Effectiveness of Realistic Mathematical Education (RME) Approach Compared to Conventional Learning Models Elementary School Students

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ABSTRACT: The learning approach that can be applied in learning mathematics is a realistic approach, because it has the advantage that it gives students a clearer understanding of the relationship between mathematics and everyday life and under the guidance of teachers students can solve their mathematical problems. The purpose of this study was to determine the effectiveness of RME compared to conventional learning models. This research is a quasi-experimental research. In this study, the population was the second semester students of class IV SD Negeri Pacitan District. In this study, the sample was part of the population taken using the Stratified Cluster Random Sampling technique, taking data from all public elementary schools in Pacitan District. The results before and after using the RME (Realistic Mathematical Education). Based on the results of the t-test analysis (paired sample t-test), it can be obtained that the t-count is greater than t table. Namely $12.078 > 1.68595$ and Sig. (2 tailed) = $0.000 < 0.05$, then Ho is rejected and Ha is accepted. So it can be concluded that there is an effect of the RME method on the development of mathematical reasoning abilities of elementary school students in the Pacitan district.

KEYWORDS: Realistic Mathematical Education, Conventional Learning, Elementary School

INTRODUCTION

Effectiveness shows success in terms of achieving the goals that have been set. If the results of the activity are closer to the target, the higher the effectiveness (Herizal & Mutia, 2020) . The essence of effective learning is a teaching and learning process that is not only focused on the results achieved by students, but how an effective learning process is able to provide a good understanding, intelligence, perseverance, opportunity and quality and can provide behavioral changes and apply it in their lives. (Fakhrurrazi, 2018) .

Based on the opinion of these experts, effective learning is making it easier for students to learn something useful to achieve the goals and learning strategies that have been set, goals, results, effects, and contexts that can be integrated in life. Effective learning media can improve the learning process of students. According to (Wisada et al., 2019) there are 4 characteristics of effective learning, namely:

1. Learning will attract the attention of students so that it can foster learning motivation
2. materials will have a clearer meaning so that they can be understood by students, and allow students to master the learning objectives better.
3. Teaching methods will be more varied
4. Learners do more learning activities, because they do not only listen to teacher descriptions, but also carry out activities such as observing, demonstrating and others, all of which can be done by using learning media based on the Development of Science and Technology.

Effective learning are the presence of a teacher element, a student element, teacher and student activities, interaction between teachers and students, aiming at changing student behavior, and the process and results are planned or programmed (Festiawan, 2020). Based on the opinion of experts, it can be concluded that the characteristics of effective learning are activities and interactions between teachers and students so that they can lead to changes in student behavior and the process and results are successful.

Mathematics is a basic science that has an important role in the development of human life. Mathematics adheres to a consistent system. However, mathematics is not rigid in system manipulation. Manipulation of the system will have no effect as long as it moves within the system adopted and within the scope of the universe of discourse. Concepts in mathematics are guidelines so that in manipulating shapes or symbols they are always in the corridor of the system adopted (Abrar, 2018). Therefore, so that

students can enjoy learning mathematics and motivate them to apply their knowledge in everyday life and improve their ability to solve problems in mathematics. One of the good lessons to be applied is the Realistic Mathematics Education (RME) approach.

The RME approach is an approach in learning mathematics that has the characteristics of discovering mathematical ideas or concepts by students through the real world or real problems as a learning benchmark. This means that in learning mathematics, students are invited to relate mathematical concepts to contextual problems, so that abstract mathematical concepts can be realized in students' minds to solve problems related to mathematics (Yudha et al., 2019) . So, the RME approach means that students are invited to connect mathematical concepts with contextual questions. As a result, abstract mathematical concepts can be realized in students' minds and solve mathematical problems.

RME is a teaching approach that starts from real things for students / emphasizes the process skills of doing mathematics, discussing and collaborating, arguing with classmates so that they can find out on their own (student inventing) as opposed to (teacher telling) and at the same time finally use mathematics to solve problems either individually or in groups (Ananda, 2018). According to (Latipah & Afriansyah, 2018) Many people think that the RME approach is an approach in learning mathematics that must use everyday problems. So, based on the opinion of several experts that RME is learning that is carried out in interaction with the environment and starts from real problems for students and emphasizes process skills in solving given problems.

The RME approach also has the advantage that it is more provide a clear understanding to students about the relationship of mathematics to everyday life and under the guidance of teachers students can solve their mathematical problems (Puspitasari & Airlanda, 2021) . However, there are also weaknesses in the RME approach , namely the low quality of the training followed and the low commitment and motivation of teachers to apply innovative learning models (Khodijah, 2019) .

Based on the opinions that have been expressed by two experts. It can be seen that the RME (Realistic Mathematics Education) approach has several advantages and disadvantages. So innovation is needed to improve the quality of learning mathematics. So, it is hoped that it can improve students ' thinking which ultimately aims at the final result. There is a teacher's role in the RME (Realistic Mathematics Education) approach which is more dominant in providing motivation, facilitator, and stimulus so that students are active in learning activities. Therefore, the teacher should be able to update the material with new challenging problems for students.

METHOD

This research is a quasi-experimental research because it is impossible for the researcher to control or manipulate all the relevant variables except for some of the variables studied. According to (Sugiyono, 2018) Experimental research can be interpreted as a research method used to find the effect of certain treatments on others under controlled conditions. The population is a generalization area consisting of objects or subjects that have certain quantities and characteristics determined by researchers to be studied and then conclusions are drawn (Riadi, 2020). In this study, the population was the second semester students of class IV SD Negeri Pacitan District. For data analysis using normality test and homogeneity test, test normality aim for knowing is sample which taken originated from population which distribute normal or no. Test normality using Lilliefors method while homogeneity test is used to test whether k samples have the same variance. The homogeneity test used the Bartlett method with Chi Square test statistics.

RESULTS AND DISCUSSION

1. Normality test

Normality test is needed to find out whether the data obtained from each learning media in this study are normally distributed or not. If the data is normally distributed, then this data can be processed using t-test statistics. Test normality using the Lilliefors method. To find out whether it is normal or not, if sig > 0.05 then it is normal and if sig < 0.05 it can be said to be abnormal. The calculation results obtained are as follows:

Table 1. Normality Test

	Kolmogorov-Smirnov [a]			Shapiro-Wilk		
	Statistics	df	Sig.	Statistics	df	Sig.
PRE TEST	.086	39	.200	.974	39	.501
POST TEST	.130	39	.096	.954	39	.112
a. Lilliefors Significance Correction						

Based on the results of the Liliefors normality test. it can be seen by looking at the Kolmogrov-Smoirnov significance value, the significance value (Sig) for all data both on the Kolmogorov-Smirnov test and the Shapiro-Wilk test > 0.05, it can be concluded that the research data is normally distributed.

2. Homogeneity Test

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The homogeneity test was used to determine the level of similarity of variance between the two groups, namely the experimental group and the control group before (pre-test) and after (post-test) treatment. The homogeneity test uses the Bartlett method to accept or reject the hypothesis by looking at the sig value in Box'Sm at a significance level of 0.05 (sig > 0.05). The results of the homogeneity test can be seen in the following table:

Table 2. Homogeneity Test

Box's M		2,916
F	Approx.	2,765
	df1	1
	df2	931,458
	Sig.	.097

Based on the table above, the Box's M value is 2,916 and a significant value is 0.097 > 0.05 indicates that the data group comes from a homogeneous population.

3. Hypothesis Test Statistics

Hypothesis testing was analyzed using t-test to determine whether learning using the RME method is more effective than conventional learning models in developing mathematical reasoning abilities of elementary school students in Pacitan district . The conclusion of the study was declared significant if the significance level was 5% and the p value < 0.05 .

Table 3. Paired sample T-test

		mean	N	Std. Deviation	Std. Error Mean
Pair 1	PRE TEST	57.77	39	13,170	2.109
	POST TEST	84.77	39	6,788	1.087

In the results of the *paired samples statistics* above, it shows a summary of the results of descriptive statistics from the two samples studied were the pre-test and post-test scores. For the pre-test value obtained an average of 57.77 and the post-test average value of 84.77. with the number of respondents as many as 39 students. The mean value of pre test < post test which means descriptively that there is a difference in average learning outcomes between pre test and post test.

Table 4. Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	PRE TEST & POST TEST	39	.138	.403

The results of the data above show the results of the correlation test or the relationship between the two data or the relationship between the pre test variable and the post test variable. Based on the output above, the correlation coefficient value is 0.138 with a significance value of 0.403. Because the value of sig. 0.403 > 0.05, it can be concluded that there is no relationship between the pre test variable and the post test variable.

Table 5. Paired Samples Test

		Paired Differences							
					95% Confidence Interval of the Difference				
		mean	Std. Deviation	Std. Error Mean	Lower	Upper	T	df	Sig. (2-tailed)
Pair 1	PRE TEST - POST TEST	-27,000	13,960	2.235	-31.525	-22.475	-12,078	38	0.000

The statistical hypothesis is as follows:

Ho: There is no effect of the RME method on develop mathematical reasoning abilities of elementary school students in Pacitan district .

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Ha: there is an effect of the RME method on develop mathematical reasoning abilities of elementary school students in Pacitan district.

The basis for making decisions is based on the t-count value with the t-table. Based on table above, it shows that there is a significant difference between the results before and after using the RME. To see the value of the t-table, it is based on the degrees of freedom (dk), whose magnitude is N-1, which is 39-1=38. The value of dk 38 at the 5% level of significance obtained a t-table of 1.68595. while the t-count is -12.078, the t-count is negative because the average value of pre-test learning outcomes is lower than the average post-test learning outcomes. So that the negative t count can be positive. Based on the results of the t-test analysis (paired sample t-test), it can be obtained that the t-count is greater than ttable, namely 12.078 > 1.68595 and Sig. (2 tailed) = 0.000 < 0.05 , then Ho is rejected and Ha is accepted. So it can be concluded that there is an effect of the RME method on develop mathematical reasoning abilities of elementary school students in Pacitan district .
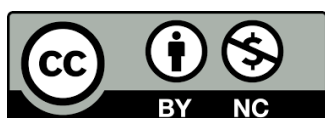
To determine the level of significance (P Value) If the significance is > 0.05, then Ho is accepted If the significance is < 0.05 then Ho is rejected. Based on table 6 shows that the significance is 0.000 < 0.05, then Ho is rejected and Ha is accepted, meaning that the hypothesis states that there are differences in the results of the mathematical reasoning abilities of elementary school students in Pacitan district before and after using the RME (*Realistic Mathematical Education)* .

CONCLUSION

Based on the results of the t-test analysis (paired sample t-test), it can be obtained that the t-count is greater than ttable, namely 12.078 > 1.68595 and Sig. (2 tailed) = 0.000 < 0.05, then Ho is rejected and Ha is accepted. So it can be concluded that there is an effect of the RME method on develop mathematical reasoning abilities of elementary school students in Pacitan district .

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