorism psychologist, created programmed instruction in 1964. This programmed learning system allows interaction between educators and students, as well as interaction among students, which is usually done directly but can also be done indirectly through written programs, audio recordings, films, teaching machines, and so on.

The proliferation of technology in education has positive impacts and provides options for improving the learning process. Students also need access to various information and communication skills to provide engaging, enjoyable, personalized, visual, and interactive learning. With the rapid development of technology, the internet can become a center for learning using this technology, and learning can be done through the internet, commonly referred to as web knowledge or technology. Learning activities utilizing technology are often used at all levels of education, especially in elementary schools. However, it may not

necessarily be effective to implement this in elementary schools, considering that students may not have sufficient age to understand and operate technology properly.

2. METHODS

This research utilizes a qualitative method aimed at directly understanding a condition experienced by subjects. The qualitative approach is used to study, investigate, describe, and explain social influences that cannot be quantified. The subjects of this research are elementary school students with the aim of assessing the effectiveness of implementing technology-based learning at the elementary school level.

The research instrument used in this study is a questionnaire. The questionnaire platform used in this research is Forms.app, and there is one question with pre-defined answer choices, allowing respondents to select the answer that best fits their situation. Other questions can be answered by respondents in the provided column according to the facts experienced by the respondent. This research method is employed to address problems based on the factual statements experienced by respondents and to focus on the effectiveness of technology use in learning. Considering the global changes that have occurred worldwide and have impacted all aspects of human life such as economy, social, political, environmental, cultural, education, technology, and so on. The researcher only wants to know whether technology-based learning has been effectively and evenly implemented at the elementary school level. The questionnaire distribution process is conducted online via social media, facilitating the researcher in collecting data in a short time. The data used in this research are primary data, namely information obtained directly by the researcher according to the required data in the research.

The questionnaire items are tailored to the data needed by the researcher, which include eight questions. At the beginning of the questions, it covers the identity of the respondent, such as full name, address, school of origin, and class. Then, questions about whether the respondent's school practices learning using technology, with the options of YES and NO. If the respondent answers YES, then what type of technology is used at the school, how often is the technology used, the respondent's opinion about the benefits of technology in learning, the respondent's level of proficiency in using technology, and if already proficient, what type of technology the respondent can use. However, if the respondent answers NO, then what are the reasons that hinder the respondent from operating technology, and the expectations for the government or school regarding effective learning according to the respondent's desires.

Several analyses were conducted on the collected data, including data collection, data reduction, data presentation, and drawing conclusions from the collected data. Thus, it can be determined whether technology has been effectively used in elementary school-level learning or not. The research was conducted from the assignment of this article until the completion of compiling the data report, taking approximately three weeks.

3. RESULTS AND DISCUSSION

Based on the results of the research that has been conducted, there were 32 respondents who filled out the questionnaire that we distributed.

Table 1. Use of Technology During Learning

Question	Yes (%)	No (%)
Does your school like to use technology during learning sessions?	75	25

These days, the use of technology in education is highly essential. The use of technology is perceived to help students in achieving learning goals.

However, there are still schools that have not utilized technology in the learning process. As revealed in Table 1, 6 respondents answered that their schools do not utilize technology in the learning process.

There are various responses regarding the frequency of educators using technology in teaching activities. These responses range from educators who always use technology during teaching sessions, some who do it once a week, and even respondents who mentioned that educators at their school have never conducted technology-based teaching at all.

The types of technology used during the learning process vary, ranging from hardware technology (projectors and gadgets) to software or platforms (Zoom Meetings, Google Classroom, YouTube, WhatsApp, and Kelas Pintar).

Most of the respondents understand the benefits of technology in education. The benefits mentioned by the respondents are diverse, including: technology can facilitate material delivery; technology can facilitate educators and students in distance learning; technology can facilitate students in communicating with educators or even with fellow students; technology can facilitate students in finding information and completing tasks given by educators; and using technology in learning can make students adept at operating technology.

However, despite their understanding of the benefits of technology in the learning process, not many respondents are proficient in using technology. This lack of proficiency is caused by various factors, such as: students not having gadgets to access technology-based learning; inadequate devices such as signals in accessing learning platforms instructed by schools/educators; the abundance of menus and features in the technology used, making students confused in operating it; and the main issue in the factor of students' lack of proficiency in operating technology in learning is their limited age to operate technology, which generally has complex steps, thus the need for guidance from educators and parents in using technology during the learning process.

As for the expectations expressed by the respondents regarding technology-based learning, they are: (1) hoping that the government/schools will facilitate all students in technology-based learning; (2) hoping that educators will be smarter in using technology for technology-based learning purposes; and (3) respondents hope for a quick return to normal learning activities considering that currently, learning is conducted remotely due to the COVID-19 pandemic, so students can learn and better understand how to use technology during the learning process.

Discussion and Analysis

In the method subsection, it has been explained that this research uses a qualitative method, which aims to understand and feel the condition experienced by the subjects. The research results regarding the effectiveness of implementing technology-based learning at

the elementary school level indicate that currently, the number of schools using technology in their learning processes is increasing. This is at least partly due to the COVID-19 virus entering Indonesia in March 2020, impacting all aspects of human life including education, thus forcing education to be conducted online.

Therefore, based on the survey results from 32 respondents, it can be proven that 75% of them use technology in their learning, such as smartphones, computers, and laptops, as well as various learning platforms such as Google Classroom, WhatsApp, Zoom, Google Meet, Google Drive, Kelas Pintar, YouTube, Quizizz, Kahoot, and Jeruedu. The types of technology that were already used in classrooms before the COVID-19 pandemic include projectors. Based on the data from the questionnaire results, it can be seen that at least some respondents often use technology in learning. Most respondents believe that the use of technology in learning can help and facilitate the learning process, such as delivering material by teachers; students' insights and abilities in technology are increasing; helping the smoothness of learning especially in this pandemic situation so that even though it is done with distance learning, at least the learning process can be carried out well; facilitating the teaching and learning process; and technology can improve students' learning abilities. However, the data results show that most respondents are not proficient in using this technology, due to limited device availability making it difficult to learn; the complexity of features and menus in technology; and the lack of students' knowledge about technology, so many students do not understand how to use it. Therefore, there is a need for special guidance or training from parents or teachers for students so that learning can be carried out effectively. In addition, there is a big hope from the respondents for learning to be conducted face-to-face (offline) as soon as possible because basically, elementary school students, especially first graders, will be more effective if learning is done while playing in the school environment. There are also many respondents who hope for technological facilities provided by the government or schools to students, such as the availability of school platforms containing various teaching materials for students, such as videos, podcasts, films, modules, and so on, which are easily accessible by students.

Thus, based on all the data obtained from the questionnaire distribution, it shows that the use of technology in the learning process at the elementary school level is still not very effective due to several factors such as media literacy skills, technology literacy skills, availability of facilities, and inadequate networks.

4. CONCLUSION

Based on the qualitative research using questionnaire instruments, through the elementary school level research subjects on the effectiveness of implementing technology-based learning, several conclusions can be drawn as follows:

1. According to the data obtained by the researcher, out of 32 respondents, 75% of respondents use technology in their school's learning. From this data, the frequency of usage varies, with some always using technology, some rarely, and even some who have never used technology at all in their learning.
2. Most respondents are aware of the importance of using technology in learning because it can facilitate the learning process, especially in the current pandemic situation.
3. Many respondents are still not proficient in using technology, and this is due to several factors, including: students who do not have devices to access technology-based learning; inadequate equipment such as signals in accessing learning platforms instructed by schools/teachers; lack of knowledge and skills of students about technology; the complexity of menus and features in the technology used, making

students confused to operate it; and the main problem in the factor of students' lack of proficiency in operating technology in learning is their limited age to operate technology, which generally has complex steps, hence the need for guidance from educators and parents in using technology so that the learning process can be carried out effectively.

4. There are several expectations from respondents related to technology-based learning, including: the availability of technological facilities provided by the government or schools to support the implementation of learning; competent educators, in this case, using technology to the fullest to facilitate the learning process and not make it difficult for students; and students hope that face-to-face learning activities will resume soon as before so that they can learn and better understand how to use technology during the learning process.
5. Based on the data from the research results regarding the presence of several inhibiting factors in technology-based learning, the author concludes that technology-based learning at the elementary school level is not effectively implemented.

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