THE USE OF MATHWAY APPLICATION ON DERIVATIVE MATERIAL ON MATHEMATICS LEARNING MOTIVATION IN HIGH SCHOOL

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ABSTRACT

Mathematics learning is one of the learning that is difficult for high school students to understand, both in understanding the material and when solving problems such as in derivative material so that students need high learning motivation and are able to help students become more confident in learning mathematics. The purpose of this study was to determine the use of the mathway application on derivative material in mathematics learning for high school students. The method in this study is quantitative quasi-experimental. The data collection techniques used were pretest and posttest tests, as well as questionnaires. The population in this study were all students of grade XI. However, the samples were: students of grade XI IPA 3 (36 people) as the experimental class and students of grade XI IPA 2 (32 people) as the control class. The results of this study showed the provision of pretest and posttest in the experimental class (XI IPA 3) through treatment with the use of the mathway application so that the difference in pretest and posttest values was obtained to see their learning motivation. The learning motivation of the experimental class was 52.61 and for the control class (XI IPA 2) it was 46.31. Furthermore, for the analysis of the questionnaire given to students in the experimental class, the average value of the questionnaire was 74.25 with a good category. The conclusion of this study is that the use of the Mathway application has an effect on the learning motivation of high school students in the derivative material as evidenced by the difference in the pretest-posttest scores of the experimental class and the control class and the average value of the questionnaire. The suggestion in this study is that there needs to be an adjustment to the use of the Mathway application in mathematics learning and it is necessary to conduct a re-examination of the use of the Mathway

application to see students' learning motivation in mathematics learning using different materials and methods.

Keywords: *Mathway Application, Derivative, Learning Motivation.*

INTRODUCTION

Mathematics is said to be a very important subject in education throughout the world compared to other subjects, so that when studying at school, students are highly required to master mathematics. Mathematics is a means of logical thinking, helping to solve everyday problems, recognizing patterns of generalized relationships of experience, a means of developing creativity, and a means of increasing awareness of cultural development. Considering the importance of mathematics, it is necessary to improve the quality of mathematics education. One thing that must be considered is improving students' mathematics learning achievement in schools (Widayanti & Nuraini, 2020:9).

Student achievement in school through mathematics lessons is not easy. Because mathematics is a very difficult subject for students to understand at school, especially for high school students (SMA). In mathematics itself, there are various materials ranging from algebra, vectors to derived numbers. As is known, many students find it difficult and unmotivated when studying mathematics in class, so teachers must work hard to restore students' enthusiasm for learning, one of which is by providing motivation.

Motivating students to learn in mathematics learning can be done in various ways because high learning motivation can make students more aware and motivated to be able to understand learning mathematics so that students can have more explorative, confident, creative learning behavior and be able to make their own decisions. High learning motivation can also make students more mature in the learning process (Lomu & Widodo, 2018:746).

Therefore, it is very important to provide motivation to learn to students, especially in learning mathematics. In addition, teachers are also more creative during the teaching process in class, one of which is to create learning media with the aim of making students more enthusiastic in learning mathematics. Because almost all students in high school find it difficult to understand mathematical material and theories, for example, derivative material.

Based on observations made, it is known that the value obtained by students in learning mathematics has not met the KKM, which is 76. For the average value that passed $\pm 40\%$ and those who did not pass $\pm 60\%$. This is because the derivative material in mathematics lessons includes low mastery of high school students. Then, it is also because teachers still use textbooks as teaching guides in the classroom and teach with the lecture method which causes most students to feel lazy and have difficulty understanding the

derivative material in mathematics learning where the information center in delivering the material is done by the teacher and students only receive, understand, and record what the teacher says, then students are given example questions and fill in practice questions. In addition, students are also not enthusiastic and lack confidence in being able to understand learning mathematics derivative material.

To overcome the above problems, the researcher took the initiative to help improve students' learning motivation through the Mathway application. This Mathway application is an Android-based application where Android is very familiar among teachers and students. Therefore, it is expected that by using the Mathway application on Android, students can be more motivated and enthusiastic about learning mathematics derivative material. Then, the use of this application can also make it easier for students to solve problems in derivative material. This Mathway application also not only presents algebra problems but also complicated calculus problems can be solved directly. This application will provide step-by-step solutions to solving problems.

METHODS

The research approach used is a quantitative research approach with the type of research being a quasi-experiment or also called a pseudo-experiment. The goal is to predict conditions that can be achieved through actual experiments, but there is no control and/or manipulation of all relevant variables. Quasi-experiments are basically the same as pure experiments, the difference is in controlling the variables. Quasi-experiments aim to find a causal relationship by involving a control group with an experimental group. To see the learning outcomes of students in the experimental and control classes, the Nonequivalent Control Group Design is used as stated by Sugiyono (2017: 14). This study was conducted using one experimental group with a comparison group (control class) because this quasi-experimental study aims to reveal a causal relationship by involving a control group and an experimental group, which begins with an initial test (pretest) given to two groups, then given treatment (treatment). This study then ends with a (posttest) given to both groups.

Table 1. Non-equivalent Control Group Design

Class	*Pre-test*	**Treatment**	*Post-test*
Experiment	O1	X	O3
Control	O2	Y	O4

Information:

O1 = *Pre-test*namely a test before being given internal treatment learning mathematics derivative material.

O_3 = Post-test, namely the final test after the Mathway application for increase student learning motivation

X	=	Treatment using the application *mathway*For increase student learning motivation
O2	=	*Pre-test*namely a test using learning video media on providing motivation in learning mathematics derivative material.
O4	=	Post-test, namely a test using learning video media on providing motivation in learning mathematics derivative material

Based on the table above, the experimental and control classes are as follows:

Table 2. Experimental and control classes of class XI IPA SMAN Banda Aceh

Class	*Pretest* (initial test)	Treatment	*Posttest* (final test)
Experiment	XI IPA 3	Using the mathway application	XI IPA 3
Control	XI IPA 2	Using learning videos	XI IPA 2

Data collection techniques in this study, namely: Questionnaires, Test techniques, and Documentation. The questionnaire sheets used in this studycontains statements and provides student responses or responses to the learning that has been done. The questionnaire was given after completing the learning outcome test. The purpose of giving the questionnaire was to find out and measure the use of the mathway application in improving mathematics learning of derivative material. The data obtained from the questionnaire were analyzed with a percentage such as the following formula:

$$P = \frac{F}{N} \times 100\%$$

Information :
F= frequency of student answers
N = total number of students
100% = cash
The questionnaire results can also be seen based on the following weight values:

Table 3. Questionnaire Value Weight

Percentage (%)	Interpretation
90-100%	Very good
70-89%	Good
50-69%	Pretty good
21-49%	Not good
$\leq 20\%$	Very less

There are two types of test instruments used in this study, namely a pretest conducted before the learning process is carried out with the aim of

measuring the initial ability of problem solving and mathematical creativity of students and a posttest conducted after the learning process ends with the aim of determining the final ability of problem solving and mathematical creativity of students. The results of the pretest and posttest will then be analyzed. This test sheet is used to see student learning achievement through the Mathway application using the formula:

$$N = \frac{nilai\ posttest - nilai\ pretst}{skor\ maksimal - nilai\ pretest}$$

For the value weights, please see the following table:

Table 4. Effectiveness Value Weighting

Percentage (%)	Interpretation
<40	Ineffective
40-55	Less effective
56-75	Quite effective
>76	Effective

Data analysis techniques used by researchers in this study: Normality Test, Homogeneity Test, Analysis of the difficulty of questions, and hypothesis testing. The normality test and homogeneity test used in this study are:*kolmogorov-smirnov*with p-value, and testingLevene. Analysis of the difficulty of the questions used in this study with the formula:

$$P = \frac{B}{JS}$$

With:
P = Level of difficulty of the question
B = Many students answered the item correctly
JS = Many students took the test
With the criteria:

$0,00 \le P < 0,30$: Difficult Questions

$0,30 \le P < 0,70$: Medium Question

$0,70 \le P \le 1,00$: Easy Question

The hypothesis tests used in this study are:paired samples t test.

RESULTS AND DISCUSSION

The research was conducted in the even semester, starting with the provision of 4 questions.*pretest-posttest*both in the experimental class and in the control class. The average value obtained from the results*Pretest-posttest*using the application*mathway*different experimental classes so thatThe

researcher concluded by calculating the difference value and obtained a value of 52.19, which shows that with the Mathway application, students find it easier to complete the test and students are also motivated to learn mathematics using the Mathway application, especially in solving math problems. Furthermore, the average value obtained from the results*Pretest-posttest*using learning videoscontrol classThere is also a difference between the two values so that researchers use the difference value as a conclusion to see the results of student learning motivation on the derived material of mathematics learning. The difference value that researchers get is 46.31 and shows lower than the experimental difference value so that it can be stated that student learning motivation on the derived material of mathematics learning has not been seen to be effective, especially in completing tests in the form of questions.

The value obtained from the results of the questionnaire analysis for the use of the Mathway application turned out to be effective for students' learning motivation in the derived material of mathematics learning and showed that the use of the application was in the good category, namely with an average of 74.25. The value obtained from the results of the test data analysisIt is known that the effectiveness of using the Mathway application is 71.06, which shows that the Mathway application used by students in learning mathematics derivative material is quite effective for student learning motivation.

Calculation of normality test in this studyby method*Kolmogorov-Smirnov*and Shapio-Wilk. The normality test data used by the researcher is based on*Kolmogorov-Smirnov*it was obtained that the significant value was 0.131 (the average significant value of the pretest-posttest of the experimental and control classes) so that it was obtained that 0.131> 0.05 so that the decision Ha was accepted Ho was rejected and the data from the study showed a normal distribution. While the Shapio-Wilk method also has the same decision where Ha was accepted Ho was rejected and showed that the data was normally distributed as evidenced by the average significant value of 0.0.028 > 0.05.

Table 5. Normality Test

Tests of Normality							
	Class	**Kolmogorov-Smirnova**			**Shapiro Wilk**		
		Statistics	**Df**	**Sig.**	**Statistics**	**df**	**Sig.**
results	pre_ex	.176	36	.006	.898	36	.003
	post_exp	.118	36	.200*	.948	36	.089
	pre_ktrl	.395	32	<,001	.578	32	<,001
	post_ktrl	.162	32	.032	.918	32	.019
Mean				0.131			0.028
*. This is a lower bound of the true significance.							
a. Lilliefors Significance Correction							

Homogeneity test calculationit was found that the data showed homogeneity. This can be seen from the significant value of 0.346 > 0.05 or by

the decision that Ha is accepted and Ho is rejected according to the homogeneity test decision.

Table 6. Homogeneity test

Test of Homogeneity of Variance					
		Levene Statistics	df1	df 2	Sig.
learning outcomes	Based on Mean	.901	1	66	.346

The analysis of the difficulty of the questions shows that the test questions in this study were obtained that some were moderate and some were easy, so that no difficulty was found in the questions for students when working on questions using the Mathway application and the results can also be stated that students are motivated to learn with the application for derivative materials for learning mathematics.

Hypothesis test calculationIt is known that there are paired sample correlation results where the data shows the relationship between the pretest-posttest of the experimental and control classes. Furthermore, the results of the hypothesis test based on the paired samples test used in this study. The use of paired samples test is because the researcher's data is paired data, namely pretest-posttest for the experiment and pretest-posttest for the control class where the researcher pays attention to the comparative value of t count from the two classes studied so that the t count for the experimental class is 18.94 and t table 1.69 and because t count 18.94> 1.69 (greater than t table) then Ho is rejected and Ha is accepted, so that the results state that there is a difference in the average motivation of students towards the treatment of using the mathway application on students. While for the control class, the t count is 15.03 and t table 1.68 and because t count 15.03> 1.68 (greater than t table) then Ho is rejected and Ha is accepted, so that the test results state that there is a difference in the average motivation of students before being given treatment.

Table 7. Hypothesis testing of pretest-posttest experimental and control classes

Paired Samples Correlations		N	Correlation	Significance	
				One-Sided p	Two-Sided p
Pair 1	Pret-post (experiment)	36	-0.119	0.245	0.490
Pair 2	Pret-post (control)	32	-0.123	0.251	0.502

e					
Paired	df-1	count	table	Test Decision	Significance

					1-Sided p	2-Sided P
Pre-post (experiment)	35	18.94	1.69	tcount > ttable Ho is rejected	<,001 <,001	<,001 <,001
Pre-post (control)	31	15.03	1.68	tcount > ttable Ho is rejected	<,001	<,001

Before conducting the research, the researcher took initial data by conducting a pretest and posttest on the control class through the treatment of learning videos to see students' learning motivation. Where the control class in question is students of class XI IPA 2 and the data obtained for the difference in pretest-posttest values in that class is 46.31. Furthermore, for the experimental class, namely students of class XI IPA 3 through the treatment of using the mathway application, the difference in pretest and posttest values to see their learning motivation is 52.61.

Based on the control class and the experimental class, it was concluded that the difference in the value of students' learning motivation pretest-posttest was lower in the control class than in the experimental class. While to see the difference value of the combination of the control and experimental classes (46.31 and 52.61) is 6.4. So from this value it can be seen that there is learning motivation of students of Banda Aceh State High School on the derivative material of mathematics learning through the use of the mathway application.

In addition, researchers also analyzed the data through questionnaires. The questionnaire was given to students after using the mathway application, namely to students in the experimental class. As in table 4.3 which shows that the average result of the questionnaire was 74.25 with a good category. Furthermore, a test analysis was also carried out and an average value of 71.06 was obtained which showed that the mathway application was quite effective for student learning motivation in the derivative material of mathematics learning.

Furthermore, the data was analyzed by looking at the normal distribution using the Kolmogorov Smirnov method as in table 4.5 which states that the significant value of 0.131> 0.05 or with the decision Ha accepted Ho rejected and concluded that the data from the researcher's research results were normally distributed. The significant value was also considered by the researcher in the homogeneity test as in table 4.6 which states that the sig value of 0.346> 0.05 with the decision Ha accepted Ho rejected and the researcher's data was homogeneous.

Then, the researcher conducted a test of the level of difficulty of the questions given to the students, namely the experimental class. Based on table 4.7, it was found that the questions worked on by the students were predominantly moderate and there were no difficult or difficult questions for students when working on questions using the Mathway application.

Finally, the researcher also conducted a hypothesis test with the aim of obtaining the researcher's alleged data on the research being studied. The results

of the hypothesis test that were considered were the pretest-posttest values of the experimental and control classes as shown in the results of 4.8. From table 4.8, it was concluded based on the comparison of the t count value > t table. In the experimental class, the t count value (18.94) > t table (1.69) was obtained with the conclusion that there was a difference in the results of student learning motivation using the mathway application of derived mathematics learning materials. While for the control class, the t count (15.03) > t table (1.68) was also obtained, there was a difference in the results of student learning motivation on derived mathematics learning materials before the researcher gave treatment as in the experimental class.

Therefore, the research results obtained by researchers in the field can be concluded that the use of the Mathway application in the derived material of mathematical learning is quite effective for use by students of Banda Aceh State High School. However, in this study, researchers found shortcomings in the use of the Mathway application where the Mathway application used by students in solving the derived material problems of mathematical learning students cannot obtain the steps/formulas/methods of working on it because it requires students to subscribe in the sense that it must be purchased as a premium.

CONCLUSION

Based on the results of the research that has been conducted, it can be concluded that:
1. The use of the Mathway application is effective in increasing the learning motivation of students at Banda Aceh State Senior High School on derivative material, as proven by the difference in the pretest-posttest scores of the control class being lower (46.21) than the pretest-posttest scores of the experimental class (52.19).
2. The results of the average pretest (27.08) posttest (79.27) experimental class and the difference value obtained was 52.19 and the questionnaire value with an average of 74.25 with a good category showed that there was student learning motivation on the derivative material of mathematics learning through the Mathway application and the use of this application can be said to be effective.

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Based on the results of the research that has been conducted, there are several suggestions that the researcher would like to convey, including the following:
1. There needs to be an adjustment in the use of the Mathway application in mathematics learning, especially for material that is difficult for students to understand so that students become enthusiastic about learning mathematics.

2. It is necessary to conduct further research on the effectiveness of the Mathway application to see students' learning motivation in learning mathematics using different methods so that students are more motivated and enthusiastic in learning mathematics.

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