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The Effect of Teachers' Pedagogical Competence and Technology Utilization on Students' Learning Outcomes in Public Elementary Schools

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ABSTRACT

This study aimed to analyze the effect of teachers' pedagogical competence on students' learning outcomes, to examine the effect of technology utilization on students' learning outcomes, and to investigate the simultaneous effect of teachers' pedagogical competence and technology utilization on students' learning outcomes. This research employed a quantitative approach. The sample consisted of 98 teachers from five public elementary schools in Kalidoni District, Palembang City. Data were collected through questionnaires and documentation. Instrument validity was tested using construct validity, while reliability was measured using Cronbach's Alpha. The prerequisite analyses included tests of normality, homogeneity, linearity, and homoscedasticity. Data analysis was conducted using quantitative descriptive analysis with multiple regression techniques. The results indicated that (1) teachers' pedagogical competence had significant effect on students' learning outcomes in public elementary schools in Kalidoni District, Palembang City; (2) technology utilization had significant effect on students' learning outcomes; and (3) Teachers' pedagogical competence and technology utilization simultaneously have a stronger and more significant effect on students' learning outcomes than the effect of each variable individually in public elementary schools in Kalidoni District, Palembang City, with an R Square value of 0.912, indicating that 91.2% of the variance in students' learning outcomes is explained by both variables, while the remaining 8.8% is influenced by other factors.

Keywords: Teachers' Pedagogical Competence, Technology Utilization, Students' Learning Outcomes

INTRODUCTION

Education at the basic level is the main foundation in character development. Education also has a role as a strategic point for student competence. The fundamental goal of education is to facilitate the optimal development of the intellectual, social, emotional, and physical abilities of each individual, while supporting them in acquiring the skills, knowledge, and values needed in daily life [1]. Through education, the Indonesian nation will be able to plan and prepare educated personnel who have the ability to compete with other countries [2]. At the elementary school level, students begin to be guided to develop logical, systematic, and critical thinking skills through the implementation of a curriculum that has been prepared in a planned manner.

As the first door in the formal education system, elementary schools are the first foothold for students to be introduced to systematic and measurable teaching and learning activities. According to the National Education System Law No. 20 of 2003 Article 17, basic

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education aims to provide basic provisions in the form of knowledge, skills, and attitudes to students to continue to the secondary education level. Improving the quality of learning in elementary schools is also very crucial. Elementary school age is often referred to as the *golden age*, which is a period of very rapid cognitive, affective, and psychomotor development. The statement about the term golden age is associated with the ability of the brain in each child to think and absorb various information faster and higher, whatever type of information given to the child can affect the child's future life [3]. Quality learning at this stage can effectively support the optimal development of children's intellectual abilities and social skills.

Gagne and Briggs Learning is described as a series of activities that are deliberately designed to help make it easier for individuals to undergo the learning process [4]. Innovative, creative, and fun learning is a form of teaching and learning process that is urgently needed today which is often associated with being able to increase the potential of students. The process of developing a critical thinking attitude in the classroom carried out by students cannot be carried out without qualified teachers in managing the classroom and preparing meaningful learning for students. Teachers have an essential role as the key to the learning process. According to [5] The success of learning is largely determined by the role of teachers through their performance at the institutional and instructional levels. As a crucial component that also determines the course of the learning process, teachers play a strategic role in determining the level of learning achievement, because teachers are responsible for designing, organizing, implementing, and assessing the course of learning [6]. This is in line with the findings of the *Organisation for Economic Co-operation and Development* known as the OECD in the Teaching *for the Future report* [7], which public that the effectiveness of teachers in learning is very strategic and influential.

An important role in the learning process is held by the teacher. The success rate of learning depends heavily on the role of teachers, as they are the ones who design, manage, implement, and evaluate the entire learning process. Teachers, in their capacity as professional educators, have a great obligation in shaping the future of the nation. Its role in the world of education is very strategic and cannot be separated from the success of learning itself. One of the many factors that affect the success of teachers' duties is their competence in planning, implementing, and reviewing the course of learning [6].

A teacher is required to master various relevant abilities as a prerequisite in building the professionalism of his profession. In the context of the national education system, competencies that must be fulfilled by teachers have been formulated as guidelines in carrying out educational duties and obligations. Competency comes from the word *competency*, an ability or proficiency possessed by a person in carrying out a job or task in a certain field, in accordance with the position held [8].

Competence itself is a set of knowledge, skills, and task behaviors that must be possessed, of course, lived, mastered, and realized by teachers through the implementation of their professional duties in the classroom, known as the learning process [9].

Improvements in specific skills related to abilities can affect the culture of the institution as well as the abilities of individuals [10]. Law of the Republic of Indonesia Number 14 of 2005 concerning Teachers and Lecturers explains that competence is an integration of knowledge, skills, and attitudes that must be mastered and internalized by teachers and lecturers as a prerequisite in carrying out professional responsibilities [11]. A teacher has a crucial role in helping students discover and develop their interests and talents, while providing motivation that can awaken students' enthusiasm for learning. Although this task is not easy, teachers who have expert skills are an important foundation in realizing quality education [12].

Referring to article 28 paragraph (3) part 1 chapter VI of Government Regulation no. 19/2005 concerning National Education Standards and article 3 paragraph (2) part I chapter II of Government Regulation no. 74/2008 concerning teachers, teacher competence consists of four forms, namely pedagogic competence, personality competence, social competence, and professional competence. Of the four forms of competence, the pedagogic competence of teachers has a very central role in the learning process in the classroom. Therefore, this competence is one of the important competencies that must be mastered by teachers. This pedagogic competence is the teacher's ability to carry out the learning process in the classroom which includes the ability to understand students, the ability to carry out learning design, the ability to evaluate learning, and the ability to develop students' potential [11].

In 2024, as many as 606,601 teachers will take part in Teacher Education Profession, with a graduation rate of 98.59%, which aims to improve teachers' pedagogic and professional competence. However, a study from The SMERU Research Institute in [13] shows that many teachers have not reached the minimum required competencies, despite having attended training. In addition to pedagogic competence, teachers also need to adapt to technological developments. Teachers' professionalism is needed in the use of technology so that it has a positive impact on development and learning [14]. Technological developments are a must that is constantly updated by every individual. Even the current generation is included in the alpha generation. This generation is a generation that is familiar and used to gadgets [15].

Educational technology is positioned as one of the most decisive aspects in the field of education personnel who are present to support educators [16]. The use of technology in education can be one of the efforts to optimize students' learning capabilities. Through the use of technology, students can more easily capture the content of learning and improve their various skills [17]. In its systematic study, it is shown that the integration of interactive media and the use of learning technology have a direct impact on increasing students' interest in learning and academic outcomes. In addition, the development of information technology opens wide opportunities to enrich the learning process in elementary schools. Various forms of technology, such as digital media, online learning platforms, and interactive applications, are becoming devices that can increase student engagement and the effectiveness of the teaching process [20]. However, the actual situation on the ground

is still not in line with what is expected. The use of technology by teachers in Public Elementary Schools, especially in the Kalidoni District area, Palembang City, faces various challenges that are not simple.

Based on the results of researchers' observations in several Public Elementary Schools in Kalidoni District, Palembang City 1) Many teachers are still grappling with adapting to digital devices, because not all of them were born and raised in the era of technology. The low level of digital literacy is not solely due to a lack of willpower, but also due to limited opportunities to learn and develop in this field. 2) Inadequate infrastructure, such as slow internet access, limited availability of devices, and learning spaces that have not been designed for technology-based learning, which further narrow the space for teachers to move in implementing digital innovations. 3) The lack of practical and continuous technical training makes teachers feel uneasy, even worried about making a mistake in using technology in the classroom.

All of this reflects that digital transformation in the world of education is not just about introducing new devices or applications, but about building the mental, emotional, and competent readiness of educators themselves. The more effectively these three elements interact, the more optimal the development of students' cognitive, affective, and psychomotor abilities. Recent studies show that the integration of pedagogic competencies and technological integration can significantly improve learning outcomes [21]. Referring to previous research, the novelty in this study lies in the conceptual and operational integration between pedagogical competence and technology utilization, empirically tested in a local context that has real infrastructure and digital literacy challenges, and analyzed within the framework of improving elementary school students' learning outcomes, especially in Kalidoni sub-district, Palembang city.

Based on the explanation that has been submitted, the researcher intends to conduct research entitled The Influence of Teacher Pedagogic Competence and Technology Utilization on Student Learning Outcomes in Public Elementary Schools in Kalidoni District, Palembang City. Thus, the objectives of this study are 1) to determine the influence of teacher pedagogical competence on student learning outcomes in public elementary schools in Kalidoni sub-district, Palembang city; 2) to determine the influence of technology utilization on student learning outcomes in public elementary schools in Kalidoni sub-district, Palembang city; 3) to determine the influence of teacher pedagogical competence and the use of technology together on student learning outcomes in public elementary schools in Kalidoni sub-district, Palembang city.

MATERIAL AND METHODS

Methods

This study employed a quantitative research design using a survey method to examine the influence of teachers' pedagogical competence and technology utilization on student learning outcomes. The research was conducted in Public Elementary Schools (SD Negeri) located in Kalidoni District, Palembang City, Indonesia. Kalidoni District, as one of the most

dynamic educational areas in Palembang City, boasts a diversity of school characteristics and teacher backgrounds that reflect the broader reality of basic education. These include schools with relatively adequate facilities and those still facing various limitations, and teachers who are already familiar with technology and those still adapting to it. These conditions make Kalidoni a strategic and representative location to examine the influence of the two key variables that are the focus of this research. The population of this study comprised all Public Elementary Schools in Kalidoni District, totaling 28 schools distributed across five sub-districts: Kalidoni, Sei Lais, Bukit Sangkal, Sei Selincah, and Sei Selayur, with a total of 522 teachers. Participants consisted of class teachers and subject teachers with varying teaching experience backgrounds and digital literacy levels, thus reflecting the real conditions of pedagogical competence and technology utilization in public elementary schools in the region.

Instrument

Data was collected using questionnaires and documentation. The questionnaire was designed to measure three variables: teachers' pedagogical competence (X_1), technology utilization in learning (X_2), and student learning outcomes (Y). The questionnaire consisted of closed-ended items measured using a five-point Likert scale, ranging from 1 (Never), 2 (Almost Never), 3 (Sometimes), 4 (Often), to 5 (Always). The items were developed based on theoretical indicators of pedagogical competence and educational technology utilization. Documentation was used as supporting data to strengthen the validity of the research, including school records and relevant academic documents.

Procedures

The research procedures were conducted in several stages. First, the researchers identified the research population and determined the sample based on predefined criteria. Second, the research instruments were developed and validated prior to data collection. Third, questionnaires were distributed to respondents (teachers) in the selected schools. Finally, the collected data were organized, coded, and prepared for statistical analysis.

Data Analysis

Data analysis in this study was conducted using SPSS version 25 through several systematic stages designed to ensure instrument quality and the accuracy of hypothesis testing. In the initial stage, instrument validity and reliability were tested. After the instrument was declared valid and reliable, a normality test was performed. In the final stage, hypothesis testing was conducted using regression analysis.

Validity and Reliability Test

The validity test was conducted using the Product Moment correlation, where each item was considered valid if the correlation coefficient exceeded the critical value at a significance level of 0.05. The reliability test was performed using Cronbach's Alpha, with a coefficient of ≥ 0.70 indicating that the instrument was reliable.

Normality Test

The Kolmogorov–Smirnov test was employed to examine the normality of the data distribution. Data were considered normally distributed if the significance value was greater than 0.05.

Hypothesis Testing

Hypothesis testing was conducted using regression analysis. Simple linear regression was applied to test the partial effects of pedagogical competence (X_1) and technology utilization

(X_2) on student learning outcomes (Y). Multiple linear regression was used to test the simultaneous influence of X_1 and X_2 on Y. The t-test was used to test partial hypotheses, with the null hypothesis rejected if tcount > ttable. The F-test was employed to test the simultaneous hypothesis, where the null hypothesis was rejected if Fcount > Ftable. A significance level of $\alpha = 0.05$ was applied in all statistical tests.

RESULTS AND DISCUSSION

Based on the data collected through questionnaires, the largest number of respondents came from SD Negeri 182 Palembang, with 27 teachers, while the smallest number of respondents came from SD Negeri 183 Palembang, with 15 teachers. Based on the descriptive statistical results, the average score (*mean*) of teachers' pedagogic competence is 106.19 with *a standard deviation* of 12.32. The use of technology has a *mean* of 106.44 with *a standard deviation* of 17.31. Meanwhile, student learning outcomes had a *mean* of 80.94 and *a standard deviation* of 5.14.

3.1.1. Data Prerequisite Test

The Normality Test was carried out with *the One-Sample Kolmogorov–Smirnov Test* with the help of the SPSS version 26 program.

Table 1. Normality Test

One-Sample Kolmogorov-Smirnov Test

	N		98
Normal Parameters[a,b]	Mean	0.0000000	
	Std. Deviation	1.52756954	
	Test Statistic		0.080
	Asymp. Sig. (2-tailed)[c]		0.127

a. Test distribution is Normal.
b. Calculated from data.

Source: SPSS processed data version 26, 2025

Table 1 shows a significance value of 0.127 (greater than 0.05), so it can be concluded that the residual in the regression model is normally distributed so that the assumption of normality is met. Furthermore, the linearity test was carried out by looking at the test results on *the Condition Index* and *Variance Proportions values*

Based on the Condition Index value which is below 30 and the distribution of variance proportions that do not show an extreme pattern of collinearity, it can be concluded that the relationship between the variables X_1 and X_2 with Y is linear and meets the assumption of linearity. The results of the multicollinearity test are seen from the values of Tolerance and Variance Inflation Factor (VIF). If the Tolerance value is > 0.10 and VIF is < 10, then the model is declared free of multicollinearity symptoms

Table 2 Multicollinearity Test

Coefficients[a]

Model		Collinearity Statistics	
		Tolerance	VIF
1	(Constant)		
	Pedagogic Competence of Teachers	.999	1.001
	Using Technology	.999	1.001

a. Dependent Variable: Studen Learning Outcomes

Source: SPSS output version 26, 2025

In table 2 of the multicollinearity tests presented, the variables X_1 and X_2 have Tolerance = 0.999 and VIF = 1.001, respectively. The VIF value is used to see the inflation rate of variance due to correlations between variables. General criteria 1) VIF > 10 → indicate multicollinearity 2) VIF < 10 → safe model. The VIF value for both variables was 1.001, which is a very low number and indicates that there are no symptoms of multicollinearity in the model. The next prerequisite test is a heterokedasticity test by conducting a Glejser test, provided that if the significance value is greater than 0.05, there are no symptoms of heteroscedasticity.

Table 5. Heteroscedasticity Test

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	1.273	1.109		1.148	0.254
	Pedagogic Competence of Teachers	-.009	.008	-.104	-1.029	0.306
	Using Technology	.007	.006	.124	1.221	0.225

a. Dependent Variable: Student Learning Outcomes

Sumber: Output SPSS versi 26, 2025

The hypothesis test was carried out to determine the extent to which independent variables, namely teacher pedagogic competence (X1) and technology utilization (X2), affect student learning outcomes (Y) at Public Elementary Schools in Kalidoni District, Palembang City. Hypothesis tests include partial test analysis (t test), simultaneous test (F test), and determination coefficient (R^2). The results of multiple linear regression tests to answer hypotheses 1 and 2 can be seen in the table;

Table 6. Multiple Linear Regression Test

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	29.672	1.685		17.612	.000
	Pedagogic Competence of Teachers	.267	.013	.640	21.007	.000
	Using Technology	.215	.009	.723	23.739	.000

a. Dependent Variable: Student Learning Outcomes

Source: SPSS output version 26, 2025

Based on table 5, it is obtained that the value of the constant of the regression equation α is 29.672 and the value of the coefficient of the free variable b1 is 0.267 and the value of b2 is 0.215, then the regression equation is obtained as follows referring to the Coefficients table, as follows:

Y = 29.672 + 0.267X1 + 0.215X2

From the equation shown above, it means that student learning outcomes (Y) have improved positively with the teacher's pedagogic competence (X1) and the use of technology (X2). Based on the output in table 6. The Multiple Linear Regression Test obtained that the significant value on the teacher's pedagogic competence (X1) of < 0.001 is less than 0.05, then hypothesis 1 where Ho is rejected means that there is a significant

influence of the teacher's pedagogic competence on the learning outcomes of students at Public Elementary School in Kalidoni District, Palembang City.

Meanwhile, the significant value of the second independent variable is a value of <0.001 smaller than 0.05 so that Ho is rejected which means that the free variable, the use of technology, affects the bound variable, the learning outcomes of students at Public Elementary School in Kalidoni District, Palembang City. Thus, there is a significant influence of the use of technology on student learning outcomes at SD Negeri Kalidoni District, Palembang City.

Discussion

The Influence of Teachers' Pedagogic Competence on Student Learning Outcomes at Public Elementary Schools in Kalidoni District, Palembang City.

Based on the results of multiple linear regression analysis presented in Table 4.15, the regression coefficient value of the teacher's pedagogic competency variable (X1) on student learning outcomes (Y) was 0.267 with a significance value of < 0.001. The *calculated t* value of 21.007 which is greater than *the t* table (1.985) shows that the variable of teachers' pedagogic competence has a significant influence on student learning outcomes. This means that the higher the pedagogic competence possessed by elementary school teachers, the higher the student learning outcomes produce. Thus, the first hypothesis (H1) which Public that "Teachers' pedagogic competence has a significant effect on student learning outcomes" is acceptable.

The findings of this study are consistent with constructivist learning theory which emphasizes the importance of the role of teachers as learning facilitators. According to Piaget [22], Students build their own knowledge through active learning experiences. In this context, teachers who have high pedagogic competence can manage the learning process in such a way that students can construct knowledge through direct experience and meaningful activities. Therefore, teachers with good pedagogic competence can facilitate students to learn actively, think critically, and understand concepts more deeply.

In line with the results of this study, Hidayat et al, in their research entitled *Pedagogic Competence of Teachers in Building Elementary School Student Learning Outcomes* found that teachers' pedagogic competence has a significant influence on the achievement of student learning outcomes [23]. Teachers who understand the characteristics of students and apply the right learning methods are proven to be able to increase student participation in the learning process. Teachers' pedagogic competence and mastery of technology have a simultaneous effect on the learning outcomes of elementary school students. In the study, it was explained that teachers with good pedagogic skills not only understand learning theories, but are also able to apply them creatively and adaptively when carrying out teaching and learning activities in the classroom [24].

The results of this study also support the findings of Nini et al, revealing that teachers' pedagogic competence has a positive effect on students' learning achievement in elementary school, which means that the better the teacher's pedagogic competence, the higher the

student's learning achievement [25]. They explained that good pedagogic competence reflects the teacher's ability to design learning that is relevant to the needs of students, as well as the ability to present learning responses that support student progress. Thus, teachers play a big role in shaping a conducive learning climate and fostering student learning motivation.

If it is related to the empirical conditions at the Kalidoni District Public Elementary School, Palembang City, most of the teachers have S1 educational qualifications and a working period of between 11 to 20 years. This condition shows that the teacher has sufficient experience and professional ability in carrying out the learning process. Based on the results of the research questionnaire, the pedagogic competence of teachers in this region is in the high category, which is shown by an average score of more than 80 on the assessment scale. Meanwhile, students' learning outcomes are also classified as good with an average score above the Minimum Completeness Criteria. This indicates that the success of student learning outcomes is inseparable from the ability of educators to organize effective teaching and learning activities.

Practically, teachers' pedagogic competence has a significant influence on the quality of the process and learning outcomes through several main aspects. These aspects include the teacher's ability to understand students' conditions, abilities, and backgrounds in depth, mastery of theoretical foundations and basic rules of learning, capacity to compile and improve relevant curriculum content, skills to implement learning activities that have educational and meaningful value, and the ability to conduct comprehensive evaluation of learning outcomes.

Teachers who have a strong understanding of the uniqueness and condition of students starting from the perspective of initial abilities, student learning styles, interests, and special needs will be able to design and choose a more appropriate learning strategy. The approaches used can vary, such as thematic, scientific, differentiation, and project-based learning approaches, so that students can be facilitated to think critically, creatively, actively, and fully engage in the learning process.

In addition, teachers who are competent in designing and implementing learning outcome evaluations are not only able to measure students' mastery of the material but can also interpret the assessment results accurately. Through good evaluation, teachers can provide appropriate follow-ups, such as learning improvement activities aimed at students who have not met their competencies, as well as material expansion activities for students who have exceeded the learning targets. Thus, pedagogic competence is the foundation in creating adaptive, quality, and development-oriented learning for students. The use of learning media designed by teachers with high pedagogic competence can strengthen students' mastery of concepts and improve their learning outcomes [26] . Teachers with good pedagogic skills tend to use media, props, and a variety of strategies in teaching and learning activities to help students be able to capture the content of learning concretely.

In addition, teachers with good pedagogic competence not only master the subject

matter, but are also able to create an interactive and innovative learning environment, especially in the context of basic education that demands active and enjoyable learning [24]. Teachers who have good pedagogic competence tend to reflect on teaching and learning activities that have been explained continuously, assess the effectiveness of the methods used, and adjust based on the results of learning evaluation.

In terms of the statistical results of this study, the contribution of the teacher's pedagogic competence variable to student learning outcomes can be explained through the determination coefficient value (*R Square*) of 0.912 or 91.2% (together with the X2 variable). This figure indicates that teachers' pedagogical competence together with the use of technology has a very large influence on the variation in student learning outcomes, while the remaining 8.8% is explained by other factors outside the model. This emphasizes that the role of teachers' pedagogic competence is very dominant in determining the quality of student learning outcomes in elementary school.

This finding also shows that teachers in the Kalidoni District area have been able to implement competency-based learning effectively, both in terms of planning, implementation, and evaluation. This can be seen from the consistency between the high average score of pedagogic competence and the achievement of good student learning outcomes. Teachers who are pedagogically competent will be better able to understand the diversity of students, motivate them to learn, and guide them to reach their maximum potential.

Conceptually, the results of this study strengthen the theoretical view of teacher competence from [27] which public that pedagogic competence is the ability of teachers to manage student learning which includes understanding students, learning design, learning implementation, and evaluation of learning outcomes. Teachers with superior pedagogical skills will display professional behavior that is able to create appropriate and economical learning interactions.

In short, it can be said that the pedagogic quality of teachers plays a big role in determining the success of student learning. at the Public Elementary School in Kalidoni District, Palembang City. The improvement of learning outcomes is not only determined by students' intellectual abilities, but also greatly influenced by the teacher's ability to manage meaningful learning and in accordance with the needs of students. Therefore, the improvement of teachers' pedagogic competence through continuous training, academic supervision, and professional development needs to be continued so that the quality of basic education in the region increases.

The Effect of Technology Utilization on Student Learning Outcomes in Public Elementary Schools in Kalidoni District, Palembang City.

The results of multiple linear regression analysis in Table 4.15 show that the variable of technology use in learning (X2) has a regression coefficient of 0.215 with a significance value of < 0.001 and a *t-value of 23.739 which is greater than* the t *of* the table (1.985). These

findings show that the use of technology has an effect and is significant on student learning outcomes. In other words, the more optimal the use of technology by teachers during the learning process, the higher the learning outcomes achieved by students.

Several studies support that the use of digital technology in learning activities teaches maximizing the interests and learning outcomes of elementary school students, especially in the era of Society 5.0 where students are expected to be able to access and manage information critically [28]. The use of technology allows teachers to present learning through attractive visual media and involve students in active learning so that students can easily understand abstract concepts.

In addition, Maskanah and Sae emphasized that the use of technology during online learning during the pandemic is able to increase students' learning motivation [29]. In their research, students who are used to learning with digital media tend to have a better understanding of the material because they can repeat the material through learning videos or interactive platforms. This shows that the use of technology not only supports and supports students' academic understanding but also increases motivation and independence in learning. Teachers who utilize learning tools supported by information technology have the potential to improve students' academic achievement. Teachers who are competent in utilizing technology tend to choose media that suits the characteristics of students, subject matter, and learning objectives. For example, the use of interactive applications for mathematics learning or science learning videos that can show phenomena in real life. Thus, students gain a more concrete and easy-to-understand learning experience.

In the context of Kalidoni District Public Elementary School, Palembang City, many teachers have integrated information and communication technology as part of their learning strategy. Based on the results of the research questionnaire, the use of technology is in the high category with an average score above 80 on the assessment scale. This utilization includes the use of *PowerPoint*, learning videos, educational applications, and online platforms that support inquiry learning, problem-based learning and project-based learning. This reinforces statistical findings that show the positive influence of technology on student learning outcomes.

In terms of theory, the use of technology is also closely related to *Constructivist Learning Theory*, which allows students to design their knowledge through interaction with the learning environment, including through digital media. Technology provides ample opportunities for students to explore knowledge more deeply, collaborate with peers in various learning activities, and access a wide range of learning resources independently and flexibly. Using digital devices, online learning platforms, and interactive media, students can develop critical thinking skills, creativity, and independent learning according to their respective needs and rhythms.

In this context, the role of teachers is no longer limited to delivering information alone, but develops into facilitators, guides, and directors in the technology-based learning process. Teachers play a role in ensuring that the use of technology by students takes place

effectively, ethically, and is directed towards achieving learning goals. Teachers also help students choose credible sources, utilize the right applications or media, and build a collaborative and meaningful digital learning environment. Thus, technology is not just a tool, but a strategic tool that enriches the learning experience and encourages the creation of innovative and transformative learning.

In addition to the cognitive aspect, the use of technology also has an impact on motivation and *higher order thinking skills*. The integration of pedagogic competencies and the use of technology in learning improves students' ability to analyze, synthesize, and evaluate. Teachers who integrate technology tools appropriately can design challenging learning activities, spur creativity, and increase student learning independence. The results of this study are also in line with the findings of Hoerunnisa and Fauziah showing that the use of technology in science learning makes it easier for students to master concepts through visual displays and direct interaction so that learning outcomes increase. In addition, technology provides opportunities for teachers to differentiate learning, adapt materials to students' abilities, and provide feedback quickly and accurately [30].

Practically, the use of technology in learning activities provides two main benefits that are very significant. First, technology plays a role as a medium that can present material in a more real, visual, and contextual way, thereby helping students understand concepts that were previously abstract. Using videos, animations, interactive simulations, and various other digital resources, students can experience a more engaging, relevant, and appropriate learning experience. Second, technology is a much more effective and efficient means of evaluation for teachers in assessing student learning achievements. By utilizing online quizzes, *Learning Management System* (LMS) platforms, and interactive assessment applications, teachers can monitor students' understanding directly, find areas that are still difficult, and map competency achievement in a more structured manner.

In addition, technology also provides wider opportunities for teachers to carry out learning follow-up in a more strategic and targeted manner. Through various *digital platforms*, teachers can present more varied and challenging enrichment materials for students who have achieved or exceeded the set competencies. On the other hand, technology allows teachers to design remedial programs that are more personalized, interactive, and in accordance with the specific needs of students who encounter obstacles in understanding the material. With the support of features such as automated learning outcome analysis, student progress tracking, and access to additional learning resources, teachers can ensure that every learner receives timely, relevant, and effective interventions. This makes the learning follow-up process more adaptive and has the potential to increase the equitable distribution of the quality of learning outcomes in the classroom. Thus, the application of technology not only improves the quality of learning but also supports teaching and learning strategies that are able to adapt and respond appropriately to the needs of each student.

The value of the determination coefficient (*R Square*) of 0.912 shows that the variable

of technology use together with the pedagogic competence of teachers contributes 91.2% to the variation in student learning outcomes, while the remaining 8.8% is influenced by other factors. These findings strengthen the argument that the quality of basic education supported using technology is one of the key factors. Based on this description, it can be stated that the use of technology has a significant influence on student learning outcomes at Public Elementary Schools in Kalidoni District, Palembang City. Teachers who can implement technology appropriately can optimize student engagement, facilitate active learning, and encourage the achievement of optimal learning outcomes. Therefore, the development of teachers' technology competencies, both through formal training and *workshops*, needs to be continuously improved so that the use of technology in learning becomes more innovative, creative, and has an impact on improving student learning outcomes.

The Influence of Teachers' Pedagogic Competence and the Joint Use of Technology on Student Learning Outcomes at Public Elementary Schools in Kalidoni District, Palembang City.

Based on the results of the hypothesis test that has been carried out, the correlation coefficient value (R) is 0.955 and the determination coefficient value (R^2) is 0.912. These findings show that 91.2% of the variation in student learning outcomes can be explained simultaneously by the teacher's pedagogic competence (X_1) and the use of technology in learning (X_2), while the remaining 8.8% are influenced by other factors outside the research model. The Fcal value of 491.258 with a significance level of $p < 0.001$ indicates that the regression model used is very significant, so that the two independent variables together have a strong influence on student learning outcomes.

The results of this study are in line with the findings of Marleta, Wardiah, and Fitriani, which show that teachers' pedagogic competence has a positive and significant effect on student learning outcomes. Pedagogic competence is reflected in the teacher's ability to design, implement, and evaluate learning in accordance with the characteristics of students and learning goals [31]. Teachers with good pedagogic competence can create a structured, interactive, and student-centered learning process, so that it has a direct impact on improving learning outcomes.

This finding is also strengthened by an international study conducted by [32] which affirms that teachers' pedagogic competence is a key factor in improving the quality of learning and student learning outcomes. Teachers who have a deep pedagogic understanding can choose appropriate learning strategies, provide constructive feedback, and create a learning environment that supports students' cognitive and affective development.

In addition to pedagogic competence, the use of technology in learning has also been proven to make a significant contribution to student learning outcomes. The results of this study are in line with the findings of Hidyat & Nikfimah [28] which emphasized that the

use of digital technology in learning is able to increase student motivation, engagement, and understanding of concepts, especially in the Society 5.0 era. Technology allows for the presentation of learning materials that are more visual, interactive, and contextual, helping students understand abstract concepts more easily.

Schindler et al. (2017) emphasized that the application of technology is very crucial in supporting online and blended learning. Teachers who have strong pedagogic competence can design technology-based learning systematically using learning videos, digital modules, online quizzes, and interactive learning applications. This ensures that changes in learning methods do not reduce the quality of student learning outcomes but rather increase the effectiveness and flexibility of learning. This finding is also in line with the study of Jin et al., (2020) which states that the use of digital technology pedagogically can create a more dynamic and meaningful learning environment, especially when teachers play an active role as facilitators and learning guides.

Overall, the results of this study confirm that teachers' pedagogic competence and the use of technology in simultaneous learning have a significant effect on student learning outcomes. These findings show that improving the quality of learning cannot be separated from the professional development of teachers, especially in the pedagogic and technological literacy aspects. Therefore, efforts to improve pedagogic competence and the use of technology through continuous training, professional mentoring, and supportive school policies are strategic steps to realize effective, adaptive, and oriented learning to improve student learning outcomes.

CONCLUSION

Referring to the data that has been collected by the researcher and the results of testing the 98 respondents at SD Negeri Kalidoni District, Palembang, it can be concluded that the following things can be concluded:

1. Teachers' pedagogic competence has a significant effect on student learning outcomes at Public Elementary Schools in Kalidoni District, Palembang City. Teachers who have high pedagogic competence can plan, implement, and evaluate learning effectively to improve students' understanding and learning achievement.
2. The use of educational technology has a significant effect on student learning outcomes. The use of digital learning media and technology-based learning resources increases student motivation, interest, and involvement in the learning process.
3. Teachers' pedagogic competence and the use of technology simultaneously have a stronger and more considerable influence on student learning outcomes than the influence of each variable separately. The integration of these two factors creates learning that runs better, is more motivating, and tailored to the characteristics of students.

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