

The Effect of Image Media on Mathematic Representation Ability of Data Presentation Materials on Learning Online Students of Class IV SD N 064998 Medan

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Abstract

The purpose of this research is to determine the effect of image media on mathematical representation ability at data presentation material in online learning of fourth grade students at State Elementary School 064998 Medan Marelan in Academic Year of 2020/2021. This research is an experimental research with quantitative method uses a Quasi experimental research with non equivalent groups pretest – posttest design. This study consisted of two variables, independent variable is image media in online learning and independent variable is the mathematical representation ability of fourth grade students at State Elementary School 064998 Medan Marelan in Academic Year of 2020/2021. The population is all students grade IV State Elementary School 064998 Medan Marelan, Totaling 58 students with sample used were 30 students of class IVA and 28 students of class IVB. The data collection instruments were observation, test and documentation. This research instrument uses test validity, test reliability, level of difficulty and differentiating power of Question. The data analysis used N – Gain calculation, Normality test, Homogeneity test and hypotetis testing. The result of this study show that the experimental class has increased, where 4 students with high interpretation and 26 students with moderate interpretation. The output table of the t – test of experimental class with value Sig. (2 – Tailed) pretest posttest value is 0.000. based on the decision criteria $0.000 < 0.05$, H_0 is rejected and H_a is accepted. It can be concluded that image media affect the student's mathematical representation ability at data presentation material in online learning of fourth grade students at State Elementary School 064998 Medan Marelan in Academic Year of 2020/2021.

Keywords

image media; mathematical representation ability; online learning



I. Introduction

Mathematics is one of the compulsory subjects taught at the level of education, be it in elementary school (SD), junior high school (SMP), high school (SMA), to further education. In addition to the close existence of mathematics in the world of education, mathematics is also often used in everyday life and other fields of science. If it is examined that learning mathematics occupies a very important role in the world of education, it can be seen from the time spent in learning mathematics is far more than other subjects in school. Related to this, how important is learning mathematics in elementary school, because at this level it will be the beginning to equip students with knowledge, as well as equip students to solve problems that exist in their daily lives.

Negative responses to learning mathematics arise not entirely because of students but also from teachers. In general, there are still many teachers who use conventional methods in teaching and learning activities, especially in mathematics. In this situation, it is the teacher who plays an active role in learning, while passive students are just listeners which make students lazy and even bored to learn mathematics. In addition, in learning mathematics in general, teachers rarely even never use learning media in delivering material, while if using media in learning, students will more easily understand mathematics learning with abstract learning characteristics.

Learning mathematics has a goal about the abilities that must be possessed by students. This ability is known as mathematical ability. In NCTM 2000 in Syafrî (2017: 49) stated that mathematical ability is the ability to face problems, both in mathematics and in real life. There are several abilities contained in learning mathematics, including problem solving skills, argumentation skills, communication skills, the ability to make connections, and representation skills. In line with this opinion, NCTM 2000 in Syafrî (2017:49) suggests about the standards of the mathematics learning process, namely: first, mathematical problem solving; second, mathematical reasoning and proof; third, mathematical communication (mathematical communication); fourth, mathematical connections (mathematical connections); and fifth, mathematical representation. From some of these mathematical abilities, the ability to represent mathematically is one of the important basic skills that must be mastered by students. This representation ability is important for understanding concepts and communicating ideas contained in mathematics. Representational ability is the ability to use notations, symbols, tables, pictures, graphs, and diagrams as intermediaries to solve problems in mathematics. The ability of mathematical representation can be seen from the ability of students to understand mathematical material, such as data presentation. Materials that are closely related to the ability of representation. Where in this material, it involves a lot of data related to tables to diagrams.

Based on the internship activities I and II that the author has carried out at SDN 064998 Medan Marelan, in learning mathematics the teacher only uses the lecture method which results in less varied or monotonous learning. Seeing this, of course the learning carried out seems boring so that students are lazy to take part in learning mathematics. In addition, the teacher has never used the media in teaching as an intermediary in delivering learning materials. In learning that is carried out especially in mathematics, many students are unable to solve the questions given by the teacher, but the teacher scolds the students. This causes students to be afraid to take part in mathematics learning. Where this must have an unfavorable influence in mathematics.

In accordance with interviews and observations that the author conducted in December 2020 with the homeroom teacher for grade IV, most students did not like learning mathematics, as seen from the learning outcomes obtained by students. From the results of the study, 70% of the students' scores did not reach the KKM, 15% was sufficient, and another 15% had exceeded. Seeing this, learning mathematics should be further improved. Furthermore, the author also provides essay questions as many as 5 questions online for students to work on. From the results of student work, 10 students got a score of 100, 8 students got a score of 75 and 40 students have not reached the KKM. From the test results above, it can be seen that there are still many students who do not understand how to read and present data.

In addition, since the Covid-19 outbreak emerged, it is undeniable that all activities have been limited, including for schools. To avoid the spread of the Covid-19 outbreak, online learning is carried out as well as learning, especially mathematics. The presence of the current COVID-19 pandemic has had a huge impact or influence in all aspects, one of which is education. The impact can be seen from the use of online methods in all education, including elementary schools. Online learning is learning that uses a web network.

Similarly, in learning mathematics, during the Covid-19 outbreak, the delivery of online mathematics learning, especially elementary schools, was limited to WhatsApp, which required students to learn more independently with the guidance of their parents. While in the previous face-to-face learning period, the results of learning mathematics were quite worrying. In this situation, it is certain that teaching mathematics is quite difficult and less effective because of the existing limitations. According to Frid in Sari, et al (2020:237) states that learning mathematics with e-learning is a challenge because it is difficult to explain mathematical concepts online. Therefore, this condition greatly affects student learning achievement. Covid 19 pandemic caused all efforts not to be as maximal as expected (Sihombing and Nasib, 2020)

In the current Covid-19 condition, teachers generally provide questions that will be solved by students without an effective explanation for each learning material. Actually, this can be circumvented, teachers can use media that are easy to access by students and teachers via WhatsApp, such as the use of image media. When students access the images shared by the teacher, students will automatically observe the images they receive. This will involve students' representational abilities, which can also improve student learning outcomes.

Based on all the explanations of the problems above, the authors are interested in examining the mathematical representation abilities of students in mathematics learning, through image media in online learning that is currently being carried out. The reason the author chose image media as a solution to solve these problems is because of the opinions of experts and relevant research on research that has been studied by previous researchers, which states that through image media can affect the ability of students, but in this case the ability to represent mathematical students in learning mathematics.

In the opinion of Rosengrant, et al in Misel, et al (2016:30) which states that representation is a process that symbolizes or symbolizes an object (object). The symbols or symbols can be made in words, pictures, diagrams, graphs, computer simulations, mathematical equations, and others. Through online learning using image media, it is hoped that it can affect the mathematical representation ability of students in the experimental class.

II. Research Methods

The type of research used in this research is quantitative research with experimental design. The method used in this study is an experimental method using a quasi-experimental design with nonequivalent groups pretest-posttest design.

The population in this study were all fourth grade students at SD N 064998 Medan Marelan in the even semester of the 2020/2021 academic year. The research sample consisted of two classes totaling 58 students. Where class IV A as the experimental class amounted to 30 students and class IV B as the control class amounted to 28 students.

The data collection instrument used in the study consisted of; observation, test and documentation. Observations were made to observe the learning process in the classroom and the effect of online learning using image media. The test is used to measure the ability

of students to what extent students are able to absorb the subject matter that has been delivered by the teacher. The test instrument was used to measure the mathematical representation ability of fourth grade students at SD N Medan Marelan, which was in the form of a test sheet in the form of an essay or a 5-question entry. This test is used to measure the mathematical representation ability of students both in the experimental class who receive online learning treatment using image media or in the control class receiving online learning treatment without using image media. This test is given at the beginning (Pre Test) and at the end (Post Test) teaching in class on data presentation material. Meanwhile, this documentation was conducted to prove that the researcher really did the research at SD N 064999 Medan Marelan.

Data analysis used in this research is statistical hypothesis testing. Before testing the hypothesis, the data groups were tested for normality, for the needs of this normality test the Liliefors analysis technique was used, while the homogeneity test analysis used an analysis technique with a comparison of variance. Hypothesis testing Statistical t-test is used to test the hypothesis whether it can be accepted or not.

III. Results and Discussion

3.1 Results

Table 1. Results of Expert Validation on Learning Devices

No	Rated Object	Validator Average	Validation Level
1	Learning Implementation Plan (RPP) Experiment Class	4,214	Well
2	Learning Implementation Plan (RPP) Control Class	4.142	Well
3	Student Worksheet (LKS)	4,166	Well

Based on the table above, the average value for the Learning Implementation Plan (RPP) for the experimental class is 4.214 with a good level of validation, the Learning Implementation Plan (RPP) for the control class is 4.142 with a good validation level, and the Student Worksheet (LKS) is 4.166 with a validation level is good.

Table 2. Expert Validation Results on Research Instruments

Learning Media	Test Results
Learning Implementation Plan (RPP)	Minor Revision
Student Worksheet (LKS)	Minor Revision
Pre-Test Experiment and Control Class	No Revision
Post Test Experiment and Control Class	No Revision

Based on the table above, it shows that the learning tools, namely the Learning Implementation Plan (RPP) and Student Worksheet (LKS) can be used with slight revisions, where for the RPP a small revision is made by changing the RPP form used to the K-13 RPP form, and adjusting activity descriptions and assessments are in accordance with RPP K-13. Meanwhile, the Pre-test/Post-test experimental and control classes can be used without revision.

a. Description of Improving Mathematics Learning Outcomes

Table 3. Improving Experimental Class Mathematics Learning Outcomes

No.	Student Code	Pre-Test Score	Post-Test Score	N-Gain	Interpretation
1	A1	8	13	41,6666667	Currently
2	A2	5	15	66,6666667	Currently
3	A3	10	18	80	Tall
4	A4	2	10	44,4444444	Currently
5	A5	10	17	70	Currently
6	A6	14	16	33,3333333	Currently
7	A7	9	13	36,3636364	Currently
8	A8	5	10	33,3333333	Currently
9	A9	9	15	54,5454545	Currently
10	A10	5	14	60	Currently
11	A11	9	13	36,3636364	Currently
12	A12	9	17	72,7272727	Tall
13	A13	8	12	33,3333333	Currently
14	A14	14	17	50	Currently
15	A15	8	15	58,3333333	Currently
16	A16	7	14	53,8461538	Currently
17	A17	6	14	57,1428571	Currently
18	A18	8	15	58,3333333	Currently
19	A19	4	12	50	Currently
20	A20	7	14	53,8461538	Currently
21	A21	8	13	41,6666667	Currently
22	A22	6	17	78,5714286	Tall
23	A23	13	17	57,1428571	Currently
24	A24	10	13	30	Currently
25	A25	15	17	40	Currently
26	A26	6	14	57,1428571	Currently
27	A27	7	13	46,1538462	Currently
28	A28	7	15	61.5384615	Currently
29	A29	8	14	50	Currently
30	A30	7	17	76.9230769	Tall

Based on the table above, it can be seen that the results of increased learning (N-Gain) of students in the experimental class have increased, where 4 students with high interpretations and 26 students with moderate interpretations. In detail, the following diagram can be seen.

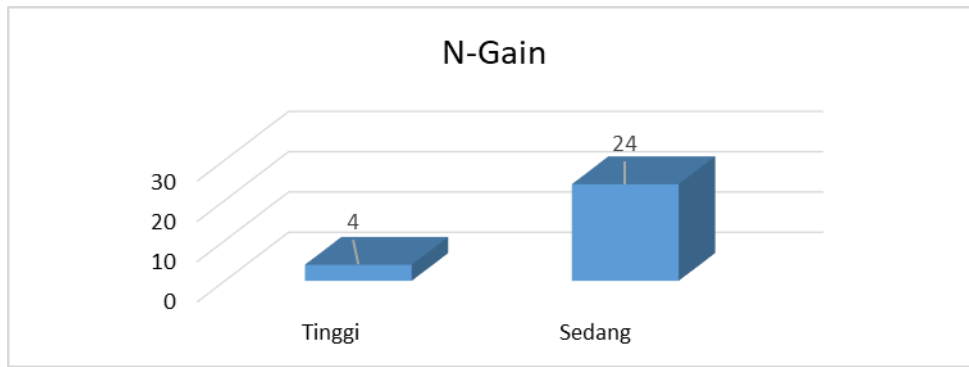


Figure 1. Experimental Class N-Gain Diagram

Table 4. Improved Mathematics Learning Outcomes in Control Class

No.	Student Code	Pre-Test Score	Post-Test Score	N-Gain	Interpretation
1	B1	4	12	50	Currently
2	B2	9	15	54.5454545	Currently
3	B3	3	10	41.1764706	Currently
4	B4	8	12	33.3333333	Currently
5	B5	8	14	50	Currently
6	B6	4	9	31.25	Currently
7	B7	3	13	58,8235294	Currently
8	B8	9	12	27.2727273	Low
9	B9	8	13	41.6666667	Currently
10	B10	5	10	33.3333333	Currently
11	B11	6	15	64.2857143	Currently
12	B12	8	14	50	Currently
13	B13	6	13	50	Currently
14	B14	4	11	43.75	Currently
15	B15	8	13	41.6666667	Currently
16	B16	2	8	33.3333333	Currently
17	B17	7	13	46,1538462	Currently
18	B18	5	11	40	Currently
19	B19	7	13	46,1538462	Currently
20	B20	5	11	40	Currently
21	B21	9	13	36,3636364	Currently
22	B22	4	15	68.75	Currently
23	B23	3	9	35,2941176	Currently
24	B24	2	9	38,8888889	Currently
25	B25	7	11	30,7692308	Currently
26	B26	5	10	33.3333333	Currently
27	B27	7	13	46,1538462	Currently
28	B28	6	11	35,7142857	Currently

Based on the table above, it can be seen that student learning outcomes in the control class have increased, where 27 students have moderate interpretations, and 1 student with low interpretations. In detail, the following diagram can be seen.

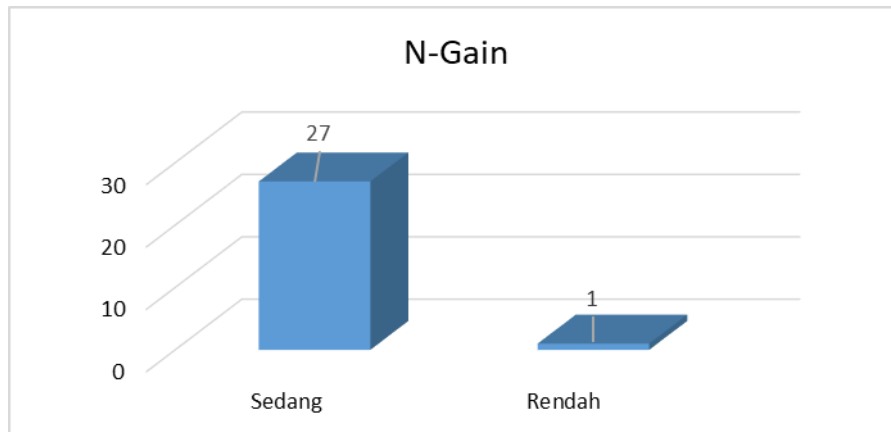


Figure 2. Control Class N-Gain Diagram

b. Test Statistics t-test

From the results of the t-test calculation, the data on student learning outcomes can be seen in the table below.

Table 5. Hypothesis t-test Results

	Paired Differences					t	df	Sig. (2-tailed)
	mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Pair 1 Pre Test - Post Test	28.66667	14,67659	2.67957	-34.14700	-23.18634	-10,698	29	.000

Based on the statement from the table "Paired Samples Test" above, it is known that the value of sig (2-tailed) for the Pre Test and Post Test values is $0.000 < 0.05$, then H_0 is rejected and H_a is accepted. So it can be concluded that there is an average difference between Pre Test and Post Test learning outcomes, which means that there is an influence of image media on the ability of mathematical representation of data presentation material in online learning for fourth grade students at SD N 064998 Medan Marelan FY 2020/2021.

c. Description of the Student Exercise Process

Based on the student answer sheets, the following will present the process of completing each item by students. From the results of the work on question number 1, students in the experimental class have been able to solve the questions well, where students are able to read the data contained in the table, although some other students solve the questions not in accordance with the expected instructions about the questions while from the results of student work in the control class, students answered not according to the question command, where students only wrote down the numbers contained in the table, while the question command was how to read the data in the table.

For question number 2, students in the control class can work on the questions well, it's just that most students do not use the straight column to solve problems, while from the results of student work in the experimental class, it can be seen that students have been able to solve problems well, students are able presenting the data given in tabular form, even though students do not use straight columns in solving questions, but the questions can be answered correctly

From the results of the work on question number 3, it can be seen that students in the control class are less able to understand the questions well, some students fill in the straight column with roman numerals, while the column should be filled with straight lines as many as the numbers in the sum column, in contrast to the experimental class students can solve the questions well, where students are able to fill in all the columns correctly in accordance with the commands expected about the questions

From the results of the work on question number 4, students in the control class showed that students were able to read the data contained in the graph correctly as well as the experimental class.

From the results of the work on question number 5, it can be seen that students have been able to solve the problem of presenting data in the form of bar charts, but students are not precise in describing bar charts, some students draw bar charts without making Cartesian coordinates or horizontal and vertical lines first. So that the results described are not exactly different from the experimental class, students can present the data in a good form.

d. Experimental Class Activity Analysis

When learning research is carried out online using WhatsApp, however, learning activities are still carried out as they should, starting from preliminary activities to closing activities. At the beginning of the lesson the researcher greeted the students, the students were enthusiastic in participating in the lesson, it was seen when the students answered the greeting from the author, which then the author checked the students' attendance by directing students to type their respective names and the word present, in the class WhatsApp group. The students were enthusiastic in taking their own attendance.

After that, before learning begins, the author does not forget to motivate students to take learning seriously and keep the spirit, even though learning is only done online. Apart from this, then the author tells the material to be studied, namely the presentation of data. Furthermore, in the core activity, the author conveys the material through a learning video that the author has provided previously. The students were enthusiastic in watching and listening to the learning videos that the author gave, it was seen when the writer gave the opportunity to students to ask questions, some students asked about the learning videos. Even though some students have asked, the author still motivates students to ask questions about things they don't understand. After that, the writer directed the students to work on the LKS that the researcher had previously distributed. Don't forget to remind students to ask questions if they don't understand the questions I give. Arriving at the closing activity, the author concludes on the material that the author has taught students, then motivates students to keep the spirit of learning at home. Learning is over. In accordance with the explanation of the observations above, the teacher also gave a score to the author with a percentage score of 98.43. Where the average per aspect observed gets category 4 with very good criteria. Likewise with student observations, the class teacher gave the researcher a percentage of the score of 90 with very good criteria.

3.2 Discussion

From the research results obtained, it will be described the discussion of the research results descriptively. Before the research was carried out, the author conducted a trial on the pre-test and post-test questions that the writer would use later during the research. The results of the trials that the author did include the level of difficulty, discriminatory power, validation of questions, and reliability of questions. From the results of the trials I did on the level of difficulty of the questions for items numbered 1-5, I obtained an index of 0.7 : 0.55 : 0.45 : 0.35 : 0.25 with each interpretation being easy, moderate, and difficult.

Furthermore, the results of the test on the differentiating power of questions for questions numbered 1-5 obtained an index of 0.325: 0.325: 0.425: 0.25: 0.275 with sufficient, sufficient, good, sufficient, and sufficient interpretations. Then the test results on the validity for numbers 1-5 obtained a high interpretation. Likewise, the results of the trial on the reliability test of questions for questions numbered 1-5 obtained high interpretations and an increase in student learning outcomes (N-Gain) for the experimental class experienced an increase, where 4 students with high interpretations, and 26 students with moderate interpretations, while increase in student learning outcomes (N-Gain) for the control class has increased, where 26 students with moderate interpretation, and 1 student with low interpretation.

Apart from the trials that the researchers did, the authors also conducted normality tests, homogeneity tests, t-test statistical tests and saw the process of solving student questions on student learning outcomes. From the results of the normality test of the experimental class, the Kolmogorof - Smirnof significance value was 0.074 for the pre-test and 0.193 for the post-test, which means the test is normally distributed. Likewise for the control class, the significance value of Kolmogorof - Smirnof is 0.173 for the pre test and 0.060 for the post test, which means that the test is also normally distributed.

In the homogeneity test results, the Based on Mean significance value is 0.489 for the pre-test and 0.525 for the post-test, which means that the data distribution is homogeneous. Furthermore, from the statistical test results of the experimental class t-test, the value of sig. (2-tailed) is obtained for the Pre Test and Post Test values of $0.000 < 0.05$, so H_0 is rejected and H_a is accepted, which means that there is a media influence on the ability to represent data presentation material in online learning for fourth graders at SD N 064998 Medan Marelan T.A 2020/2021. Then from the process of solving student questions, it was found that students in the experimental class were able to solve problems better, and compared to students in the control class, ie students in the class were better able to read data than students in the control class for question 1, students in the experimental class able to present data in a table more precisely and completely compared to students in the control class for question number 2, students in the experimental class were able to complete the data in the table better and more accurately than students in the control class for question number 3, students in class the experiment and control were able to read the data on the bar chart well for question number 4, but students in the experimental class were better able to present the data in the form of a bar chart than students in the control class for question number 5.

IV. Conclusion

1. The use of image media has an influence on the ability of mathematical representation of data presentation materials in online learning for fourth grade students of SD N 064998 Medan Marelan T. A 2020/2021. This can be seen from the results of hypothesis testing which shows that the significance value obtained is 0.000 which is smaller than the 0.05 significance level.
2. The process of completing student answers using image media in online learning is better than online learning without using image media.

Suggestion

Based on the conclusions of the research results above, the following are some suggestions that researchers can give:

1. The use of image media in online learning Mathematics data presentation material can be further developed to improve students' mathematical representation abilities.

2. In order to make careful preparations in the use of image media in online learning.
3. Picture media cannot stand alone and not all materials can use this method, so teachers need to combine it with other methods as supporters and are good at choosing materials that match this method.

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