



## **The Effectiveness of Using the Photomath Application in Enhancing Students' Learning Interest**

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### **Abstract**

This article examined the effectiveness of using the Photomath application in enhancing the learning interest of Grade VIII students at SMP Negeri 8 Tapung. This study analyzed students' learning interests before and after using the Photomath application. The research employed a quasi-experimental design. Purposive sampling was used to select participants, consisting of 23 students from grade VIII C. Data were collected through documentation, surveys, and observations. The findings of this study indicated an increase in the average score of the learning interest questionnaire. Before using the Photomath application, the average score was 54.592, categorized as low interest. After using the Photomath application, the average score increased to 55.62. Based on the calculation of the average scores from both data sets, it was concluded that  $H_0$  was accepted and  $H_a$  was rejected. This meant that there was no significant difference in average learning outcomes between the experimental group and the control group. These findings suggested that Grade VIII students at SMP Negeri 8 Tapung showed limited interest in learning using the Photomath application.

**Keywords:** effectiveness; interest in learning; photomath application

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### **INTRODUCTION**

The world of education serves as a means to advance and develop knowledge and skills essential for human life (Dewi & Primayana, 2019; Haleem et al., 2022; Oktaviani et al., 2022). In today's era, various educational facilities are available, making it increasingly easier for students to enhance their knowledge. Along with the rapid advancement of technology, educators face new challenges in delivering instruction to their students. Educators must also take responsibility for their students' development by adapting teaching methods to meet the evolving needs of learners.

The key factor in ensuring the continuity of education and learning lies in students' interest in learning (Harefa, 2023; Khasanah, 2021; Lin et al., 2016). Interest is one of the key factors in achieving goals in the learning process. When students are interested, they are naturally motivated to engage in the learning process from start to finish. Students with a genuine interest in learning are more enthusiastic about their studies. Interest significantly influences learning outcomes (Arni et al., 2024; Gunawan et al., 2022; Sambuaga, 2020); if the subject matter does not align with a student's interests, they are unlikely to learn



effectively due to the lack of personal appeal. Conversely, subject matter that captures students' interest is easier to learn, as interest enhances the learning experience.

Regarding learning difficulties, initial observations conducted by the researchers at SMP Negeri 8 Tapung revealed that students' performance in mathematics was notably low. This poor academic performance was influenced by various factors, including the students' lack of interest in learning (Kosanke, 2019). Based on interviews with Grade VIII students at SMP Negeri 8 Tapung, it was found that mathematics is the least favoured subject among students. This is attributed to a one-directional teaching approach, which causes students to feel bored and dislike mathematics. Many even express complaints when mathematics class begins. Various reasons have been found for why this happens, including because mathematics is associated with numbers, calculations, formulas, challenging questions, and other perceptions that tend to be negative about the subject. These factors have further diminished students' interest in learning mathematics. This situation poses a serious challenge in today's era, as these students represent the younger generation who will carry forward the responsibility of advancing the nation's intellectual development (Handayani, 2022).

Educators are fundamentally required to conduct the learning process effectively. However, field observations reveal that many educators still rely on lecture-based methods, often failing to align with current educational goals. These goals emphasize a student-centred approach rooted in active learning. To increase students' interest in mathematics, relevant solutions and innovative approaches based on science and technology are necessary. These are expected to address the issue of low student interest in mathematics. Thus, it is crucial to implement appropriate solutions in education to rekindle students' enthusiasm for learning. This involves creating an engaging and enjoyable atmosphere during mathematics lessons. Relevant solutions and innovations involving technology can attract students' interest and are expected to help resolve the issue of low interest in learning mathematics (Febriana & Setiawan, 2024; Lai et al., 2024).

In this modern era, many applications are designed specifically for students, including the Photomath application. Photomath is a smartphone-based application with various features to help students solve mathematics problems (Hamadneh, 2015; Pikri et al., 2023; Saundarajan et al., 2020). To date, this application has significantly assisted students in overcoming the challenges they face in solving mathematical problems. The functionality of this application in addressing mathematical problems is powered by advanced technology, which enables it to recognize mathematical symbols and notations. Photomath can solve various mathematical problems, including roots, exponents, arithmetic, trigonometry, fractions, systems of linear equations, and more (Muslimah et al., 2023; Zain et al., 2023).

In this study, the researcher chose the topic of systems of linear equations in two variables (SPLDV). In addition to facilitating student participation in the research, this topic is highly relevant to everyday life. Many situations encountered in daily activities, such as calculating the price of items while shopping, involve the principles of SPLDV.

## **METHOD**

This research was a quasi-experimental study involving two classes that received different treatments: the experimental and control groups. In this design, neither the experimental nor control group was selected randomly. Both groups were given a pre-test, followed by the intervention, and then a post-test. The population in this study consisted of all Grade VIII students for the 2023/2024 academic year at SMP Negeri 8 Tapung. The sample for this study was Class VIII C, consisting of 23 students. The sampling technique used in this study was purposive sampling. Purposive sampling is a technique where samples are

selected from the population based on specific criteria. This technique was chosen because not all students met the criteria relevant to the phenomenon being studied.

Therefore, the specific criteria for selecting samples allowed for alignment with the research needs. This study used three research instruments: observation, questionnaires, and documentation. The research procedure was carried out in the following steps: determining the research sample, establishing research variables and indicators that formed the basis for instrument development, creating the research instruments (questionnaires), collecting data by distributing the questionnaires to the respondents (research samples), managing the data, and preparing the research report. The data analysis techniques used in this study were The n-Gain Test, Descriptive Statistics, and Inferential Statistics (Normality Test, Homogeneity Test, and Hypothesis Testing).

## RESULTS AND DISCUSSION

The researcher's study aimed to examine students' learning interest before and after using the Photomath application and to determine the application's effectiveness in enhancing the learning interest of Grade VIII students at SMP Negeri 8 Tapung on the topic of the SPLDV. The mathematics teacher had previously taught this topic using a lecture or conventional method.

Based on the initial observations conducted by the researcher, it was found that students' academic performance was very low, as reflected in the results of their daily tests. One of the contributing factors was students' lack of interest in learning. Learning interest is a condition in which an individual or a group of students shows attention to a subject and demonstrates a desire to explore and verify it further. To increase the learning interest of Grade VIII students at SMP Negeri 8 Tapung, the researcher proposed a solution by introducing the Photomath application. Initial observations revealed that teachers or students had not used this application in the learning process. Photomath is a mathematics application that functions as a calculator and can be used in two ways: the first is by scanning a math problem, and the second is by typing the math problem into the application's keypad. The application then provides the solution along with detailed step-by-step explanations.

The learning model applied in this study was direct instruction with the teacher-centered learning method. There were five stages in the Direct Instruction model, including the goal-setting phase, the demonstration (presentation) phase, the guided practice phase, the phase of checking students' understanding and providing feedback, and the independent practice phase. The instrument used in this investigation was a student learning interest questionnaire. The questionnaire was administered twice: in the control class, where the Photomath application was not used, and in the experimental class, where the questionnaire was given after students had used the Photomath application. This study was conducted throughout four sessions.

### Results of the Analysis of Student Learning Interest Questionnaire Before Treatment

The results of the analysis of the student learning interest questionnaire before treatment can be seen in Table 1.

Table 1 Descriptive results of the analysis of student learning interest questionnaire before treatment

	<b>N</b>	<b>Minimum</b>	<b>Maximum</b>	<b>Mean</b>	<b>Std. Deviation</b>
Pre-test	27	50.00	65.00	54.5926	3.12877
Valid N (listwise)					

Source: Processed Data SPSS.26, 2024

Table 1 obtained the following values: minimum value = 50.00, maximum value = 65.00, mean = 54.5926, and standard deviation = 3.12877. Furthermore, the scores from the analysis were grouped into five categories, as shown in Table 2.

Table 2 Percentage results of the analysis of student learning interest questionnaire before treatment

Interval Score	Category	Frequency	Percentage
>80	Very Interested	3	11.1%
66-79	Interested	2	7.4%
55-65	Moderately Interested	5	18.5%
45-54	Less Interested	10	37.0%
<45	Not Interested	7	25.9%
Total		27	100.0%

Table 2 showed that 3 students, or 11.1% of the total, were categorized as very interested; 2 students, or 7.4%, were categorized as interested; 5 students, or 18.5%, were categorized as moderately interested; 10 students, or 37.0%, were categorized as less interested; and 7 students, or 25.9%, were categorized as not interested.

With an average score of 54.5926, these data allowed the researcher to classify students' enthusiasm for learning mathematics as low.

### Results of the Student Learning Interest Questionnaire After Treatment

Results of the analysis of the student learning interest questionnaire after treatment can be seen in Table 3.

Table 3 Results of the analysis of student learning interest questionnaire after treatment

	N	Minimum	Maximum	Mean	Std. Deviation
Pre-test	23	49.00	63.00	55.622	3.39262
Valid N (listwise)	23				

Based on Table 3, the following values were obtained: minimum value = 49.00, maximum value = 63.00, mean = 55.6522, and standard deviation = 3.39262. Next, the scores from the analysis were grouped into five categories, as shown in Table 4.

Table 4 Percentage results of the analysis of student learning interest questionnaire after treatment

Interval Score	Category	Frequency	Percentage
>80	Very Interested	11	47.8%
66-79	Interested	10	43.5%
55-65	Moderately Interested	2	8.7%
45-54	Less Interested	0	0%
<45	Not Interested	0	0%
Total		23	100%

The data presented in Table 4 showed that 11 students, or 47.8% of the total, fell into the very interested category. The interested category included 10 students or 43.5%; the moderately interested category had 2 students or 8.7%; the less interested category had 0 students or 0%; and the not interested category had 0 students or 0%. With an average score of 55.6522, the researcher categorized students' interest in learning mathematics as moderately interested based on these data.

The percentage in Table 5 represents the student learning interest questionnaire analysis before and after the treatment using the Photomath application.

Table 5 Percentage analysis of the questionnaire before and after treatment

Category	Score	
	Before Treatment	After Treatment
Very Interested	3	11
Interested	2	10
Moderately Interested	5	2
Less Interested	10	0
Not Interested	7	0

### N-Gain Test

The N-Gain Score Test is conducted by calculating the difference between the pre-test and post-test scores. By determining this difference, known as the gain score, we can assess whether the use or application of a specific method (such as Photomath) can be considered effective.

Table 6 Results of the N-Gain test analysis

	N	Minimum	Maximum	Mean	Std. Deviation
N-Gain	23	-9.65	12.50	.3217	4.91661
Valid N (listwise)	23				

Table 6 shows that the minimum value of the N-Gain score was -9.65, the maximum value was 12.50, and the average value was 0.3217. Based on this, it could be concluded that the average N-Gain score fell within the range of 0.3-0.7, indicating a moderate improvement in student learning interest. After the study was completed, the findings were examined to conclude the research data. The research data analysis involved descriptive statistics, which provided insights into the results of the student learning interest survey both before and after the intervention.

### Normality Test

The result of the normality test is shown in Table 7.

Table 7 Normality test with one-sample kolmogorov-smirnov test

		Unstandardized Residual
N		23
Normal Parameters	Mean	.0000000
	Std. Deviation	3.38664985
Most Extreme Differences	Absolute	.157
	Positive	.157
	Negatives	-.107
Kolmogorof – Smirnov		.753
Asymp. Sig. (2-tailed)		.623
Test distribution is Normal		

In Table 7, the researcher applied the Kolmogorov-Smirnov formula and obtained a significance value of 0.623. This indicates that the data tested follows a normal distribution because the significance value (p-value) is greater than 0.05 ( $0.623 > 0.05$ ).

### Homogeneity Test

The result of the homogeneity test is shown in Table 8.

Table 8 Levene's test for homogeneity of variance

Levene Statistic	df1	df2	Sig.
0.494	1	48	0.486

Based on the homogeneity test results in Table 8, a significance value of 0.486 was obtained. This means that the variation in the data can be considered homogeneous because the significance value (p-value) is greater than 0.05 ( $0.486 > 0.05$ ).

### Hypothesis Test

The result of the hypothesis test can be seen in Table 9.

Table 9 Hypothesis testing with independent samples test

		F	Sig	T	Df	Sig. (2-tailed)
Mathematics	Equal variances assumed	0.249	0.620	-0.877	44	0.385
Learning Interest	Equal variances not assumed			-0.877	4.398	0.385

Based on Table 9, the t-value in the first row was -0.877, which was the result of the t-test assuming equal variances for both data sets. The t-value in the second row was the result of the t-test when the variances of the two data sets were not equal. Since Levene's test result indicated that the variances were homogeneous, the t-value used was based on the t-test, which was 0.877 with a significance of 0.385.

The obtained Sig. (2-tailed) value  $> 0.05$ , which was ( $0.385 > 0.05$ ), means that  $H_0$  was accepted and  $H_a$  was rejected. This means there was no difference in the average learning interest between the experimental and control classes.

The researcher applied four indicators of learning interest in the research process. The first was the students' feelings of enjoyment during the learning process. In this case, the students were enthusiastic about participating in the lesson, especially with the Photomath app, which they found to be a new and useful application to help solve math problems, with complete features and easy usage. The second was student involvement in the learning process. In this case, the students could express their opinions and ask questions about the material or the use of the Photomath app that they had not fully understood. The third was students' interest in participating in the lesson. In this case, the students were very interested in the assistance provided by the Photomath app, making the learning process not monotonous or boring. The fourth was students' attention during the learning process. In this case, the Photomath app made the students very focused and enthusiastic during the learning activities. Their curiosity and interest motivated them to pay attention to and observe the media used. This was supported by research theory conducted by Handayani (2022), who stated that learning interest can also be defined as a state that describes how students can foster a sense of liking, interest, attention, and involvement in a learning process they are engaged in.

The research findings of the researcher were consistent with the findings of Permatasari & Yuniarta (2021), whose experimental results showed that students felt assisted and were able to understand each step of applying Photomath with the help of e-learning. The Photomath program had various features that made it easier for users to use. To avoid addiction to the app, users still had to decide whether to use it, especially children who needed supervision. This was in line with the research of Avanda & Putri (2020), which revealed that although students gained the most benefits from the Photomath app, there were also drawbacks, such as being lazy to think or relying solely on Photomath to solve math problems instead of doing manual calculations.

## CONCLUSION

Based on the data analysis and discussion regarding the effectiveness of using the Photomath application in enhancing students' learning interest, it was concluded that students' interest in learning after using the Photomath application was higher than their interest before using the application. However, the increase was modest according to the average calculation of the two data sets. Therefore, it can be stated that Grade VIII students at SMP Negeri 8 Tapung were more curious about learning when using the Photomath application.

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