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THE EFFECT OF GOOGLE CLASSROOM-ASSISTED REALISTIC MATHEMATICS EDUCATION APPROACH ON STUDENTS' MATHEMATICAL REASONING ABILITY

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ABSTRACT

Mathematical reasoning is an important aspect, but there are still many students who are weak when it comes to mathematical reasoning. Factors that affect the level of mathematical reasoning of low students, including: a) students easily forget the material taught; b) the student has no idea in completing it; c) students are not careful in understanding the problems in the problem; d) students do not understand which formula will be used in solving the problem; e) Students do not understand the concept of the material. This research aims to determine whether or not there is an influence of the approach realistic mathematics education helpgoogle classroomon mathematical reasoning abilities. Quantitative Approach method used in this researchpre-experimental design with one group pretest posttest design. The research subject is the experimental class. Data collection was carried out with pretest and posttest data on the mathematical reasoning abilities of grade 7 students at one of the junior high schools in Purwasari district, kabupaten Karawarang. Data analysis techniques in this study that is analyze the scores of pretest and posttest results students by t-test for 2 dependent samples (Paired Sample T-Test) done with the help of IBM SPSS 21 software. The research results show that there is value of sig 0,000 < 0,05 which means a positive influence approach realistic rathematic education help google classroomon ability students' mathematical reasoning. Based on the result, we can be concluded that there is a positive influence of the approach realistic mathematic education help google classroomon students mathematical reasoning abilities. The learning process uses an approach realistic mathematic education help google classroom can be used as an alternative learning to improve students mathematical reasoning abilities.

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INTRODUCTION

Mathematical reasoning ability is very important and necessary for students in the process mathematics learning or for everyday life. This is appropriate the opinion of (Hendriana et al.,

2018) which explains that mathematical reasoning is a mathematical ability that is necessary and important for students to have at the level middle school and the importance of having mathematical reasoning abilities in students at basically in line with the vision of mathematics in particular to meet future needs.

The importance of mastering mathematical reasoning abilities was also stated by Baroody (Bernard & Rohaeti, 2016) that mathematical reasoning is very important in helping individuals not just remembering facts, rules, and steps to solving problems, but use their reasoning skills in making predictions based on their experience concerned will gain an understanding of interrelated mathematical concepts and learn meaningfully ormeaningfull learning.Therefore, it is necessary to realize that The importance of mathematical reasoning skills needs to be understood and mastered by all levels community, especially students from elementary to tertiary level.

Even though mathematical reasoning is an important aspect, there are still many students who are weak in terms of mathematical reasoning. It can be seen based on several studies including: (Aziz & Hidayati, 2019); (Adiyanti & Noor, 2019); (Jelita & Zulkarnaen, 2019) stated that the mathematical reasoning abilities of junior high school students were still in the low category.

Aprilianti & Zanthy (2019) suggest that the factors that influence the level of students' mathematical reasoning is low, including-: a) students easily forget the material being taught; b) students do not have ideas in solving them; c) students are less thorough in understanding the problems in the questions; d) students do not understand which formula will be used in solving the problem; e) students do not understand the concept of the material. In an effort to improve students' mathematical reasoning abilities, teachers must pay attention to influencing factors and factors that can support mathematical reasoning abilities in the learning process such as: learning models, learning approaches, learning methods and learning strategies.

Noting the importance of having mathematical reasoning abilities but on the other hand these abilities are still low, it is necessary to look for learning efforts that provide greater opportunities for students to achieve better mathematical reasoning abilities. One of the learning approaches that are expected to improve mathematical reasoning abilities is approach realistic math education with the help of google classroom.

Approach realistic math education views mathematics as a human activity. Gravemeijer (Junaedi et al., 2015) explains that approachrealistic math educationbased on five characteristics, namely: 1) using context; 2) using models; 3) using contributions from students' own results; 4) interactivity in the learning process; and 5) integrated with various topics. And three principles: 1) the reinvention and progressive mathematics; 2) educational phenomena; and 3) model development by the students themselves. It is hoped that students will feel happy, interested, and easily understand learning mathematics with a mathematical approach realisticbecause it places reality and student experience as the starting point of learning where students are given the opportunity to construct their own formal mathematical knowledge through existing reality problems. (Putra & Nurfauziah, 2018) explained that the theory of realistic mathematic education approach is based on the perception that mathematics is a human activity and mathematics must be linked in a real way in the context of student life. Learning activities emphasize more on student activities to seek, find, and build knowledge, so that learning is student-centered.

Ernawati (2016) explains that Google Classroom is an application provided by Google For Education to create classrooms in cyberspace.Google Classroom can also be connected with all servicesGoogle For Educationothers, such as:Google Mail, Google Drive, Google Calendar, Google Docs, Google Sheets, Google Slides, And Google Sites so that it can be

used in the learning process. Sabran, & Sabara (2019) explained that the criteria for implementing learning google classroomas a learning medium as a whole is quite effective with a tendency rate of 77.27%. Therefore, it is suitable for use in the distance learning process, such as when a local government circular is issued to carry out the distance learning process oronlinewith students learning from their homes to prevent the spread of COVID-19. Based on the description above, the researcher wants to know whether or not there is an influence of the approach realistic mathematic education help google classroomon mathematical reasoning abilities. As for previous research (Halimah et al., 2020); (Yanti Anggani et al., 2019); (Gusnarsi et al., 2017); (Putri Rimadona & Robandy, 2018); (Raharjo et al., 2018); (Lestari, 2017) which shows that there is an increase in mathematical reasoning abilities using a realistic math education approach. The novelty of this study lies in the google classroom assisted media as well as the sample and research time.

METHOD

The approach in this study uses a quantitative approach, namely explaining a relationship between one variable and another through statistical data. The research method used is an experiment with a research design using a pre-experimental design with one group pretest-posttest design.

The design pattern of this study is as follows:

Table 1. The one-group pretest-posttest design (Sugiyono, 2019)

O_1	X	O_2

Description:

O1 = Pretest

O2 = Posttest

X = Realistic mathematics education approach.

The research design was chosen because it was to determine the effect of realistic mathematics education learning treatment on students' mathematical reasoning abilities by comparing post-test and pre-test scores.

The population in this study were all students in class VII at One of the junior high schools in Purwasari District, Karawang Regency Karawang Regency as subjects in the study. Because the population is considered homogeneous, that is, has the same abilities, there is no superior class, the researchers decided to use a s with samples taken, namely class 7C students with a total of 25 students.

The test instrument used in this study is in the form of a description (subjective) which is used to measure students mathematical reasoning abilities. The test is carried out twice, namely before the learning process takes place (pre-test) and after the learning process takes place (post-test). The pretest is given to determine students' initial abilities in mathematical reasoning abilities, while the posttest is given to see the achievement of mathematical reasoning abilities.

The instrument was tested to determine and measure the level of validity, reliability, index of difficulty and discriminating power of the items. use Software IBM SPSS 21 for windows.

Table 2 Test Validity of Mathematical Reasoning Ability Test Instruments

Item	Correlation Coefficient	Interpretation of Validity	Description

	Validation		
1	0.398	Low	Valid
2	0.593	Moderate	Valid
3	0.510	Moderate	Valid
4	0.363	Low	Valid
5	0.785	High	Valid

Tabel 3 Reliability Test Instrument Mathematical Reasoning Ability Test

Reliability	Interpretation of Reliability	Description
0.405	Moderate	Reliable

Tabel 4 Distinguishing Power Test Mathematical Reasoning Ability Test Instrument

No. Question	$\bar{XA}$	$\bar{XB}$	SMI	DP	Interpretation
1	3,78	3.33	4	0.11	Low
2	3,44	2.22	4	0.30	Moderate
3	3,78	2.11	4	0.42	High
4	3,44	0.89	4	0.64	High
5	3,78	1.33	4	0.61	High

The data analyzed were the scores of students' pretest and posttest results in the experimental class. After the data was obtained, pretest and posttest data analysis was carried out to test the hypothesis that there was an effect of the realistic mathematics education approach assisted by Google Classroom on students' mathematical reasoning abilities. The statistical method used is hypothesis testing with two dependent sample t tests (paired sample t test).

RESULTS AND DISCUSSION

Results

The results of this research are in the form of quantitative data obtained from mathematical reasoning ability test instruments. Before being given treatment, the researcher gave a pretest before learning using a realistic mathematics education approach assisted by Google Classroom to determine students' initial mathematical reasoning abilities. Obtained pre-test data with an average score of 7.2. This shows that students' mathematical reasoning abilities are still low with a minimum score of 5 and a maximum score of 10 and the distribution of the

data variables is small so that it is a good representation of the entire data because the value of the data the sample tends to be close to the average.

In the learning process using a realistic mathematics education approach assisted by Google Classroom, it was carried out in six meetings. Learning with a realistic mathematics education approach uses LKS (Student Worksheets) which are distributed through google classroom as a learning medium. In working on student worksheets, students feel interested because the starting point of learning uses context, namely starting with the story of buying a bag in various rectangular shapes as a presentation of a mathematical model that is connected to real situations that are already known to students.

When working on student worksheets, they can mathematize or model the context mathematically.

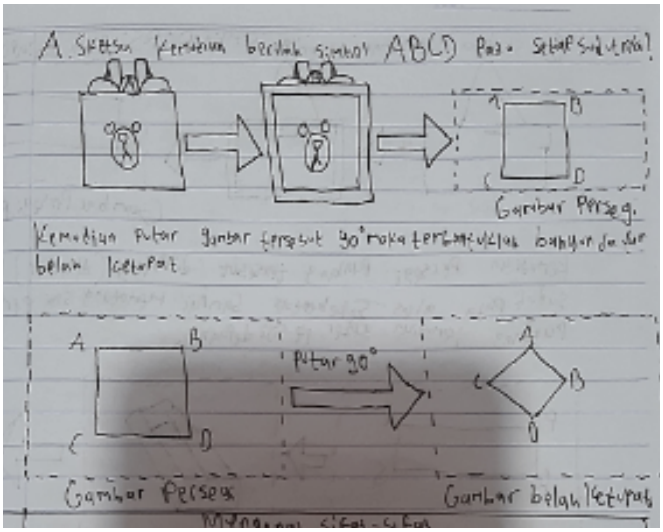

Figure 1 students mathematize (model of) the context of the bag

Based on Figure 1 it can be seen that students can mathematize (model of) the context of a square bag by students drawing a square then depicting it as if rotated 900 to become a rhombus and based on Figure 5 it shows students can mathematize (model for) the context of the bag to find a solution for the length cloth required. With the of model (informal form) and the for model, students are able to make an analogy of contextual problems. So that in this learning process can train students' reasoning abilities.

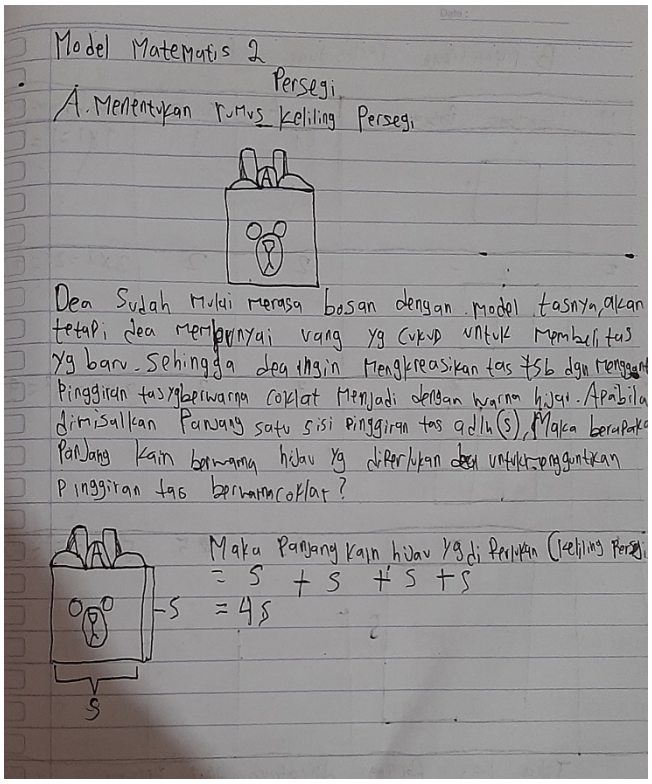

Figure 2 students mathematize (model for) the context of the bag

When working on LKS students can also construct as a basis for the development of mathematical concepts. So that mathematics is not given to students as a ready-to-use product but as a concept built by students.

Every class meeting that uses a realistic mathematics education approach, students are given exercises on mathematical reasoning abilities. Mathematical reasoning ability practice questions in the LKS are done individually.

After six learning meetings, at the last meeting the researcher conducted a final test to measure mathematical reasoning ability after being given treatment using a realistic mathematics education approach assisted by Google Classroom. Obtained post-test data with an average score of 10.72, this indicates an increase in the average mathematical reasoning ability of students that is equal to 3.52 with a minimum score of 5 and a maximum score of 20 and the distribution of variable data is small so that it is a good representation better than the overall data because the sample data values tend to be close to the average.

Based on the results of research on mathematical reasoning abilities, the following data are obtained in Table 5:

Table 5 Mathematical reasoning ability data

	N	*Minimum*	*Maximum*	*Mean*	*Std. Deviation*
Postes	25	5,00	20,00	10,72	4,07
Pretes	25	5,00	10,00	7,20	1,56

Based on Table 5, the mean value for the post-test score is greater than the mean value for the pre-test score. Then based on the standard deviation value which is smaller than the mean

value of both the post-test value and the pre-test value, it shows that the distribution of the data variables is small so that it is a good representation of the entire data because the sample data values tend to be close to the average. This can indicate that there is an increase in students' mathematical reasoning abilities after using a realistic math education approach assisted by google classroom.

The data and explanation above only provide a general description of the results of pre-test and post-test data processing. Meanwhile, conclusions regarding the presence or absence of the effect of the realistic mathematics education approach assisted by Google Classroom on students' mathematical reasoning abilities were obtained from testing the paired sample t-test hypothesis.

Table 6 Data from paired sample t test results

Mathematical Reasoning Ability Test			
	T	*df*	*Sig.*
data postes * data pretes	5,3	24	0,000

Based on the results of the paired sample t-test output using IBM SPSS 21 for Windows Software, in Table 8 it can be seen that the value of Sig. (2-tailed), which is 0.000 less than 0.05, it can be concluded that there is a difference between the average mathematical reasoning abilities of students before and after the implementation of learning mathematics using a realistic mathematics education approach assisted by Google Classroom.

Discussions

The data from this research is quantitative data obtained from mathematical reasoning ability test instruments. Before being given treatment, the researcher gave a pretest before learning using a realistic mathematics education approach assisted by Google Classroom to determine students' initial mathematical reasoning abilities. Pretest data was obtained with an average score of 7.2. This shows that students' mathematical reasoning abilities are still low with a minimum score of 5 and a maximum score of 10 and the distribution of the data variables is small so it is a good representation of the data because of the sample data value. tends to be close to the average. Rimadona, Fitriani, & Roban (2018) stated that many students only count to find answers without using reasoning and cannot provide reasons why they use certain methods in formulating answers. In research by Aziz & Hidayati (2019); Alfionita & Hidayati (2019); Adiyanti & Aini (2019); Jelita & Zulkarnaen (2019) also stated that junior high school students' mathematical reasoning abilities are still in the low category.

In working on the worksheet, students feel interested because the starting point for learning uses context, namely starting with the story of purchasing bags in various rectangular shapes as a presentation of mathematical models that are connected to real situations that are already known to students. Treffer (Wijaya, 2011) states that the use of realistic contexts or problems is used as a starting point for mathematics learning. Soejadi (Mustamin, 2017) stated that linking students' real life experiences with mathematical ideas in classroom learning is important for meaningful learning.

When working on worksheets, students can mathematize or model the context mathematically. Maaβ (Wijaya, 2011) states that modeling helps students understand and also master mathematical concepts more easily. Students can mathematize (model of) the context of a bag in the shape of a square by drawing a square then depicting it as if it were rotated 900 to become a rhombus and based on the picture. 4.5 shows students can mathematize (model for) the context of the bag to find a solution for the required length of fabric. With the of model (informal form) and the for model, students are able to make analogies with contextual problems (Hernawati, 2015). So that this learning process can train students' reasoning abilities.

When working on worksheets, students can also construct them as a basis for developing mathematical concepts. So mathematics is not given to students as a ready-to-use product but as a concept built by students. Palinussa (Herawati, 2015) states that through realistic mathematical education students think more actively. So that students are able to reason, look for patterns to make generalizations and through generalizations students look for formulas that can be used to solve other problems. Apart from that, students are able to work on and answer the problems in the LKS. The results of research (Veralita, Rohaeti, & Purwasih, 2018) state that the Realistic mathematics education approach challenges students to complete worksheets in groups, compile answers, draw conclusions and students are also required to present the results of their work and then respond to them from their friends from the group. other

Based on the calculation of the difference between pre-test and post-test scores in the mathematical reasoning abilities of students who use the realistic mathematics education approach assisted by Google Classroom, it can be seen that the difference in the average post-test score using the realistic mathematics education approach assisted by Google Classroom is 10.72 higher than the average pre-test score of 10.72. 7.2. Based on this, it can be seen that there is an increase in mathematical reasoning abilities after using realistic mathematics education assisted by Google Classroom. To statistically prove whether or not there is an influence of the realistic mathematics education approach assisted by Google Classroom on mathematical reasoning abilities, a parametric test is used, namely the two dependent t test (Sample Paired T-Test).

The results of the two dependent t test (Sample Paired t-Test) show that the sig. (2-tailed) of $0.000 < 0.05$, it can be concluded that there is a difference between the average mathematical reasoning abilities of students before and after implementing mathematics learning using the realistic mathematical education approach assisted by Google Classroom, which means that there is an influence of the realistic mathematical education approach assisted by Google classroom on students' mathematical reasoning abilities. This is in line with research (Saputri, 2018) which states that the realistic mathematics education approach influences students' mathematical reasoning abilities.

CONCLUSION

Based on the calculation of the difference between the pretest and posttest scores in the mathematical reasoning abilities of students who used the Realistic Mathematics Education

approach assisted by Google Classroom, it can be seen that the difference in the average posttest score using the Realistic Mathematics Education approach assisted by Google Classroom was 10.72 higher than the average pretest score of 10.72. 10.72 is higher than the pretest average score of 7.2. Based on this, it can be seen that there is an increase in mathematical reasoning abilities after using realistic mathematics education assisted by Google Classroom. To statistically prove whether or not there is an influence of the realistic mathematics education approach assisted by Google Classroom on mathematical reasoning abilities, a parametric test is used, namely the two dependent t test (Sample Paired T-Test).
The results of the two dependent t test (Sample Paired t-Test) show that the sig. (2-tailed) of $0.000 < 0.05$, it can be concluded that there is a difference between the average mathematical reasoning ability of students before and after implementing mathematics learning using the Realistic Mathematics Education approach assisted by Google Classroom, which means that there is an influence of the Realistic Mathematics Education approach assisted by Google class on students' mathematical reasoning abilities..

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