

RESEARCH ARTICLE

Influences of gadgets on students' learning achievement for elementary school

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Abstract: This research aims to determine how much influence gadgets have on the learning outcomes of grade 4 elementary school students. This research is quantitative research with an ex post facto research design. In this study, the sampling technique used random cluster sampling with a population of 859 students and a sample of 141 students. The research instruments were questionnaires and tests. Instrument test using validity test and reliability test. The data analysis of the normality test, linearity test, and hypothesis test with the regression test, f-test, t-test and the coefficient of determination. The study's results showed a significant effect of the use of gadgets on student learning outcomes by 23.5%, with a correlation value of 0.491. This indicates that the relationship influence of the role of parents, students' learning motivation and the use of gadgets on student learning outcomes is powerful and significant.

Keywords: influence gadgets, student achievement, learning outcomes, elementary school

1 Introduction

The development of technology and information has progressed very rapidly, marked by advances in the field of information and technology. The Indonesian nation is one of the nations involved in advancing information media and technology (Aguayo *et al.*, 2022; Harun *et al.*, 2021). The current use of gadgets is undoubtedly supported by the development of communication and information technology, one of which is the entry of the internet as an online era (Barianos *et al.*, 2022). Where activities or activities are carried out connected via internet technology, this can be seen from the high number of active gadget users in the world based on data from we are social (Dahal *et al.*, 2022). In August 2014, active gadget users reached almost 3 billion, and as many as 71 million came from Indonesia. The use of gadgets or tools that can be easily connected to the internet has increased from time to time (Julianingsih *et al.*, 2021). Currently, approximately 45 million people use the internet, of which 9 million people use cell phones to access the internet. Whereas in 2001, the number of internet users in Indonesia was only half a million of the total population. This number is increasing along with the low price of mobile phones in the market.

Gadgets make it easier for everyone to access all information, but what about when devices are used by early childhood who should play with their peers, socialize with their environment, explore themselves, and think creatively in addressing problems because of the advantages of gadget applications? Gadgets can be used to develop thoughts, ideas, businesses and lifestyles of teenagers or adults or people with special interests. On the contrary are not used as entertainment media, for playing games, or watching an event online, online tv or youtube for early childhood (Suzana *et al.*, 2020).

For adults, technology is used to support various activities or their work. As for children, this technology has a dual function (Kalogiannakis & Papadakis, 2017; 2020). From a positive perspective, it can stimulate children's brain performance with various applications of motor activities rarely found in everyday life (Kastriti *et al.*, 2022). The negative side is that they will always depend on technology resulting in the child being indifferent to the surrounding environment and not understanding the various ethics and norms around him. So, saying hello or talking to the surroundings is reduced. Many parents also complain that their children prefer to play with gadgets than study. It affects children's learning outcomes (Mohammed, 2022). Of course, it is not surprising that children can operate and use widgets to see the things they like. As explained above, devices have an impact on children (Papadakis, 2018; 2021). Especially in the time of use for the long term. Although most parents certainly understand the effects caused by gadgets, parents still allow them to use them (Saruji *et al.*, 2017).

In the school environment, students must also make rules regarding using gadgets. For example, students are prohibited from bringing devices to school. According to the Asian Parent

Insight, surveyed in early 2014, as many as 2.500 parents in Singapore, Thailand, Indonesia, Malaysia, and the Philippines were respondents to this survey (<http://id.theasianparent.com/hasil-survey-smartphone-yang-shocking>).

The survey conducted by Asian Parent Insight is based on an age range of 3-8 years. The place where they use gadgets is also important because the site where they use devices must always be under the supervision of their parents so that their use of gadgets can be suppressed and reduced. However, according to data from the Asian Parent Insight, they often use devices at home, which should have a level of direct supervision from parents.

Research by [Maria & Novianti \(2020\)](#) showed the effects of using gadgets on student development and learning outcomes. Research from [Jannah & Rachman \(2021\)](#) about the effect of parenting and gadgets on learning outcomes, the results of this study show 1) there is an influence of parenting style on the learning outcomes of social studies, 2) there is an effect of using gadgets on the learning outcomes of social studies.

Based on the explanation above, technology is beneficial to help teachers in the implementation of learning. Teachers must be responsive and able to use it. So that learning becomes more interesting. In another research ([Istiqomah, 2019](#)), there is a positive and significant relationship between the intensity of gadget use and learning motivation and the social studies learning outcomes for class V Public Elementary School Se-Gugus Drupadi Semarang City. This is indicated by r-count 0.469 and r-table 0.1422 ($0.469 > 0.1422$), meaning that the intensity of using gadgets and learning motivation together affect student learning outcomes.

2 Literature review

The gadget is a term that comes from English, which means a small electronic device that has many functions. According to [Wahyuningtyas et al. \(2013\)](#), "a gadget is an electronic device or instrument that has a practical purpose and function to help human work". Gadgets can have positive and negative effects on children's learning achievements. Learning achievement is the results obtained in the form of impressions that result in changes in the individual due to an activity ([Sullivan & Glanz, 2013](#)). If student learning activities are disrupted by playing with too many gadgets, there will be a decrease in student achievement; however, if students use devices to increase knowledge at school and remember their obligations as students to learn.

The positive impacts of using gadgets include 1) the development of imagination, 2) training intelligence, 3) increased self-confidence, and 4) developing skills in reading, mathematics, and problem-solving. Meanwhile, the negative impacts of using gadgets include 1) decreased concentration while studying, 2) laziness to write and read, 3) decline in social skills, 4) addiction, 5) may cause health problems, 6) cognitive development of early childhood is hampered, 7) inhibiting language skills, 8) can influence early childhood behaviour.

According to [Yeung et al. \(2021\)](#), learning outcomes result from an interaction between acts of learning and doing of teaching. From the teacher's perspective, the front of education ends with evaluating learning outcomes. From the student's perspective, learning outcomes are the end of a piece or the peak of the learning process. According to [Susanto et al. \(2021\)](#), "changes that occur in students, both concerning cognitive, affective, and psychomotor aspects as a result of learning."

[Lin et al. \(2016\)](#) explain that internal and external factors influence learning outcomes. Internal factors include 1) physical factors consisting of health factors and disability factors, 2) psychological factors consisting of intelligence, attention, interests, talents, motives, maturity, and readiness, and 3) fatigue factors, both physical and spiritually tired. External factors include how parents educate, the relationships between family members, the home atmosphere, family economic conditions, understanding of parents, and cultural background. They also include school factors such as teaching methods, relationships between teachers and students, student-student relations, school discipline, learning tools, school time, lesson standards oversize, building conditions, learning methods, and homework assignments.

3 Methodology

This research is quantitative research with a *rex post facto* research design. This means that it is a systematic empirical search in which the researcher cannot directly control the independent variable because the event has already occurred or cannot be manipulated by its nature. This research uses a descriptive approach because its activities include collecting data to test hypotheses or answer questions concerning the current state of the subject of a study ([Arikunto, 2010](#)).

The population in this study were 4th-grade students of a Public Elementary School in Bonang District, Demak Regency, totalling 859 students in the 2019/2020 school year. The sample is 141

grade 4 elementary school students in the Diponegoro Cluster, Bonang District, Demak Regency. The sampling technique used was random cluster sampling and purposive random sampling. This study's data collection method was a questionnaire and a test. The instrument test uses validity and reliability tests. With data analysis, Normality Test, Linearity Test, Hypothesis Testing with Regression Test, F-Test, T-Test and the coefficient of determination.

4 Results

4.1 Description of data

The data obtained in this study consisted of questionnaire answer data from 2 variables, namely teacher professionalism and teacher performance. The data is processed into a description of the data. (see Table 1)

Table 1 Data description

	Student Learning Outcomes	Gadget Usage
No. (Valid)	141	141
Mean	115.18	108.57
Median	116.00	109.00
Mode	117	110
Minimum	93	88
Maximum	130	123
Sum	16241	15309

The results of data processing respondents' perceptions of the variable use of gadgets with a mean value of 108.57, a minimum value of 88, and a maximum value of 123. Table 2 shows the frequency distribution of gadget usage variable.

Table 2 Frequency distribution gadget usage

No.	Interval	Absolute Frequency	Relative Frequency	Category
1	88 – 94	5	4%	Very low
2	95 – 101	16	11%	Low
3	102 – 108	46	33%	Currently
4	109 – 115	51	36%	High
5	116 – 123	23	16%	Very high
Total		141	100%	

Based on Table 2 results, we can conclude that frequency distribution gadget use is 4% (or five respondents) in the deficient category, 11% (or 16 respondents) in the low category, 33% (or 46 respondents) in the medium category, 36% (or 45 respondents) in the high category, and 16% (or 23 respondents) in the last category. Mean gadget use is as extensive as 108.57, which is located in the high category and the highest frequency distribution is in the high category with 36%. Frequency distribution results from gadget use, illustrated in a bar chart as shown in Figure 1.

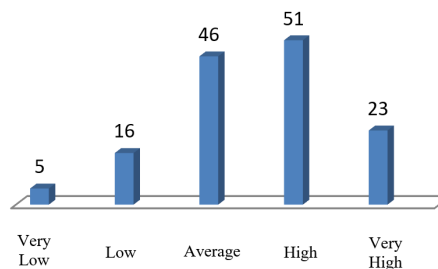


Figure 1 Frequency distribution results in gadget use

4.2 t-test

H0 = 0: There is no influence between the variables of the role of parents, learning motivation, and the use of gadgets on student learning outcomes.

Ha = 0: There is an influence between the variables of the role of parents, learning motivation, and the use of gadgets on student learning outcomes.

Table 3 shows the results of the t-test for hypothesis 4.

Based on Table 3, it can be seen that:

(1) The resulting regression equation is $Y = 9.141 + 0.760X1 + 0.069X2 + 0.187X3$;

Table 3 t-test results (Coefficients)

Model 1	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	Beta	Std. Error	Beta		
Constant	9.141	6.251		1.462	0.146
The role of parents	0.750	0.056	0.720	13.291	0
Student's motivation to study	0.069	0.059	0.060	1.168	0.245
Gadget Usage	0.187	0.057	0.176	3.298	0.001

(2) Dependent variable value student learning outcomes can be seen from the constant value of 9.141 with a note of independent variables permanent;

(3) The influence of the independent variable role of parents on student learning outcomes, when viewed from the magnitude of the regression coefficient 0.760, can be interpreted that every change in the role of parents is one unit. The variable student learning outcomes will increase by 0.760 with notes that other independent variables remain;

(4) The influence of independent variables on student learning motivation on student learning outcomes, when viewed from the magnitude of the regression coefficient 0.069, can be interpreted that every change student's motivation to study is one unit. The variable student learning outcomes will increase by 0.069 with notes that other independent variables remain.

The effect of the independent variable on the use of gadgets on student learning outcomes, when viewed from the magnitude of the regression coefficient 0.187, can be interpreted that every change in gadgets using one unit. The variable student learning outcomes will increase by 0.187 with notes that other independent variables remain.

4.3 F-test

Based on Table 4, the results of the ANOVA test the role of parents, learning motivation and the use of gadgets together on student learning outcomes, namely:

(1) The significance value of 0.000 is smaller than the significance level of 0.05 or 0.000 0.05;

(2) The value of F-count is 130.357, and the value of F-table at a confidence level of 0.05 is the value of 3.509, then F-count > F-table or 130.357 > 3.062;

(3) There is a significant effect between the variables of the parent's role, learning motivation and the use of gadgets on the variables of student learning outcomes significantly.

Table 4 F-test results for hypothesis 4 (ANOVA^b)

Model 1	Sum of Squares	df	Mean Square	F	Sig.
Regression	5479.598	3	1826.533	130.357	0.000 ^a
Residual	1919.608	137	14.012		
Total	7399.206	140			

4.4 Test coefficient of determination (R test)

Based on Table 5, the value of adjusted R Square is 0.755 or 75.5%, meaning that the influence of the role of parents, student learning motivation and the use of gadgets together on student learning outcomes is 0.755 or 75.5% and the remaining 24.5 % influenced by other variables outside the study.

Table 5 Hypothesis determination test 4 (Model Summary^b)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.861 ^a	0.741	0.735	3.743

The correlation value of the influence of the role of parents, students' learning motivation and the use of gadgets on student learning outcomes was 0.861. This shows that the relationship between the influence of the role of parents, students' learning motivation and the use of gadgets together on student learning outcomes is powerful and very significant.

5 Discussion

Descriptive analysis results show respondents' perceptions of using gadgets in the high category. This means that respondents perceive the use of gadgets to have a role and influence on student learning outcomes. Students want gadgets because they can easily find the information

they want. In the past, a student who had to access the internet for an assignment had to visit an internet cafe.

Based on the hypothesis test, the results obtained from using gadgets on student learning outcomes is quite strong correlation value the effect of using gadgets on student learning outcomes by looking at the R-value is solid and significant. According to [Keumala et al. \(2019\)](#), a gadget is an electronic device or instrument with a practical purpose and function to help humans work. Gadgets can have positive and negative effects on children's learning achievement. Learning achievement is the result obtained in the form of impressions that result in changes in the individual as a result of an activity. The positive impacts of using gadgets include 1) the development of imagination, 2) training intelligence, 3) an increase in self-confidence, and 4) developing skills in reading, mathematics, and problem-solving.

In this modern era, gadgets can now be used like computers ([Papadakis & Orfanakis, 2018](#)). In the gadget, there is also an application to open the internet. Online education services provide educational services for users (students) by using the internet as a medium ([Papadakis et al., 2021](#)). This online service can consist of various stages of the educational program process, such as registration, entrance test, school payments, assignments, case discussions, examinations, assessments, discussions, and announcements ([Papadakis & Kalogiannakis, 2017](#)). Distance education can take full advantage of internet technology, provide effectiveness in terms of time and place and even improve the quality of education. Forms of materials, exams, quizzes and other educational methods can also be implemented on the web, such as teacher materials are made in the form of presentations on the web and can be downloaded by students ([Papadakis, 2022](#)). Therefore, even though it has a significant influence, the use of gadgets by students must also be considered for its negative impact.

[Anuar et al. \(2021\)](#) conveyed that by using appropriate technology, teachers can increase student motivation in learning. This is because technology-based games will be more interesting than without using technology, considering the development of students today is much different from the old generation.

The effect of gadgets on student achievement at the Tasikmalaya Islamic Foundation Vocational School. Showing research results and hypothesis testing, the results of the f-count test are 1.157. The hypothetical equation states that the significance value of $0.319 > 0.05$ is more significant than f table. Thus, it is said that H_0 is accepted and H_a is rejected, so the hypothesis reads that there is a significant influence between perceived usefulness (X1) and perceived ease of use (X2) variables on Attitude Toward Using (Y) simultaneously. The effect of Perceived Usefulness (X1) and Perceived Ease of Use (X2) together on Attitude Toward Using (Y) is 2.3%, and the remaining 97.7% is the influence given by other variables outside the model or research.

[Adi et al. \(2020\)](#), The Effect of Gadgets on Learning Outcomes in Economics Subjects for Class X Students of Public Senior High School No. 1 Plumpang. The results of this study indicate that the influence of gadgets on learning outcomes in economic subjects for class X students of Public Senior High School No. 1 Plumpang is 45.3%. Based on the results of the product-moment correlation analysis of 0.673, there is a reasonably close/strong enough relationship because the value is 1. With a coefficient of determination of 45.3%, it has a positive effect, meaning that the influence of Gadgets has a positive impact on Learning Outcomes in Economics Subjects for Class X Students Public Senior High School No. 1 Plumpang, Plumpang District, Tuban Regency. In contrast, the remaining 54.7% is influenced by other variables following [Adi et al. \(2020\)](#) study results. Gadgets influence the ups and downs of student learning outcomes ([Lavidas et al., 2022](#)). Challenges and opportunities of mathematics in digital times: Preschool teachers' views ([Lavidas, 20022](#)). The more intense the use of devices for learning, the better and higher student learning outcomes. Vice versa, the everyday use of gadgets for learning will affect low student learning outcomes.

Based on the description above, the third hypothesis, which states a significant influence between the variable use of gadgets and the variable student learning outcomes, is proven.

6 Conclusion

Based on the results of research and discussions that have been carried out, this research concludes that there is a significant effect of using gadgets on student learning outcomes, as big as 34%. This is evidenced by the regression equation $Y = 47.642 + 0.622X_3$ with a correlation value of 0.58. The correlation value of the influence of the role of parents, students' learning motivation and the use of gadgets together on student learning outcomes are based on the R-value of 0.861. It reveals that the relationship between the influence of the role of parents, students' learning motivation and the use of gadgets on student learning outcomes is powerful and significant.

Conflicts of interest

The authors declare that they have no conflict of interest.

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