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The Effect of Realistic Mathematics Education Approach on Students' Representation Ability at SDN 112 Rejang Lebong

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Abstract: This study aims to determine 1) the difference between representation skills taught using the Realistic Mathematics Education (RME) approach with representation skills taught using conventional approaches 2) and the effect of the Realistic Mathematics Education (RME) approach on the representation skills of fourth grade students of SDN 112 Rejang Lebong. The research method used is quantitative research method. The research results from the application of the Realistic Mathematics Education (RME) approach showed that; 1) the average value of the posttest of the experimental class with the Realistic Mathematics Education (RME) approach was 89 and the average value of the posttest of the control class with the conventional approach was 84. Based on the average posttest results, it can be concluded that there is a difference between the Realistic Mathematics Education (RME) approach and the conventional approach. 2) From the results of the hypothesis test analysis, the t count value is 3.424> t table 1.667 with a significance level of 0.05. So, Ha is accepted and H0 is rejected, so from the results of the analysis it can be concluded that there is a positive and significant influence between the application of the Realistic Mathematics Education (RME) approach to the representation skills of grade IV students of SDN 112 Rejang Lebong.
Keywords: Realistic Mathematics Education, Representation Ability

Introduction

One of the subjects that is considered to have a high level of difficulty for students is mathematics. This is because mathematics contains symbols, formulas, and requires high numeracy skills to solve problems to obtain correct and precise answers. However, math's is one of the most important sciences in our lives. Because this science is so important, the basic concepts of mathematics taught to a child must be correct and strong. Math's will be easier to learn if students have mathematical representation skills. Representation is at the centre of mathematics learning. Students can develop, deepen their understanding of concepts and relationships between mathematical concepts they already have through creating, comparing and using representations. The purpose of learning mathematics in Indonesia is that students must have the ability to present mathematical ideas in various forms, whether in the form of symbols, graphs, tables, or in other forms to clarify problems and be used in solving problems. The ability to re-present various ideas to clarify the problem and the ability to design a solution model and interpret the solution of the problem is included in the ability to represent mathematics. (BSNP, 2006)

The National Council of Teachers of Mathematics (NCTM) includes representation as one of the five competencies that must be possessed by students and is programmed for students ranging from pre-kindergarten to grade 12. (Hatfield,

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2008) Representation ability is the ability to present mathematical ideas in the form of images, mathematical models, and written text of a given concept or problem, so that it can then be used to communicate it with others. So, students must be able to present a certain concept or problem first, only then can they communicate it well to others.

Representation skills that are well mastered will help students in learning mathematics so that it will be able to affect their learning outcomes. The low mathematical representation ability of students can be one of the causes of low student learning outcomes in mathematics learning. Students' difficulties in expressing and presenting these ideas are often only considered to be related to the problem of low communication skills. Yet if examined more deeply, there is something more fundamental than communication skills, namely representation skills.

Based on the results of researchers' observations during the initial observations carried out at SD Negeri 112 Rejang Lebong, the learning model used in the learning process tends to be monotonous or does not vary according to the learning so that it makes students not active in learning. Especially in mathematics learning, this will make it difficult for students to understand and learning tends to be boring. So that when students are asked to explain again and even work on problems, not a few students are unable. Therefore, teachers need to try other learning model approaches to attract students' attention so that they can be active in the learning process. The following is data on learning outcomes in the odd semester.

Table1.
Data on Learning Outcomes of Fourth Grade Students of SDN 112 Rejang Lebong

Grade	KKM	Number of students	<KKM	>KKM
IV A	65	24	10	14
IV B	65	26	9	17

Sumber: Odd Semester Mid-Term Assessment Results

Based on the table above, it can be seen that out of 24 students in class IVA there were only 10 students who were complete or only 42% and the remaining 14 students or 58% were not complete. Furthermore, for class IVB of 26 students there were only 9 students who were complete or only 35% and the remaining 17 students or 65% were not complete. This shows that the low mathematics learning outcomes of fourth grade students of SD Negeri 112 Rejang Lebong.

One of the ways that a teacher can do for this problem is by changing the learning model used such as the Realistic Mathematics Education (RME) learning model. Realistic Mathematics Education (RME) is an approach to learning mathematics that is associated with problems in the daily lives of students so that it makes it easier for students to receive material and provide direct experience that they

experience. In this way a teacher can more easily invite students to attract students' attention, make students more active and even invite students how to solve problems in their own way. Thus students are not easily bored and find it difficult to learn so that the process of teaching and learning activities can run effectively.

The Realistic Mathematic Education (RME) approach has several advantages, namely: 1) giving students a clear understanding of everyday life and its usefulness to humans 2) giving the understanding that mathematics is a field of study that is constructed and developed by students themselves not only those who are experts in the field 3) giving students an understanding of how to solve problems does not have to be the same between one person and another. Everyone can find or use a way as long as they are serious. With the advantages that exist in this learning approach, the researcher believes that students' representation skills can be improved, especially in learning mathematics. (Karunia, 2015)

In addition, this research is also strengthened and in line with previous research. The previous research was the research of Harko Wikan Jatmiko with the title "The Effect of Realistic Mathematics Education (RME) Approach Using Computer Media on Student Mathematics Learning Outcomes on the Subject Matter of Triangles of Class VII Students of SMPN II Sumbergempol in 2015/2016". (Jatmiko, 2015/2016) concluded that: based on the results of the study showed that there was a significant effect of Realistic Mathematics Education using computer media on mathematics learning outcomes. This is indicated by the calculation value of the t test, namely t count = 3.087 while with a significance level of 5% and a large effect on the learning outcomes of VII grade students of SMPN2 Sumbergempol which is 79%. In addition, Lina Marlina's research. "The Effect of Collaborative Problem Solving Learning Model on Students' Mathematical Representation Ability". Thesis, Department of Mathematics Education UIN Syarif Hidayatullah Jakarta, April 2014. (Marlina, 2014) The results showed that the most prominent representation aspect that can be developed through the Collaborative Problem Solving learning model is the visual representation aspect, both for high and low ability students. So it can be said that the Collaborative Problem Solving learning model is effective in developing visual representation skills for all levels of student ability. While in the other two aspects, namely mathematical expression and written text, both are almost balanced and not too big a difference with the visual representation aspect.

In line with the research that has been done previously above with the results of research on the improvement of student learning outcomes after the application of the RME approach with before using the RME approach became the author's motivation to examine the effect of the RME approach on students' representation skills. Therefore, this study aims to obtain evidence whether there is a significant increase in representation skills between before and after the application of the RME approach.

Method

This research uses a quantitative research approach, the type of research used is experimental research, the research design used is Quasy Experiment Design or what is commonly called a pseudo experiment. This research design uses the Control Group Pretest-Posttest Design, because this design involves two groups, namely the experimental group and the control group. In this study, the total population of the study was 50 students and all the population would be the research sample, so the technique used in determining this sample was a saturated sample.

The research variables in this study are independent variables (X) Realistic Mathematics Education (RME) approach. The treatment carried out in the experimental class is to use the Realistic Mathematics Education (RME) learning model in the learning process. The dependent variable (Y) is the representation ability of fourth grade students of SD Negeri 112 Rejang Lebong. In the study of Realistic Mathematics Education (RME) learning model as an independent variable that affects students' representation ability. Realistic Mathematics Education (RME) is a learning model using a teaching approach that starts from things that are real for students in the learning process. Ability is the ability of students to communicate ideas or ideas and the ability to re-present notations, symbols, tables, images, graphs, diagrams, equations or mathematical expressions in other forms in a certain way.

Result and Discussion

This study used a quasi-experimental approach with two group pretest posttest design, which was conducted in class IV of SD Negeri 112 Rejang Lebong involving 2 classes as samples. Before giving treatment, a pretest was given to students to determine and evaluate students' representation skills. A total of 10 description questions on Mathematics subjects were used as an assessment instrument for students' representation skills.

Table 2.
Frequency Distribution of Experimental and Control Pretest Results

		Experiment			Control	
No	**Score**	**Fi**	**%**	**Score**	**Fi**	**%**
1	90-95	5	19,2	90-95	2	26,9
2	85-89	0	0,0	85-89	0	0,0
3	79-84	2	7,7	79-84	4	15,4
4	73-78	1	3,8	73-78	0	0,0
5	66-72	0	0,0	66-72	3	11,5
6	60-65	2	7,7	60-65	1	3,8
7	54-59	0	0,0	54-59	0	0,0
8	48-53	5	17,2	48-53	2	7,7
9	42-47	0	0,0	42-47	0	0,0
10	36-41	5	19,2	36-41	4	15,4
11	30-35	6	23,1	30-35	3	11,5
	Total	26	100		24	100
Mean		55,19		Mean	66,42	
Median		50,00		Median	70,00	
Mode		30		Mode	90	
Std. Deviation		22,649		Std. Deviation	22,838	
Range		60		Range	60	
Minimum		30		Minimum	30	
Maximum		90		Maximum	90	

Based on table 2 above, the experimental class pretest results obtained the highest score of 90 and the lowest score of 30 with an average pretest score of 55 while the control class pretest results obtained the highest score of 90 and the lowest score of 30 with an average pretest of 66.42. The data shows that the learning outcomes of the experimental class are still low compared to the control class, meaning that there are still many students who have not met the KKM (65) both in the control class and the experimental class.

After conducting a pretest to determine the initial ability of students, researchers then applied the Realistic Mathematics Education (RME) learning approach in Mathematics subjects on pictograms and bar charts. After the application of the learning approach, the researcher gave a posttest to assess students' representation skills after receiving the treatment. The results of the posttest in both the experimental and control classes are presented in table 3 below, namely as follows.

Table 3.
Frequency Distribution of Experiment and Control Posttest Results

No	Skor	Posttest Eksperimen		Skor	Posttest Kontrol	
		Fi	%		Fi	%
1	94-95	5	19,2	92-93	1	3,8
2	92-93	3	11,5	90-91	6	23,1
3	90-91	4	15,4	88-89	0	0,0
4	88-89	4	15,3	86-87	0	0,0
5	86-87	2	7,7	84-85	7	26,9
6	84-85	4	15,4	82-83	0	0,0
7	82-83	2	7,7	80-81	6	23,1
8	80-81	2	7,7	78-79	1	3,8
9	78-79	0	0,0	76-77	0	0,0
10	76-77	0	0,0	74-75	2	7,7
11	74-75	0	0,0	72-73	0	0,0
12	72-73	0	0,0	70-71	1	3,8
	Total	26	100		24	100
Mean		88,73		Mean	83,58	
Median		88,50		Median	85,00	
Mode		95		Mode	85	
Std. Deviation		4,644		Std. Deviation	5,860	
Range		15		Range	23	
Minimum		80		Minimum	70	
Maximum		95		Maximum	93	

Based on the table above, the experimental class posttest results obtained the highest score of 95 and the lowest score of 80 with an average pretest score of 88.73 and the control class posttest results obtained the highest score of 93 and the lowest score of 70 with an average of 83.58. The data shows that there are differences in pretest and posttest scores in both experimental and control classes. The data showed that there was a significant increase in the experimental class after applying the Realistic Mathematics Education (RME) learning approach.

The normality test uses the Kolmogorov-Smirnov and Shapiro-wilk tests on the SPSS statistics 29 program with a significant level of 0.05. If sig > 0.05, then the data is normally distributed. Hypothesis testing by conducting t-test. The t-test was conducted to determine the effect of the Realistic Mathematics Education (RME) approach on the ability to re-represent the fourth grade students of SDN 112 Rejang Lebong. This test was conducted with SPSS 29, namely the independent t-test. Based on the results of the posttest hypothesis t-test, it is obtained that the analysis value of the application of the Realistic Mathematics Education (RME) approach has an effect in improving students' representation skills indicated by a sig value of 0.001

<0.05 in accordance with the t-test criteria if sig <0.05 then H0 is rejected and Ha is accepted.

Realistic Mathematics Education (RME) is a learning approach that is related to the reality of human life. Students are invited to think about solving problems according to real experiences experienced by students in everyday life or things that are close to students. This aims to make it easier for students to understand a lesson and be able to solve the problems given because they are related to their lives.

Burhan Iskandar Alam and Zulkardi revealed that realistic mathematics learning is learning that starts from real things for students, emphazing the process of doing mathematics skills, discussing and collaborating, arguing with classmates so that they can find their own ways or problem-solving strategies and use mathematics to solve the problem both individually and in groups. (Alam, 2012)

This research also proves the theory expressed by Kusumaningrung and Nuriadin that learning mathematics using the RME approach is more interesting and makes students more active to present mathematics lessons in other forms so that it is more effective in improving representation skills. (Kusumaningrum, 2022) This is evidenced by the greater Posttest value obtained by the experimental class compared to the control class Posttest results.

At the first meeting, researchers gave pretest questions that had been prepared to determine the ability of students before the application of the Realistic Mathematics Education (RME) approach. Furthermore, researchers conducted learning with the RME approach by inviting students to pay attention to plants in the environment around the school to then be grouped and explained in front of the class in groups. At the next meeting, students are given the opportunity to write down their family members' favourite foods and what items are in their bags individually. After conducting several meetings, the researcher gave a posttest at the end of the meeting to determine the effect of the Realistic Mathematics Education (RME) approach on students' representation skills.

This research uses a Quasy Experiment Design design using Control Group Pretest-Posttest Design. This study used two classes, namely the experimental class and the control class with a total of 50 students. The research was conducted to get answers to the questions in the problem formulation.

After carrying out several stages of the above activities, the researcher can explain some of the discussions in accordance with the researcher's problem formulation, namely that: 1) After applying the Realistic Mathematics Education (RME) approach in class IV SDN 112 Rejang Lebong, the results of mathematics learning have increased significantly. This can be seen in Table 1.2 in the experimental class obtained an average pretest score of 55 and an average posttest score of 89 while in Table 1.3 the control class obtained an average pretest score of 65 and posttest results of 84. This shows that there is a significant increase in the experimental class with the application of the Realistic Mathematics Education (RME) approach. This is also in line with the results of Siregar and Harahap's

research which states that there is an increase in the representation skills of students taught using the RME approach which is much better than the representation skills of students before using the RME approach (Harahap, 2021). Based on this, the conclusion can be drawn. That there is a difference in the representation ability of students taught using the Realistic Mathematics Education (RME) approach with learning using conventional approaches. Which is evidenced by the pretest and posttest scores of students. 2) Based on the results of data analysis t test (independent sample test) obtained sig value of 0.001 <0.05 in accordance with the t-test criteria if sig <0.05 then H0 is rejected and Ha is accepted. This means that there is a positive and significant effect on the Realistic Mathematics Education (RME) approach to the representation skills of grade IV students of SDN 112 Rejang Lebong. It can be concluded that, learning mathematics with the Realistic Mathematics Education (RME) approach is better than conventional learning in an effort to have a positive influence on representation skills. One of the reasons is that the RME approach emphazes students to find their own mathematical concepts not taught directly by the teacher, but found by students through learning activities.

Conclusion

After the application of the Realistic Mathematics Education (RME) learning approach, there is a significant difference between the learning outcomes of the experimental class and the control class, this is evidenced by the greater average value of the experimental class posttest compared to the control class. This means that there is a difference between the Realistic Mathematics Education (RME) learning approach and the conventional learning approach. Based on the results of the t test data analysis (independent sample test), the t count value is greater than the t table value, it can be concluded that Ha is accepted and H0 is rejected. From the results of the hypothesis test it can be concluded that there is a positive and significant effect on the Realistic Mathematics Education (RME) approach to the representation skills of fourth grade students of SDN 112 Rejang Lebong.

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