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The Influence of the Use of Educational Technology on the Quality of Learning at Public Elementary Schools

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Abstract

Background - The development of digital technology has brought significant changes to the field of education, especially in the learning process at the elementary school level. The use of educational technology has become an important strategy to improve learning quality, student engagement, and the effectiveness of content delivery. However, not all educational institutions, particularly in rural areas, have optimally integrated technology into the learning process. Therefore, it is essential to examine the extent to which the use of educational technology affects the quality of learning, particularly in public elementary schools in the Randublatung District.
Purpose - This study aims to investigate the impact of using educational technology on the quality of learning at public elementary schools in Randublatung District.
This research uses a quantitative approach with a descriptive analysis design. Data were collected through questionnaires distributed to teachers and students and analyzed using statistical techniques to examine the relationships between variables.
Findings - The results show that the use of educational technology contributes significantly and positively to the improvement of learning quality, with an influence value of 82.4%. Technology integration has been proven to enhance student interaction and engagement and support the overall success of the teaching and learning process.
Conclusions - The study concludes that the use of educational technology plays a crucial role in improving the quality of learning. Systematic adoption and training in technology use within the educational environment are necessary to achieve more effective and higher-quality learning outcomes.
Novelty/Originality/Value The novelty of this research lies in its empirical evidence showing the substantial contribution of educational technology to learning quality in elementary schools located in rural areas, specifically in Randublatung. Furthermore, the study highlights the importance of onboarding training for users (teachers and students) as a key factor in the successful integration of technology in education—an aspect rarely discussed in previous similar studies.

Keywords: educational technology; quality of learning; elementary school

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INTRODUCTION

Education is intended to enhance human resources through learning in schools (Yuliza et al., 2021). Elementary education plays a crucial role in shaping the foundation of knowledge and character of students (Qadir et al., 2022). In the current digital era, the use of educational technology is increasingly developing and has the potential to enhance the quality of learning in elementary schools. Information and communication technology (ICT) tools are very important for the education process (Molla & Seyoum, 2022). Educational technology includes various software, learning applications, interactive media, and hardware that support the teaching and learning process. With the proper use of technology, it is hoped that learning will become more engaging, interactive, and effective in enhancing students' understanding. Therefore, effectively integrating ICT tools into various levels of education can enable educational stakeholders to create an interactive learning environment and enhance student engagement (Toma et al., 2023). The authors have recently proposed a broader perspective on teacher competence, which includes traits such as knowledge and more specific aspects in certain situations, such as attention, and incorporating teacher traits into their performance in the classroom. (Yang & Kaiser, 2022). How these tools are used and perceived impacts the effectiveness of their integration (Istiningsih, 2022).

At the Randublatung District State Elementary School, the implementation of educational technology still varies, depending on the readiness of the teachers, school infrastructure, and support from related parties. Several previous studies have shown that educational technology can enhance student motivation and academic performance, but its implementation in various elementary schools still faces challenges, such as limited facilities and a lack of teacher skills in integrating technology into learning. Some authors argue that communication and digital skills are the most significant professional competencies in this academic year (Fernández et al., 2024). Utilizing ICT tools enhances students' learning outcomes. This helps them collaborate with educators, access a wealth of information, enhance problem-solving and creative thinking skills, and unleash their innovation and creativity (Baytar et al., 2023).Therefore, this study aims to explore the extent to which the use of educational technology affects the quality of learning at the Randublatung District Public Elementary School, as well as the factors that support or hinder its effectiveness.

Digital technology and the internet significantly expand the boundaries of teaching and learning in schools. Integrating ICT tools in primary and secondary education is a challenging endeavor that requires careful planning, implementation, evaluation, and refinement (Ghavifekr et al., 2017). However, to experience this significant integration of technology, we must understand its pedagogical role in education. This must be done by considering the unique needs, difficulties, and opportunities of each context and field of study (Ginger & Govender, 2021). Students must be prepared to use smart devices during the digitalization of education because there is a new approach to teaching and learning. This will enhance their learning, understanding, attention, and literacy (Mhlongo, S., 2023).

Digitalization raises questions about epistemology and ethics in addition to affecting the curriculum and teaching methods (Krutka et al., 2019; Lund & Aagaard, 2020). Teacher candidates are quickly educated by teacher educators (Tondeur et al., 2020). Teacher education is still criticized for not adequately training prospective teachers to face the challenges of using digital technology in education. This happens despite several studies and reports indicating that teacher education has made progress in preparing students to teach with ICT (Guðmundsdóttir & Hatlevik, 2018; Napal Fraile et al., 2018; Nelson et al., 2019).

Technology-assisted education is becoming increasingly important in today's educational world. It is very important to understand how it is used and its impact, especially in primary and

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secondary education, where foundational development occurs (Boateng et al., 2024). This research is based on constructivist learning theory, which emphasizes that students can build their own understanding through active and meaningful learning experiences, which can be reinforced by the use of educational technology. Digital game-based learning combines education and play, using digital platforms as media, and employing game elements to teach specific skills or achieve certain learning outcomes. It takes core content and objectives and makes the learning experience enjoyable for many students (Krath et al., 2021). The ability to use ICT tools in the classroom has become a crucial skill for educators due to the global spread and acceptance of ICT tools in education (Dzinoreva & Mavunga, 2022).

In addition, educational technology theory is also used to analyze how digital devices can enhance the effectiveness of the learning process. With this approach, this research aims to identify the impact of educational technology on the quality of learning, as well as provide strategic recommendations for schools in optimizing the use of technology in the teaching and learning process.

This research has new and interesting aspects to investigate, namely, first, identifying the types of educational technology that are most effective in improving the quality of learning at the Randublatung District Public Elementary School. Second, analyzing the obstacles faced by teachers and students in adopting educational technology. Third, providing data-based recommendations to enhance the use of technology in learning to make it more effective and sustainable.

In the context of this research, the hypothesis to be tested focuses on the relationship between the use of educational technology and the quality of learning at the Randublatung District Public Elementary School. Based on the literature review and existing theories, the use of educational technology is defined as the utilization of devices, applications, and digital media in the teaching and learning process, aimed at enhancing student interaction and engagement. The quality of learning, on the other hand, is measured through indicators such as the achievement of learning objectives, the level of student engagement, and student satisfaction with the learning process.

According to Heinich, et. al. (2022), the use of educational technology is an integration of educational theory and practice that utilizes technology to enhance the effectiveness of teaching and learning. This emphasizes the importance of the relationship between theory and practice in education. According to Sumarlin et al. (2024), they argue that a teacher who uses educational technology in their teaching process will certainly make learning easier and the learning concepts more tangible. This will cause the material to be easily understood by students, which in turn will improve the quality of learning.

Haryono (2023) explains that technology helps make teaching more engaging. The presence of technology in teaching can also facilitate and enhance students' understanding. Teachers can use videos from YouTube to explain multiplication and division in an engaging and easy-to-understand manner. For example, by combining technology and curriculum content, we can explain concepts, conduct educational games, and many other engaging learning activities.

Based on the theory of the influence of technology in education, this research hypothesis can be formulated as follows: Null Hypothesis (H0): There is no significant effect of using educational technology on the quality of learning at the Randublatung District Public Elementary School. This means that the use of educational technology will not improve the quality of learning. Alternative Hypothesis (Ha): There is a significant influence of the use of educational technology on the quality of learning at the Randublatung District Public Elementary School.

This research expects that the increased use of educational technology will positively contribute to the quality of learning, leading to improved interaction between teachers and students, better mastery of the material by students, and student satisfaction regarding their

learning experience. This hypothesis is formed based on previous research that shows that the use of technology in education can enhance the effectiveness of learning and students' academic achievements. Thus, this research aims to empirically test and analyze the influence, as well as to enhance the understanding of how educational technology can be utilized to improve the quality of learning in schools.

METHOD

In this study, a quantitative approach with an explanatory research design was used, aimed at analyzing the relationship between several variables and understanding their impact on the quality of learning. The primary data source was obtained from teachers at Randublatung District State Elementary School, with data collected through questionnaires distributed directly to the respondents. The questionnaire was created based on the indicators that have been determined for each variable, namely the use of educational technology, which is then measured using a Likert scale.

The data collection technique was carried out by distributing a questionnaire containing questions related to the research variables, where respondents were asked to provide their assessment of the statements presented. For data analysis, descriptive and inferential analysis techniques are used, where the data obtained from the questionnaire will be analyzed using descriptive statistics to describe the respondents' profiles and using multiple regression techniques to test the influence between the independent variable (use of educational technology) and the dependent variable (quality of learning). The measurement of variables is carried out by establishing tested indicators, making it easier to interpret the research results. The data collected is processed using statistical programs to obtain valid and accountable results.

RESULT AND DISCUSSION

This research aims to examine the influence of using educational technology on the quality of learning at Randublatung District State Elementary School. From the analysis of data obtained through questionnaires distributed to 197 respondents, it was found that the use of educational technology significantly contributes to the improvement of learning quality. Based on the results of the linear regression analysis, the t-value for the use of educational technology was obtained at 30.244, which is much greater than the t-table value (1.97220), with a significance value (p-value) of 0.000, indicating that the use of educational technology has a significant impact on the quality of learning.

Table 1. The Influence of Educational Technology Use on Learning Quality

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	44,096	2,966		14,868	,000
The use of educational technology	,677	,022	,908	30,244	,000

Source: SPSS Output

The research results from the table above show that the t-value for the use of educational technology is 30.244, while the t-table value is 1.97220 (30.244 > 27.071) with a sig value of 0.000 < 0.05, so H0 is rejected and Ha is accepted, which means that the use of educational technology has a significant effect on the quality of learning at Randublatung District State Elementary School.

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Then, to determine the extent of the contribution of the influence of educational technology use on the quality of learning, the R-square coefficient of determination value expressed as a percentage is used.

Table 2. The Contribution of Using Educational Technology to the Quality of Learning

R	R Square	Adjusted R Square	Std. Error of the Estimate
,908	,824	,823	6,077

Source: SPSS Output

The result of the coefficient of determination test in the table above shows that the R-square value is 0.824, indicating that the use of educational technology has a strong influence on the quality of learning. This result means that the use of educational technology has a contribution of 82.4% to the quality of learning at the State Elementary School in Randublatung District. Meanwhile, the remaining 17.6% can be influenced by other variables not examined in this study, such as facilities and infrastructure, performance management, and program evaluation.

Based on Table 2, the value of the constant coefficient is 44.096, and the coefficient of the educational technology usage variable (X2) is 0.677. Thus, the regression equation is obtained:

$Y = a + ßX_1$

$Y = 44{,}096 + 0{,}677\ X_1$

Based on the equation above, the constant value of 44.096 indicates that when the use of educational technology is valued at 0, the quality of learning has a value of 44.096. Next, the positive value (0.677) found in the regression coefficient indicates that the direction of the relationship between the variable of educational technology usage and the variable of learning quality is positive, where each increase in the usage of educational technology can improve the quality of learning by 0.677. Thus, the higher the use of educational technology, the higher the quality of learning.

The results of this study affirm that the use of educational technology has a strong positive impact on the quality of learning. This phenomenon aligns with previous research that states that technology in education can enhance the success of the teaching and learning process. For example, Rosidin, Marwiyah, & Fakhrunnisa (2024) show that educational technology not only facilitates access to information but also stimulates students' interest in learning. With the presence of interactive features such as simulations and learning games, students are more actively engaged in the learning process, which contributes to a higher quality of education.

The integration of technology in education is also relevant in the current context, where the younger generation grows up with easy access to digital devices. Technology-based learning tools, such as mobile applications and e-learning platforms, provide students with the opportunity to learn in a more flexible and independent manner. Teachers can improve their professional expertise through the integration of technology. The study found a considerable positive association between instructors' professional competence and technological integration (Aslam et. al., 2020). With the presence of technology, students can explore learning resources independently, enriching their understanding of the material being taught. Create an innovative learning environment where students gain a fresh perspective on their subject areas (Mdhlalose et al. 2023). Through the development of creative products, animated learning materials can instruct students to meet their learning objectives. The educational materials created place a strong emphasis on local knowledge and animation. Because primary school pupils were so imaginative and inquisitive, the animation was selected (Shala L, Shatri K., 2022).

However, it should be noted that the success of integrating educational technology also depends on the digital skills of teachers and students (Kram et al., 2022). This research shows that

the competence of technology users in this regard greatly affects the effectiveness of its use. Without adequate skills, both teachers and students may face difficulties in utilizing technology optimally, as stated by Al-Emran et al. (2016), who noted that users' familiarity and comfort with technology significantly influence its integration into education.

What provides novelty in this finding is the emphasis on the importance of not only technology adoption but also training and skill enhancement for users, both teachers and students. This is different from many previous studies that focused more on the effectiveness of the technology itself without considering the readiness of the users. Therefore, in implementing educational technology in the curriculum, there needs to be a continuous training program for teachers to optimize the use of technology in learning.

Overall, the results of this study reinforce the argument that to improve the quality of learning at the elementary education level, the integration of educational technology is a necessity. Intentions to employ technology in their future classrooms are positively correlated with good views toward technology and a strong sense of personal control over the decision to use it (Watson et. Al., 2021). However, a holistic approach needs to be implemented by considering human resources and supporting infrastructure so that the results can be maximally felt in the classroom.

CONCLUSION

The research results show that the use of educational technology significantly and positively improves the quality of learning at SD Negeri in Randublatung District, contributing 82.4% to the variation in learning quality. The findings confirm that student engagement increases through the use of digital tools and learning resources, with both teacher and student digital competencies being key success factors. Practically, teacher training in technology is needed to optimize technology integration in teaching. Theoretically, this research supports the theory of technology integration in education and highlights the importance of user onboarding training. However, the study's focus on a single school and the exclusion of other variables such as facilities, educational management, and teaching styles limit the generalizability of the findings.

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