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THE APPLICATION OF TALOGTIKA MEDIA TO IMPROVE MATHEMATICS LEARNING OUTCOMES AT SMK GENERASI MANDIRI

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Abstract

This study aims to determine whether the use of talogtika media can improve student learning outcomes in mathematics subjects on logarithms at SMK Generasi Mandiri. This study uses a quantitative approach with the Quasi Experimental Design method. The population in this study were all class X students at SMK Generasi, while the sample was class X TKJ 1 which consisted of 32 students. The results of the research and analysis showed that there was a significant increase in student learning outcomes after talogtika media was applied. The increase in scores reached 35 points. This can be seen from the pre-test results which had an average of 47.5 and a post-test of 82.5. The difference in scores between the pre-test and post-test was 35 points. The application of talogtika media in improving student learning outcomes in mathematics subjects for class X shows that this media can be an effective way to improve learning outcomes, because talogtika media helps students understand the material more easily during the learning process.

Abstrak

Penelitian ini bertujuan untuk mengetahui apakah penggunaan media talogtika bisa meningkatkan hasil belajar siswa dalam mata pelajaran matematika materi logaritma di SMK Generasi Mandiri. Penelitian ini menggunakan pendekatan kuantitatif dengan metode Quasi Experimental Design. Populasi dalam penelitian ini adalah seluruh siswa kelas X di SMK Generasi, sedangkan sampelnya adalah kelas X TKJ 1 yang terdiri dari 32 siswa. Hasil penelitian dan analisis menunjukkan bahwa terjadi peningkatan signifikan dalam hasil belajar siswa setelah media talogtika diterapkan. Peningkatan nilai mencapai 35 poin. Hal ini terlihat dari hasil pre-test yang memiliki rata-rata 47,5 dan post-test sebesar 82,5. Perbedaan nilai antara pre-test dan post-test adalah sebesar 35 poin. Penerapan media talogtika dalam meningkatkan hasil belajar siswa di mata pelajaran matematika kelas X menunjukkan bahwa media ini bisa menjadi salah satu cara yang efektif untuk meningkatkan hasil belajar, karena media talogtika membantu siswa dalam memahami materi secara lebih mudah selama proses pembelajaran.

INTRODUCTION

Information technology is rapidly evolving with the emergence of digital media such as interactive applications, educational videos, and online platforms, which allow access to learning materials at any time. Technology also allows

educators to create interactive learning experiences that can increase student motivation and interest (Ali et al., 2025). The integration of technology encourages students to actively engage in learning, deepen their understanding of the material, and provide variety in teaching methods. This creates a dynamic and innovative learning environment, which ultimately contributes to improving the quality of education.

The use of media in education is a very effective method for integrating technology into the teaching and learning process. Media plays a crucial role in the context of modern education, where technological advancements make its use a necessity to support learning. (Lestari et al., 2023). Various types of media, both print and electronic, can be used by teachers to create an interactive learning environment. By understanding the role of media, students' potential can be maximized.

Learning media functions as a tool for conveying information that can capture students' attention by utilizing visual, sound, and interactive elements. (Limbong et al., 2022). This makes the learning process more engaging and effective compared to traditional teaching methods. For example, in mathematics learning, using real media can help students understand concepts more clearly and practically. (Winanda et al., 2024). Thus, the use of media in the learning process is very important for creating an effective and enjoyable learning atmosphere. If learning media is used correctly, it is hoped that students can understand the lesson material more easily and have the potential to develop to their fullest extent.

SMK Generasi Mandiri is a vocational school that offers several skill programs, such as mechanical engineering, automotive engineering, computer and network engineering, and others. This school is located in Gunungputri District, Bogor City, West Java. In the process of learning mathematics for 10th-grade students in the computer and network engineering program, the results have not yet reached the Minimum Completion Criteria, which is 70. Based on the mid-semester exam results, out of 32 students, only 10 or 31% successfully

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completed the course, while the remaining 22 students or 69% still did not pass. From interviews with teachers, it was found that students felt difficulty understanding the material because the learning media used by the teachers were limited, only explaining the material in front of the class by writing on the blackboard. The consistent way of delivering the material makes students less enthusiastic about learning mathematics. The majority of students who have not yet mastered the material are struggling with logarithms because they are only memorizing the formulas without understanding and applying them.

To improve students' understanding of logarithmic material, there needs to be a change in the way teachers teach, namely by using interactive learning media that can dynamically display the properties of logarithms. Learning media are all forms of tools, materials, or technologies used to convey information from teacher to student, thus helping them understand the material better. (Diana et al., 2022). One example of interactive media is dialogic media. Media talogtika is expected to make students more active in learning, facilitate understanding of the material, and create a fun learning atmosphere so that students do not get bored quickly. Media talogtika is a type of learning media that offers engaging and challenging learning experiences, thereby encouraging students to develop optimally. By using the Socratic method, it is hoped that the quality of learning in schools will improve and student learning outcomes will also be better. This research aims to determine whether the use of talogtika media can improve students' learning outcomes in mathematics, specifically on the topic of logarithms, at SMK Generasi Mandiri.

Based on the explanation above, the author wishes to conduct research at SMK Generasi Mandiri. The author felt it was necessary to implement a learning model that was appropriate for technological developments, using dialogic media as an aid in the process of obtaining information and improving student learning outcomes. Therefore, the author is interested in researching this problem with the title "The Application of Talogtika Media to Improve Mathematics Learning Outcomes at SMK Generasi Mandiri".

RESEARCH METHODS

This research uses a quasi-experimental method. (quasi-experimental). This method was chosen because the researcher could not fully control the independent variable. (Gusti & hilda., 2023). The research was conducted on only one group, the experimental group, without a control group. This research was conducted at SMK Generasi Mandiri, located in Gunungputri District, Bogor City, West Java. The population in this study consists of all tenth-grade students at that school. Meanwhile, the research sample consists of 32 students from class X Computer and Network Engineering (TKJ) 1. The research design used is a one-group pre-test post-test design, where research participants take an initial test (pre-test) before the intervention and a final test (post-test) after the intervention. (Irnawan et al., 2025). Pre-tests and post-tests are conducted to accurately measure the impact of the treatment, thereby reducing the possibility of bias in the research.

Data in this study were collected thru interviews and questionnaires. Interviews are an effective way to gather direct and in-depth information from research subjects. (Ardiansyah et al., 2023). In this study, questionnaires were used to collect data before and after the treatment was administered. The filling process is divided into two stages: an initial test (pre-test) and a final test. (post-test). The results of the initial and final tests were analyzed in three stages: normality test to determine data distribution, homogeneity test to check for equal variances, and hypothesis test using the independent samples T-test. With this approach, the research aims to determine whether the application of Talogtika Learning Media can improve students' mathematics learning outcomes, especially on the topic of logarithms.

RESULTS AND DISCUSSION

Previously, it was explained that the purpose of this research is to determine how to apply the talogtika media to improve students' learning

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outcomes in mathematics. Before the research began, an objective test was first conducted, which involved testing the instrument on students who already had prior knowledge. The trial was conducted in class XI TKJ 1 in the form of 20 multiple-choice questions with 30 student respondents. Instrument analysis was conducted by determining the validity and reliability of the questions. From the results of the instrument trial, 20 valid questions were obtained. The item reliability coefficient reached 0.75, which falls into the category of $0.70 \leq r \leq 0.90$, so it can be concluded that the reliability of the item is high. Furthermore, this study uses one class as its subject, consisting of pre-test, treatment administration, and post-test stages. Next, a normality test was conducted. If the data is normally distributed, then the normalized gain test is performed, followed by a t-test. After that, a conclusion is drawn as to whether the hypothesis is accepted or rejected.

a. Normality Test

The first step in the testing process is to check the normality of the pre-test and post-test data.Normality testing is a way to determine whether the data you have follows a normal distribution pattern or not. (Muhammad et al., 2025). By conducting a normality test, researchers can ensure that the basic assumptions in statistical analysis are met, so that the research results can be trusted. Normality testing is conducted to ensure that the data used in the study has a normal distribution. Additionally, statistical analysis was also conducted to see if there was a significant difference between the pre-test and post-test results after the treatment was administered.

The results of this statistical analysis provide important information in evaluating the effectiveness of the treatment administered in the study. Based on statistics from the tested sample, it is said to be normally distributed if the L_{hitung} value is smaller than the L_{tabel} value. Using the Liliefors test with a significance level of $\alpha = 0.05$, which was used in this study. The results of the normality test can be seen in the following table.

Table 1. Normality Test Results

Uji normalitas	**L_{hitung}**	**L_{tabel}**	**Keterangan**
Pre-test	0,0994025	0,156624	normal
Post-test	0,1484038	0,156624	normal

From the results of the normality test conducted, for the pre-test, the L_{hitung} value was 0.099, which is smaller than the L_{tabel} value of 0.156. This indicates that the pre-test data is normally distributed. Meanwhile, for the post-test, the L_{hitung} value was 0.148, which is also smaller than the L_{tabel} value of 0.156. Therefore, it can be concluded that the post-test data is also normally distributed. Based on the Lilliefors alpha significance table of 0.05%, it can be concluded that the significance values of the pre-test and post-test results are less than 0.05%. so that hypothesis testing can continue.

b. Homogeneity Test

The next step is to perform a homogeneity test. The next step is to perform a homogeneity test. This test is conducted to ensure that the variance between the pre-test and post-test groups is equal or homogeneous. The homogeneity test results are accepted if the F_{hitung} value is less than the F_{tabel} value. If so, the null hypothesis (Ho) is accepted, which means the data comes from the same variance between the pre-test and post-test groups. The results of the variance test can be seen in the following table.

Table 2. Homogeneity Test Results

	Pre-test	**Post-test**
Rata-rata	47,5	82,5
Varians	246,7742	143,5484
F_{hitung}	1,719101	
F_{tabel}	1,772066	
Ket	**Homogen**	

From the results of the homogeneity test conducted, the variance value obtained in the pre-test was 246.774, while in the post-test, the variance value was

143.548. Additionally, the L_{hitung} value obtained is 1.719, which is smaller than the L_{tabel} value of 1.772. Thus, it can be concluded that the data used is homogeneous.

c. Hypothesis Testing

The final step is to perform a hypothesis test using a t-test at a significance level of 5%. The results of the hypothesis test are used to determine the difference in values between before and after the treatment is applied. (Ikhlas, 2020). The criteria for the success of a hypothesis test are: if the t_{hitung} value is greater than the t_{tabel} value, then the null hypothesis is rejected and the alternative hypothesis is accepted. Thus, it can be concluded that the application of talogtika media in mathematics learning significantly improves the learning outcomes of class X students at SMK Generasi Mandiri. Here is the hypothesis formulation that will be tested:

H_0 : There is no improvement in student learning outcomes with the application of talogtika media in class X mathematics learning at SMK Generasi Mandiri.

H_1 : There is an increase in student learning outcomes with the application of talogtika media in class X mathematics learning at SMK Generasi Mandiri.

The results of the hypothesis test can be seen in Table 3.

Table 3. T-test Results

t-Test: Paired Two Sample for Means

	Pretest	*Posttest*
Mean	47,5	82,5
Variance	246,7741935	143,5483871
Observations	32	32
Pearson Correlation	0,261372036	
Hypothesized Mean Difference	0	
df	31	
t Stat	-11,5877626	
P(T<=t) one-tail	4,24314E-13	
t Critical one-tail	1,695518783	

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P(T<=t) two-tail	8,48628E-13
t Critical two-tail	2,039513446

Based on the results of the hypothesis test in Table 3, it can be seen that there was an improvement in student learning outcomes after the talogtika media was applied in mathematics lessons for class X at SMK Generasi Mandiri. From the t-test data, it can be seen that there is a highly significant difference between the pre-test and post-test scores, with the average post-test score being higher than the pre-test score. This means that the treatment or intervention given between the pre-test and post-test is likely effective, not just a coincidence.

The use of talogitika media has a positive impact on improving students' learning outcomes. From an average pre-test score of 47.5, it increased to 82.5 on the post-test, resulting in 35 points gain. This shows that talogtika media is able to improve students' understanding and skills in learning mathematics. With this increase, it can be concluded that the use of media in the learning process provides real benefits and has a positive impact on students' learning progress. This aligns with the experts' opinion that integrating technology into the learning process can make students more motivated and active in their studies (Depita, 2024). By using talogtika media, students not only learn in the usual way, but can also use technology to understand mathematical material in a more interesting and interactive way. It is hoped that more students can reach their maximum learning potential if the use of media in learning continues to be developed.

The t-test results provide strong evidence to reject the null hypothesis (H_0), which states that there is no average increase between the two groups. The alternative hypothesis (H_1) is accepted at a significance level of 5% ($\alpha = 0.05$). The obtained t-statistic value is 11.587, which is greater than the critical t-value of 2.039, thus strengthening the conclusion that there is a statistically significant increase in the average. Improved student learning outcomes are also influenced by their ability to better understand the learning material over time, which has a

positive impact on their learning results. Good learning outcomes are reflected in students' ability to complete tasks well, as well as their interest and positive attitude toward the lesson (Marissa, 2022). This is supported by the characteristics of talogtika media, which present clear and interactive visual images. Research (Hanifah et al., 2022) states that interactive visual media successfully increases students' learning motivation and makes the learning process more engaging and interactive. This research helps develop better and more creative learning methods, aiming to make it easier for students to understand lesson material and create effective and enjoyable learning experiences for the future of education.

CONCLUSION

Based on the research findings and discussions that have been explained regarding the application of the talogtika media to improve mathematics learning outcomes at SMK Generasi Mandiri, the researcher can draw several conclusions. The application of talogtika media significantly affects students' learning outcomes. This is evident from the group's statistical table, which shows that the average post-test score reached 82.5, while the pre-test score was only 47.5. Thus, there is a clear improvement in learning outcomes between the pre-test and post-test. From the results of the hypothesis test (t-test), the t_{hitung} value was 11.587 and the t_{tabel} value was 2.039. Since t_{hitung} is greater than t_{tabel} (11.587 > 2.039), it can be concluded that there is a significant difference. Additionally, the significance value (p=0.000) is less than 0.05, so it can be concluded that H_0 is rejected and H_1 is accepted. Based on the data obtained, the pre-test score in the experimental class was 47.5, while after treatment (post-test) it increased to 82.5. This indicates an improvement in the learning outcomes of class X students in TKJ 1 at SMK Generasi Mandiri. Students' learning outcomes in mathematics improved after using the talogtika media, with an average score of 82.5, which exceeded the minimum criteria.

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