

The Effect of Using Smartphones on the Mathematics Learning Outcomes of Class X Students at SMA Negeri 2 Tondano

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Abstract

This study investigates the impact of smartphone use on mathematics learning outcomes for SMA Negeri 2 Tondano students in grade ten. This investigation employs a survey methodology. This investigation was conducted at SMA Negeri 2 Tondano during the even semester of the academic year 2022/2023. This study's population consisted of all pupils in class X, which consisted of two classes and 58 students; questionnaires and documentation were used to collect data. The questionnaire provides information regarding Smartphone Use. In contrast, the documentation exposes the mathematics learning outcomes of grade X students from SMA Negeri 2 Tondano during the even semester of the academic year 2022/2023. Simple Linear Regression Analysis will be utilized to test the hypothesis in this investigation. Using the regression equation $Y = 40.443 + 0.517X$, with $F_{count} = 15.076 > F_{table} = 4.10$ and Sig value. = 0.000 alpha = 0.05; and the correlation coefficient value of 0.533, it was determined that there was a positive effect of Smartphone use on the mathematics Learning Outcomes of Class X Students at SMA Negeri 2 Tondano. Thus, it can be concluded that smartphone use has a 28.4% impact on the mathematics learning outcomes of pupils in class X at SMA Negeri 2 Tondano.

Keywords: Smartphones, Mathematics Learning, Learning Outcomes

Abstrak

Penelitian ini bertujuan untuk mengetahui pengaruh penggunaan smartphone terhadap hasil belajar matematika siswa kelas X SMA Negeri 2 Tondano. Investigasi ini menggunakan metodologi survei. Investigasi ini dilakukan di SMA Negeri 2 Tondano selama semester genap tahun pelajaran 2022/2023. Populasi penelitian ini adalah seluruh siswa kelas X yang terdiri dari dua kelas dan 58 siswa; kuesioner dan dokumentasi digunakan untuk mengumpulkan data. Kuesioner memberikan informasi mengenai Penggunaan Smartphone. Sebaliknya, dokumentasi memaparkan hasil belajar matematika siswa kelas X SMA Negeri 2 Tondano semester genap tahun pelajaran 2022/2023. Analisis Regresi Linier Sederhana akan digunakan untuk menguji hipotesis dalam penelitian ini. Menggunakan persamaan regresi $Y = 40,443 + 0,517X$, dengan $F_{hitung} = 15,076 > F_{tabel} = 4,10$ dan nilai Sig. = 0,000 alfa = 0,05; dan nilai koefisien korelasi sebesar 0,533, maka ditetapkan ada pengaruh positif penggunaan Smartphone terhadap Hasil Belajar Matematika Siswa Kelas X SMA Negeri 2 Tondano. Dengan demikian dapat disimpulkan bahwa penggunaan smartphone memiliki pengaruh sebesar 28,4% terhadap hasil belajar matematika siswa kelas X SMA Negeri 2 Tondano.

Kata Kunci: Smartphones, Pembelajaran Matematika, Hasil Belajar

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INTRODUCTION

The development of technology is now very rapid in this modern era; technology is increasingly developing and making technology an important part of human life. These technological advances have caused many changes in aspects of human life, including communication (Barakati, 2013; Setiawan, 2018). Communication used to take a long time to deliver; now, with technology, everything is very close and without distance (Marpaung, 2018; Domu et al., 2023).

The smartphone is one of the communication technologies that help humans to get information quickly. In addition to helping find information, Smartphones also function to generate

information, so with the development of communication technology, the use of smartphones also develops (Nursina, 2016). Smartphones are currently being used by all levels of society, including those within the scope of education (Alpan, 2020). This technological advancement has caused enormous changes in humanity (Wahyudi & Sukmasari, 2018). This change has had a big impact on changes in values that exist in society, especially people with Eastern cultures such as Indonesia (Bernadet et al., 2018; Wahyudi & Sukmasari, 2018). Advances in smartphone and internet technology have not only hit urban communities but can also be enjoyed by people in villages (Khulogo, 2017; Putra, 2017). As a result, all positive and negative information can be easily accessed by the public (Kurniawan, 2014).

A smartphone is a tool for voice communication or commonly called a mobile phone. Besides receiving calls or short messages, Smartphones are generally equipped with a web for internet or browsing. The existence of smartphones in the pace of globalization of communication and information technology has its phenomenon in the world of education, especially for students (Nursing, 2016). Its presence offers the sophistication of being able to access all information across the globe quickly, easily, and cheaply, which can be used as a form of learning pattern to improve performance with various available features, such as an internet access network that provides various kinds of information needed by its users (Panji & Ratnamiasih, 2018).

Based on the results of observations made by researchers, it was found that in the world of education, currently, many students use smartphones. The positive impact of using Smartphones in education is to make it easier for students in the learning process, but in addition to facilitating the learning process, it also has a negative impact that is no less big than the positive impact (Priansa, 2017; Arifuddin et al., 2022). Some use Smartphones to gain knowledge by learning what can be accessed on Smartphones; however, on the other hand, Smartphones also make students lazy and often waste time playing using Smartphones so that students lack concentration in receiving the subject matter, student learning outcomes decrease (Rahma, 2015; Putra & Patmaningrum, 2018).

When the researchers made observations at SMA Negeri 2 Tondano, it was found that most students at SMA Negeri 2 Tondano were using smartphones. According to some students, Smartphones make it easier for students to communicate with parents, teachers, and friends. Apart from communicating, students also use smartphones to browse information on the internet quickly and easily. With smartphones, students can find material information delivered by teachers with clear sources so that many students understand better and can repeat the material presented, and students can also access electronic books (Husain, 2014; Yunar & Ana, 2017). However, with the freedom to use smartphones at SMA Negeri 2 Tondano, some students use smartphones for things that are not related to learning, including students using smartphones to play games. In contrast, learning takes place. Some only watch YouTube, Tiktok, and other applications. Other entertainment.

Based on data on the math scores of class X students in the odd semester of the 2022/2023 academic year, the math scores obtained by some of these class students have scores below the KKM standard, while the KKM for Mathematics at SMA Negeri 2 Tondano is 75.

METHOD

In this research, the survey method is utilized. This survey method requires treatment in data collection, such as the distribution of questionnaires, assessments, and so on; it is used to collect data from natural (not artificial) locations. This survey method's treatment differs from that of experiments (Sugiyono, 2013). This investigation will be conducted with class X students at SMA Negeri 2 Tondano. This investigation will be conducted during the even semester of the academic year 2022-2023. The participants in this research were all class X SMA Negeri 2 Tondano students. This study's sample consisted of forty pupils from class X at SMA Negeri 2 Tondano. This study utilized (1) Even semester midpoints, i.e., instruments to measure student learning outcomes, and (2) Questionnaires regarding the impact of smartphone use on learning.

This study employs a Likert scale, which is a method for measuring attitudes by expressing approval or disapproval of certain subjects, objects, or incidents using a score between 1 and 5. The accompanying table provides an explanation of the questionnaire grid for each independent variable employed.

Table 1. Gradation of Question Answer Values

Alternative Answer	Scores for Statements	
	Positive	Negative
Strongly Agree	5	1
Agree	4	2
Doubtful	3	3
Disagree	2	4
Strongly Disagree	1	5

The questionnaire needs to be tested for validity and reliability before being used. The Y variable is the even semester exam score for the 2020/2021 academic year. The variable in this study is the use of a smartphone as the independent variable and student learning outcomes as the dependent variable, so from this context, this research is a quantitative study. In this study, to obtain data about the effect of using Smartphones in learning on student learning outcomes, a questionnaire was used, namely a list of questions to be filled out by respondents, in this case, students of class X SMA Negeri 2 Tondano—meanwhile, data collection techniques used observation, questionnaires, and documentation.

RESULT AND DISCUSSION

Testing the Validity and Reliability of Research Instruments

The Smartphone Use Questionnaire that was tested came from (Hasdina Hamid, 2018). The questionnaire totaled 30 statements then modified by the author so that the questionnaire that was

tested numbered 22 statements. Then this questionnaire was tried out. It tested the Validity and Reliability of the Smartphone Use Questionnaire using SPSS software version 25 with a significance level of 5%.

From the results of the validity test of Smartphone Use from 22 statements, 20 valid and 2 invalid statements were obtained. Then, based on the Smartphone Use questionnaire reliability test results, the Cronbach Alpha value was 0.867. Based on the table of interpretation guidelines for the correlation coefficient, it can be interpreted that the Smartphone Use instrument has a very high level of reliability in the category. Furthermore, of the 20 valid and reliable statements, they are designated as a Research Questionnaire.

Normality Test

The normality test in this study was carried out using the Kolmogorov-Smirnov statistical test with the help of the SPSS version 25 program. The results of the data normality test can be seen in Table 2 below.

Table 2 Normality Test Results

Significance Value (Asymp. sig 2-tailed)	Description
0,200	The data is normally distributed

The basis for decision-making:

1. The significance value is > 0.05 , so the data is normal.
2. The significance value is < 0.05 , so the data is not normal.

Hypothesis:

H0: Residual data is normally distributed

H1: Residual data is not normally distributed

Decision:

Based on Table 2 above, the significance value is $0.200 > 0.05$. So that H0 is accepted or the data is normally distributed.

Linearity Test

The linearity test aims to determine whether the relationship between the independent and dependent variables is linear or non-linear.

Table 3. Linearity Test Results between Variable X1 and Variable Y

Variable			Free degrees (db)	F _{count}	Sig.	Information
Dependent	Independent					
Smartphone Usage (X)	Student Mathematics Learning Outcomes (Y)	Deviation from Linearity	13;25	2,032	0,062	Linear

The basis for decision-making:

If the value of Deviation from Linearity Sig. > 0.05, then there is a significant linear relationship between the independent and dependent variables.

If the value of Deviation from Linearity Sig. < 0.05, there is no significant linear relationship between the independent and dependent variables.

Hypothesis:

H_0 : There is a significant linear relationship

H_1 : There is no significant linear relationship

Decision:

Based on Table 3 above, it is obtained that the Significance value of the Deviation from linearity is 0.062 > significance level $\alpha = 0.05$, so H_0 is accepted, so there is a significant linear relationship between the Smartphone Use variable (X) and the Student Mathematics Learning Outcomes variable (Y).

Simple Linear Regression Analysis

Determine the estimating model for the influence of smartphone use (X) on student mathematics learning outcomes at SMA Negeri 2 Tondano (Y), with the equation:

$$\hat{Y} = a + bX$$

It is necessary to calculate the value of b (regression coefficient) and a (intercept) using the formula:

$$b = \frac{n \sum XY - (\sum X)(\sum Y)}{n \sum X^2 - (\sum X)^2}$$

and

$$a = \bar{Y} - b\bar{X}$$

From the results of calculations with the help of SPSS version 25, the values $\alpha = 40.443$ and $b = 0.517$ are obtained so that the equation

$$\hat{Y} = 40,443 + 0,517X$$

The equation above shows that if the value of using a Smartphone (X) increases by 1 unit, then the value of Mathematics Learning Outcomes for Class X students at SMA Negeri 2 Tondano (Y) will also increase by 0.517 units. Furthermore, the statistical hypothesis is formulated as follows:

$$H_0 : \beta = 0$$

$$H_1 : \beta > 0$$

With the criteria for rejecting H_0 (accepting H_1) if the value $F_{\text{count}} \geq F_{\text{table}} = F_{\alpha(db1,db2)}$ or when Sig. $\leq \alpha$ otherwise cannot reject H_0 . For hypothesis testing to test the significance of the effect of variable X on variable Y with the help of SPSS 25, the following values are obtained:

Table 4. Results of Hypothesis Testing X1 with Y with SPSS

Source of Variance	Sum of Squares	Free degrees (db)	Middle Square	F _{count}	F _{table}	Sig.
Regression	606,154	1	606,154	15,076	4,10	0,000
Residu	1527,821	38	40,206			
Total	2133,975	39				

Based on Table F, the values obtained from:

$$F_{tabel} = F_{0,05(1,38)} = 4,10$$

Where $\alpha = 0,05$ with $db1 = 1$ and $db2 = n - 2 = 40 - 2 = 38$

Based on Table 4 above that $F_{count} = 15,076 > F_{table} = 4,10$ then it can be decided to reject H_0 , so that there is an effect of smartphone use on the mathematics learning outcomes of class X students at SMA Negeri 2 Tondano.

Based on Table 4 above that value $Sig. = 0,000 < \alpha = 0,05$ then it can be decided to reject H_0 , so that there is an effect of smartphone use on the mathematics learning outcomes of class X students at SMA Negeri 2 Tondano.

Table 5. Results of the Effect of X on Y

Variable		Value of r-r ²	
		rx _y (Correlation coefficient)	r ² _{xy} (Coefficient of determination)
Smartphone Usage (X)	Student Mathematics Learning Outcomes (Y)	0,533	0,284

Based on Table 5. above explains the value of the correlation coefficient (r_{xy}) i.e., as big 0,533 and explained the percentage of influence of the independent variable on the dependent variable which is called the coefficient of determination which is the result of squaring (r_{xy}) i.e., as big 0,284. This means that the effect of Smartphone use on Mathematics Learning Outcomes of Class X students at SMA Negeri 2 Tondano is 28.4% and the remaining 71.6% is influenced by other factors.

Based on the results of the analysis, it shows that the use of smartphones has a significant effect on the Mathematics Learning Outcomes of Class X Students at SMA Negeri 2 Tondano. With the regression equation obtained from the results of hypothesis testing is $\hat{Y} = 40,443 + 0,517X$, from this equation shows that partially the value of the regression coefficient X, ie $b = 0,517 > 0$ which means that the better the students are in using smartphones, the better the students' mathematics learning outcomes will be. Thus, it can be concluded that the use of smartphones has a positive effect on the Mathematics Learning Outcomes of Class X students at SMA Negeri 2 Tondano.

Based on the data analysis, the hypothesis test results showed that the use of a smartphone (X) had a positive and significant effect on Student Mathematics Learning Outcomes (Y) 28.4%, and

other factors influenced the remaining 71.6%. Following the results of research conducted by Panji Angkasa (2023) entitled "The Effect of Using Smartphones on Student Achievement at Adi Sanggoro Vocational High School, Bogor," shows that there is a positive effect of using Smartphones on student achievement. Moreover, research conducted by Rahma (2015) entitled "The Effect of Smartphone Use on Student Learning Outcomes at SDN 209 Inpres Garantiga, Simbang District, Maros Regency" shows that the use of Smartphones has a positive effect on student learning outcomes.

Based on the results of this study strengthens current research that the use of smartphones influences the learning process, which can make it easier for students to find information about lessons, namely in the form of electronic books, learning resources from the internet, which can also help students communicate with teachers and fellow students to share information related to learning. This means that the higher the use of Smartphones in learning, the better Student Learning Outcomes will be.

CONCLUSION

Based on the results of the research and discussion, it can be concluded that there is a positive and significant influence between the use of smartphones on the mathematics learning outcomes of class X students at SMA Negeri 2 Tondano in the 2022/2023 academic year with a correlation coefficient of 0.533 and the contribution of smartphone use to student mathematics learning outcomes is 28.4%. Other factors influence the remaining 71.6%.

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