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The Effect Of Using Multimedia Macromedia Flash On Student Mathematics Communication At SMP Negeri 1 Labuhan Deli

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Abstract. *This research is a quasi-experimental research. The research conducted at SMP Negeri 1 Labuhan Deli aims to find out. 1) To find out how the mathematical communication ability of students who learn to use Macromedia Flash. 2) To find out how the mathematical communication ability of students who learn without using Macromedia Flash. 3) To find out whether the mathematical communication of students who learn using Macromedia Flash media is better than the mathematical communication of students who learn without using Macromedia Flash media for class VII students at SMP Negeri 1 Labuhan Deli T.A. 2021/2022. The population in this study were all students of class VII at SMP Negeri 1 Labuhan Deli. Using a homogeneous technique, samples were taken from 2 classes of population. One class was used as the experimental class, namely class VII-2 which was taught with Macromedia Flash and class VII-3 which was used as the control class, namely class which was taught without using Macromedia Flash. As a data collection tool using PreTest and PostTest. In this study 1) the mathematical communication ability of students learning to use Macromedia Flash with an average pretest of 67.77 and a posttest of 85.54. 2) the mathematical communication ability of students who learn without using Macromedia Flash with an average pretest of 67.13 and a posttest of 77.54. then testing the hypothesis for learning outcomes using paired t-test. after testing the data, it turns out that the results of testing the ability of learning outcomes in the experimental class at the pretest level α = 0.05 with Lcount < Ltable, namely 0.09452 <0.192 and posttest 0.1228 <0.192 , and the results of testing the ability of learning outcomes in the control class at the pretest level α = 0.05 with Lcount < Ltable, namely 0.1014 < 0.184 and posttest 0.1659 < 0.184, then H0 is accepted and Hi is rejected. Thus it can be concluded that the mathematical communication ability of students who use macromedia flash media are better than those without using macromedia flash media.*

Keywords: *Macromedia Flash ; Communication Ability*

BACKGROUND

Education in life has a very important role in determining the success and progress of a country and nation. In achieving a quality education, an effort is needed that should pay attention to everything related to education itself. Education can be interpreted as a means of inheriting life because a skill acquired in the past and present can be preserved and developed for future generations.

Mathematics is a complex and difficult subject. This is because mathematics has an abstract nature or because learning is less related to the realities that students usually encounter in everyday life. According to Erman (2015) Mathematics is the science of logic regarding shapes, arrangements, quantities and other related concepts in large numbers divided into three types of fields, namely: algebra, analysis, and geometry.

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Through learning mathematics students are expected to be able to communicate ideas with symbols, tables, diagrams or other media to clarify situations or problems. (Trianto. 2016). This mathematical communication ability is also a requirement for solving problems, meaning that if a student cannot communicate well about understanding problems and mathematical concepts, then he cannot solve the problem properly. Therefore this mathematical communication ability is important in learning mathematics. (Aminah. 2018).

Therefore, in learning mathematics, there needs to be interaction so that students' mathematical communication ability need to be possessed by students. Meanwhile, outside of mathematics lessons, students' mathematical communication ability are still important for students to have as a tool for interacting with others. Communication between one another can build a better life and without communication it will not be possible for an exchange of mindsets from each individual in society. Therefore students are expected to be able to communicate well so that they can interact properly, both at school and in society (Purnamasari, 2021).

In this case, communication is seen as the student's ability to communicate the mathematics that is learned as the message content that must be conveyed. With students communicating their knowledge, there can be a renegotiation of responses between students, and the role of the teacher is expected to only be a filter in learning (Hodiyanto, 2017)

The use of computers as a learning aid has experienced a shift in the world of education. The use of computer programs in mathematics learning is very beneficial because it can provide broad opportunities for students and teachers to develop their abilities in investigation and analysis, as well as forming new knowledge and understanding in seeing lessons using computer programs in simple data collection, visualization, analysis and complex. (Miftahul, 2019)

The use of Macromedia flash is very helpful in Mathematics learning activities with animations and pictures that will make it easier for students to remember Mathematical symbols and so that they are easily understood by students. Therefore, Macromedia flash can be said to be able to improve students' mathematical communication skills. Mustamid & Raharjo (2015)

LITERATURE REVIEW

Learning Mathematics

According to the expert (Slameto, 2020) learning is a process of effort that is carried out by a person to obtain a new change in behavior as a whole as a result of his own experience in interaction with his environment. Meanwhile (Djamarah, 2020) learning is a series of physical and mental activities to obtain a change in behavior as a result of individual experience in interaction with their environment which involves cognitive, effective and psychomotor.

Based on several expert opinions about the understanding of learning above, it can be concluded that learning is a process of changing human behavior or skills as a result of effort, training and individual experience in interactions with their environment involving knowledge (cognitive), attitudes (affective) and skills (psychomotor).

Mathematical Communication Ability

Mathematical communication can be interpreted as a dialogue event or mutual relationship that occurs in a classroom environment, where messages are transferred, and messages are transferred containing mathematical material that students learn, for example in the form of concepts, formulas or problem solving strategies. With students communicating their knowledge, there can be a renegotiation of responses between students, and the role of the teacher is expected to only be a filter in learning (Susanto, 2014). Schoen, Bean and Ziebarth (Hulukati, 2017) suggest that mathematical communication is a person's ability to explain an algorithm and a unique way to solve problems, students' ability to construct and explain presentations of real-world phenomena in graphs, words / sentence equations, tables and Physical presentation or students' ability to give guesswork about geometric drawing.

RESEARCH METHODOLOGY

The population in this study was all class students VII of SMP Negeri 1 Labuhan Deli in the 2021/2022 academic year. By using a homogeny technique, the sample was taken from a population of 2 classes. One class was made into an experimental class, namely class VII-2 which was taught by Macromedia flash and class VII-3 which was used as a control class, namely a class taught using conventional methods.

Research Type And Design

Types Of Research

This research is a quasi-experimental research , which is a research that is intended to determine the effect of something imposed on student subjects.

Research Design

In this study, the design used was "designed two group pre test - post test". The experimental class was given treatment in the form of teaching using Macromedia Flash online or online, while the control class was given treatment in the form of teaching conventional lectures online. The number of study hours for each study group is 2x45 minutes. Before the treatment was held, the researcher held a pretest which aims to determine the initial state of the students. Meanwhile, the post test which is held at the end of the teaching aims to see how much communication skills the students want to achieve. In summary, the research design is shown in Table 1. The research design used is :

Table 1. Design Pretest and Posttest

Class	Pretest	Treatment	Posttest
Experiment	T1	X1	T2
Control	T2	X2	T2

Information :

X_1 = Learning using Macromedia Flash on Social Arithmetic material

X_2 = Learning using without Macromedia Flash on Social Arithmetic material

T_1 = Pretest is given to the experimental class and control class before treatment

T_2 = Posttest given after treatment in the experimental class and control class.

Research Instruments

Mathematical Communication Ability Test

A test of students' mathematical communication ability was arranged by the author, for its development the following steps were taken:

a) Make a question grid, which includes sub-topics, the level of difficulty of each item, and the number of questions to be made

b) Compile mathematical communication test questions.

c) Assess the suitability between material, indicators and test questions to determine the validity and validity of the face

Evaluation Instruments

After that an evaluation instrument is held, then calculates the validity and In the preparation for this test, the content validity and predictive validity were used to solve the test questions.

a) Content validity Content validity is the degree to which a test measures the scope of the substance it is trying to measure. A test is said to have contentment validity if it measures certain specific objectives that are parallel to the material or subject matter given.
b) The validity of the Forecast
c) Test difficulty level

Research Procedure

The steps taken to carry out the assessment are as follows:

a) Preparation phase:
    1. Provide information to the school regarding research activities
    2. Develop a research schedule
    3. Determine the subject matter to be researched
    4. Develop a learning implementation program
    5. Prepare the instrument, namely a multiple choice test of 20 questions with 4 options and an online observation sheet
    6. Validating the test with the help of a validator
b) Implementation stage:
    1. Determine the sample class from the existing population
    2. Carry out a pretest to both classes to determine the students' initial ability of the material being taught
    3. Perform data analysis pretest namely normality test, homogeneous test
    4. Provide treatment to both classes online
    5. Give posttest to both classes to find out student learning outcomes of the material that has been taught.
    6. Perform posttest data processing, namely normality test, homogeneity test and hypothesis testing to determine the effect of learning media based on Macromedia Flash on learning outcomes of social arithmetic material.
    7. Concluding the Research Results

Data analysis technique

Before testing the hypothesis, an analysis of the data is carried out that has been obtained to answer the problem formulation and draw conclusions Of the research hypotheses that have been determined using the uji-t.

Analysis test

Normality test

Normality test is performed to determine whether the data samples come from populations with normal distribution or not. In this study, the test for normality using Lilliefors test. Testing normality of the research data using Lilleifors test performed with the following steps

Homogeneity test

Homogeneity test is used to determine whether the derived groups have the same characteristics (homogeneous) or not. The homogeneity test of the variance of two independent variables can be done with the F test,

Hypothesis testing

After the analysis test is carried out, it is followed by hypothesis testing. This test was conducted to determine the difference in the average variables of the two groups, namely the group of students whose learning process used Macromedia Flash media with students whose learning process was not using Macromedia Flash media.

REASEARCH FINDING AND DISCUSSION

Normality Test

To find out if the distribution of data is normally distributed or if the normality test cannot be carried out in the experimental and control classes using the Liliefors test, the normal conditions that must be met is $L_{hitung} < L_{tabel}$ pada taraf $\alpha = 0.05$. the results of the calculation of the data normality test are in the appendix, in summary the results of the student normality test can be seen in the table below.

Table 2. Summary of Experiment Class Data Normality Test Results

No	Data	L_{hitung}	L_{tabel}	Conclusion
1	Pretest	0.094524	0.192	Normal
2	Posttest	0.122834	0.192	Normal

From the table above 2. it can be seen that the pretest data and posttest data have a normal distribution of data at the significance level $\alpha = 0.05$ where $L_{hitung} < L_{tabel}$

Table 3. Summary of Control Class Data Normality Test Results

No	Data	rol Class Data N...	ata Normali...	Conclusion
1	Pretest	0.101482	0.184	Normal
2	Posttest	0.165964	0.184	Normal

From the table above 3. it can be seen that the pretest data and posttest data have a normal distribution of data at the significance level $\alpha = 0.05$ where $L_{hitung} < L_{tabel}$

Homogeneity Test

Based on the normality test for the distribution of the pretest data and pretest data for both classes, the distribution is normal, so the analysis is continued by testing the homogeneity of the two variances between the pretest data for the experimental class and the control class using the Levene test using the SPSS for windows program with a significance level of 0.05. After processing the data, the output display can be seen in the table.

Table 4. Homogeneity Test Results

Test of Homogeneity of Variance

		Levene Statistic	df1	df2	Sig.
Kemampuan Komunikasi matematis siswa	Based on Mean	.137	3	76	.938
	Based on Median	.188	3	76	.905
	Based on Median and with adjusted df	.188	3	74.054	.905
	Based on trimmed mean	.164	3	76	.920

Based on the output of the variant homogeneity test using the Levene test in the table, the pretest significance value was 0.938 and the posttest value was 0.905. Because the significance value is more than 0.05, it can be concluded that the control class and experimental class students come from populations that have the same variance, or the two classes are homogeneous.

Hypothesis using t test

Hypothesis testing is used to determine the effect of each independent variable on the dependent variable. Testing the t-test hypothesis using the help of the IBM SPSS for windows program, namely by comparing the calculated significance of each independent variable to the dependent variable with a significance level of 5%. Decision making using the IBM SPSS for windows application can be made by comparing the results in the Sig column. (2-tailed) with alpha research. The basis for independent decision making until the T-Test is as follows:

a) If the value of Sig. (2-tailed) < research alpha (0.05), then H0 is rejected and H1 is accepted.
b) If the sig. (2-tailed) > research alpha (0.05), then H0 is accepted and H1 is rejected

Table 5. Hypothesis Test with t test

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	T	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Kemampuan Komunikasi matematis siswa	Equal variances assumed	1.038	.314	5.813	42	.000	8.000	1.376	5.223	10.777
	Equal variances not assumed			5.813	36.602	.000	8.000	1.376	5.211	10.789

From the output above, we get a P-value for Levene's test of 1.038 because this value is greater than the alpha value = 0.05, so the variance of the two data is homogeneous. The value in the t column is the tcount obtained from the calculation results. The t value in the first row, namely 5.813, is the result value of t if the variance of the two data is homogeneous. Because the results of the Levene's test state that both variances are homogeneous, the tcount used is the one based on the t value, which is equal to 5.813 with a P-value of 0.000. The P-value obtained is smaller than alpha = 0.05, so H0 is rejected. This means that at the 95% level of confidence it can be concluded that there is an effect of the use of multimedia macromedia flash on students' mathematical communication ability.

Discussions

In the study the two classes were given different teaching, where the experimental class was taught using Macromedia Flash media while the control class was taught without using Macromedia Flash media. From the initial test that was analyzed in the experimental class, it was found that 5 people (25%) out of 20 students had a very low level of mathematical communication ability. Then 3 people (15%) of the 20 students in the low category of mathematical communication ability. For the medium category level, only 8 people (40%) of 20 students. while for the level of mathematical communication ability in the high category, only 2 people (10%) out of 20 students and for the level of mathematical communication ability in the very high category, only 2 people (10%) out of 20 students.

From these differences in teaching, the average value of the experimental class was 88.54 while the control class was 77.54. So based on the results of research conducted by researchers in class VII SMP NEGERI 1 LABUHAN DELI it can be concluded that the average mathematical communication ability of students in social arithmetic material using macromedia flash media is better than those without using macromedia flash media.

CONCLUSION AND SUGGESTION

Conclusion

Based on the research results obtained the following conclusions.

1. Students' mathematical communication ability by learning using Macromedia Flash Media at SMPN 1 LABUHAN DELI d with a value range of 0-100 are obtained mean = 67,77 (pretest) and 85,55 (posttest), large variance= 40,08 (pretest) and 12,83 (posttest), standard deviation = 6,33 (pretest) and 3,88 (posttest).
2. Students' mathematical communication ability with learning without using Macromedia Flash Media at SMPN 1 LABUHAN DELI with a score range of 0-100 are obtained mean= 49,5 (pretest) and 62,25 (posttest), large= 62,11 (pretest) and 27,52 (posttest), and standard deviation = 15,48 (pretest) and 14,87 (posttest).

3. Based on the data analysis in this study, it can be concluded that students' mathematical communication ability with learning using Macromedia Flash media are better than students' mathematical communication ability with learning without using Macromedia Flash media.

Suggestion

Based on the research results, the following suggestions are proposed:

1. Mathematics teachers at SMP NEGERI 1 LABUHAN DELI are advised to use Macromedia Flash media as an alternative in mathematics learning activities which are expected to improve students' mathematical communication ability
2. For teachers at SMP NEGERI 1 LABUHAN DELI who will use Macromedia Flash Media, make media that is more interesting and varied.
3. There are several limitations in this research, both in terms of the implementation of learning activities, delivery of learning materials, and so on. Therefore, it is better to conduct further research that examines mathematics learning using macromedia flash media on other subjects and at different school levels

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