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THE EFFECT OF REALISTIC MATHEMATICS EDUCATION (RME) LEARNING MODEL ON MATHEMATICS LEARNING OUTCOMES OF CLASS IV SD GMIM SION RAANAN BARU

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Abstract

This study aims to determine the effect of using the Realistic Mathematics Education model on mathematics learning outcomes of the fourth grade students of SD GMIM Sion Raanan Baru. The method used in this study was a quasi-experimental study using a non-equivalent pretest-posttest control group design. Data collection was carried out using a multiple-choice test of learning outcomes, involving 30 students as samples. Pre-test and post-test data were analyzed descriptively indicating that the minimum score achieved from the learning outcomes of students given treatment in the form of the conventional learning model is 12 out of an ideal score of 100 and the maximum score is 40 out of 100. Meanwhile, the minimum score of student learning outcomes given treatment using the Realistic Mathematics Education learning model is 64 out of an ideal score of 100 and the maximum score is 88 out of 100. The experimental and control groups' sample post-test data are normally distributed and have homogeneous variants. Then a further test is carried out the next test carried out is hypothesis testing using t-test. Based on the results of the hypothesis test, it is known that t-statistics> t-table = 16.74 > 1.701131, it can be concluded that there exists a significant effect of applying the Realistic Mathematics Education learning model compared to the conventional learning model if it is oriented to mathematics learning outcomes from plane figures of the fourth Grade Students of SD GMIM Sion Raanan New.

Keywords: learning outcomes; learning models; realistic mathematics education

INTRODUCTION

The quality of education is determined by the quality of the learning itself, so that quality education is in harmony with quality learning (Diana N, 2023). Education has an important role in advancing the Indonesian nation in the current era of globalization. Education is usually referred to as teaching, because education generally requires teaching and everyone is obliged to educate the learning process to improve student learning outcomes.

Mathematics as one of the subjects that occupies a very important role in education. Learning mathematics is very important to develop everyday life. Mathematics is a powerful and clear communication tool and can be used to present information in various ways, such as improving logical abilities , thoroughness, patience and awareness as well as giving satisfaction to the effort made to solve a challenging problem. Despite being a very important subject, mathematics is still

considered a difficult subject for some students. Therefore, the use of appropriate learning strategies is necessary in order to assist students in understanding mathematics learning.

Based on observations in class IV SD GMIM Sion Raanan Baru, it was found that the facilities and infrastructure at school were sufficient, but the learning model applied was the lecture method, this made students less active in learning and students had difficulty understanding learning concepts, therefore in observation, there are still students whose grades do not reach the KKM <60.

Based on the observations of researchers from a total of 30 students, only 12 people or 40% could solve the problem well, while 60% could not solve the problem because of the lack of students' attention to learning mathematics in flat shape material, and the learning applied by the teacher was not suitable for students so students are also less active in learning.

Based on the problems encountered during the observation that the learning model taught by students in flat shapes lessons must be improved, one model that can be used is the Realistic Mathematics Education learning model, with the Realistic Mathematics Education learning model students will be more active and students will think more critically so that can improve student learning outcomes.

Based on the existing problems, the researchers conducted a study entitled "The Influence of Realistic Mathematics Education (RME) Learning Model on Mathematics Learning Outcomes of Class IV SD Gmim Sion Raanan Baru.

RESEARCH METHODS

This study aims to determine the effect of the Realistic Mathematics Education (RME) learning model on the Mathematics Learning Outcomes of Grade IV SD GMIM Sion Raanan Baru. This research is an experimental research. The experimental design used was the pre-test and post-test control group design. In this research design there is an experimental class, namely the class using the Realistic Mathematics Education (RME) model, and the control class using the conventional model. The research subjects came from class IV SD GMIM Sion Raanan Baru which were randomly selected as many as 30 people out of 40 students. Furthermore, the 30 students were divided into 2 classes which would be used as the control class and the experimental class.

Data collection was carried out through tests of students' cognitive learning outcomes. The test was given 2 times, namely the initial before being given treatment and the test after being given treatment. Furthermore, students' cognitive learning outcomes are described and the effect is seen by using the T-test. Hypothesis testing with the T-test is carried out for pre-test data and post-test data. It is said that Realistic Mathematics Educatio (RME) has an influence on students' cognitive learning outcomes if the results of the T-test data pre-test show no difference between the control class and the experimental class and in the results of the T-test post-test data there is a significant difference between the control class and the class experiment.

RESULTS AND DISCUSSION

This research was conducted to determine the effect of the modelRealistic Mathematics Education(RME)on the results of learning mathematics class IV.

Pre-test and post-test results of the control class

In this study, the data taken were the results of learning mathematics on flat shapes. The range of post-test and pre-test scores is 0-100. In the control class or class that does not use the Realistic Mathematics Education (RME) model, it is obtained that is 356-460, the maximum pre-test and post-test scores for the control class are 40 and 60, the minimum pre-test and post-test scores for the classcontrolnamely 12 and 16, the mean of the pre-test and post-test of the classcontrolnamely 23.73 and 30.66, the standard deviation of the class pre-test and post-testcontrolie 10.08 and 13.7, the class pre-test and post-test rangescontrolnamely 28 and 32, and the class pre-test and post-test variancescontrolnamely 101.63 and 188.95. The research results for the control class are reviewed in the table below.

Table1.ResultsControl class pre-test

No	Name	Frequency
1	12 – 17	6
2	18 – 23	1
3	24 – 29	3
4	30 – 36	4
5	37 - 42	1

Table2. ResultsPost-test control class

No	Name	Frequency
1	16 – 24	9
2	25 – 33	1
3	34–42	2
4	43–51	2
5	52 - 60	1

Pre-test and post-test result data of experimental class

In this study, the data taken was the result of learning mathematics on Flat Shape material. The range of post-test and pre-test scores is 0-100.

In the experimental class or class using the Realistic Mathematics Education (RME) model, the number of pre-test and post-test was obtained, namely 380 and 1202, the maximum pre-test and post-test scores for the experimental class were 44 and 88, the minimum pre-test and post-test scores were the post-test of the experimental class is 12 and 64, the average pre-test and post-test of the experimental class are 10.97 and 6.34, the pre-test and post-test ranges of the experimental class are 44 and 24 and the pre-test and post-test variances experimental class, namely 120.38 and 40.26.

The results of research for the experimental class or class using the modelRealistic Mathematics Education(RME)examined in the table below

Table 3. ResultsExperimental class pre-test

No	Name	Frequency
1	12 – 18	5
2	19 – 25	4
3	26 – 32	2
4	33 – 39	1
5	40 - 46	3

Table 4.ResultsExperimental class post-test

No	Name	Frequency
1	12 – 18	5
2	19 – 25	4
3	26 – 32	2
4	33 – 39	1
5	40 - 46	3

Research result

The stages in carrying out data analysis are the normality test and homogeneity test. This stage aims to ensure that there is compatibility between the subject matter that has been taught and the contents of the instrument that has been made so that the resulting data is more accurate.

The following are the results of research data analysis that has been carried out:

Control Pre-Test Normality Test and Experimental Pre-Test

Hypothesis:

H0 : Sample comes from a normally distributed population

H1 : Samples come from populations that are not normally distributed

Test Criteria:

H0 is accepted if the price is significant (Sig.)> 0.05 then H1 is rejected or,

H1 is accepted if the price (Sig.)< 0.05 then H0 is rejected

Table 5.Normality test pre-test experimental class and control class

	Class	Kolmorogov-Smirnov			Shapiro-Wilks		
		Statistics	Df	Sig	Statistics	Df	Sig
Pretest	Control	.178	15	.200*	.894	15	077
	Experiment	.220	15	.049	.897	15	085

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

Based on testing the data in the output table states that the significance value or sig. on the normality testShapiro-Wilkselarge 0.077 for the control class and 0.085 for the classexperiment.

Because both prices are sig. is greater than 0.05, it is concluded that the data is normally distributed.

1. Normality Test Post-Test Control and Post-Test Experiment Hypothesis :

H0 : Sample comes from a normally distributed population

H1 : Samples come from populations that are not normally distributed

Test Criteria:

H0 is accepted if the significance price (Sig.) > 0.05 then H1 is rejected or,

H1 is accepted if the price (Sig.) < 0.05 then H0 is rejected.

Table 6.Normality Test Post-Test control class and experimental class

	Class	Kolmorogov-Smirnov			Shapiro-Wilk		
		Statistics	Df	Sig	Statistics	Df	Sig
Postest	Control	.191	15	.147	.893	15	.074
	Experiment	.219	15	.050	.895	15	081

a. Lilliefors Significance Correction

Based on testing the data in the output table states that the significance value or sig. in the Shapiro-Wilk normality test of 0.081 for the control class and 0.074 for the experimental class. Because the two Sig prices are greater than 0.05, it can be concluded that the data is normally distributed.

Homogeneity test pre-test control class and experimental class

Hypothesis:

H0 : Sample comes from a homogeneous population

H1 : The sample comes from a non-homogeneous population

Test Criteria:

H0 is accepted if the significance price (Sig.) > 0.05 then H1 is rejected or

H1 is accepted if the price (Sig.) > 0.05 then H0 is rejected.

Table 7.Homogeneity TestPre-Testcontrol class and experimental class

Levene Statistics	df1	df2	Sig.
.230	1	28	.636

By using a significant level α = 5% or 0.05, H0 is rejected if the Sig (significance) value is < 0.05 and H0 is accepted if the Sig. (significance) > 0.05.

Decision:

Based on the Test of Homogeneity of Variances, a Sig value of 0.636 is obtained which is greater than 0.05, then H0 is accepted or in other words there is no difference in the population variance of the class pre-test data.Classes taught with the RME Modelwith the population variance of class

value datawho were not taught with the RME Model, it can be concluded that the experimental class with the classcontrolhomogeneous.

Post-Test Homogeneity Test of experimental class and control class

Hypothesis:

H0 : Sample comes from a homogeneous population.

H1 : The sample comes from a non-homogeneous population.

Test Criteria:

H0 is accepted if the significance price (Sig.) > 0.05 then H1 is rejected or,

H1 is accepted if the price (Sig.) < 0.05 then H0 is rejected.

Table 8.Homogeneity Test Post-Test control and experimental class

Levene Statistics	df1	df2	Sig.
12,793	1	28	001

Decision:

Based on the Test of Homogeneity of Variances, a Sig value of 0.001 is obtained which is less than 0.05, then H0 is rejected and H1 is accepted or in other words there is a difference in the data variance in the post-test class control class and the post-test classexperiment, then it can be concluded classexperimentwith a non-homogeneous control class.

Hypothesis testing

Because the normality and homogeneity tests have been fulfilled, the hypothesis can be carried out.

Decision :

Steps

H0:≤μ_1 μ_2

H1:>μ_1 μ_2

Test criteria:

H0 is accepted if price ≤and H1 is rejected or,T_(hitung) T_(tabel)

H1 is accepted if the price is > and H0 is rejectedT_(hitung) T_(tabel)

Where :

μ_1= average student learning outcomes in the experimental class using the learning modelRealistic Mathematics Education.

μ_2= average student learning outcomes in the control class using the lecture learning model.

Probability α = 0.05

Is known :

$\bar{x}_1$= 80.13 s_1^2= 40.26 n_1= 15

$\bar{x}_2$= 25.33 s_2^2= 120.38 n_2= 15

So :

$$Q_{count} = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}}$$

$$Q_{count} = \frac{80.13 - 25.33}{\sqrt{\frac{40.26}{15} + \frac{120.38}{15}}}$$

$$Q_{count} = \frac{54.8}{\sqrt{2.684 + 8.025}}$$

$$Q_{count} = \frac{54.8}{\sqrt{10.709}}$$

$$Q_{count} = \frac{54.8}{3.272}$$

$$Q_{count} = 16.74$$

With db=$(n_1 + n_2) - 2$ = 15 + 15 – 2 = 28 and α = 0.05 then T is obtained$_{table}$ =1.701131 (appendix 7)

Decision: H0 is rejected because > = 16.74 > 1.701131T_(hitung) T_(tabel)

Based on the results of calculating the hypothesis test, it is known that the price of H0 is rejected because > = 16.74 > 1.701131, it can be concluded that there is a significant influence of the learning modelT_(hitung) T_(tabel)Realistic Mathematics Educationon the results of learning mathematics flat shape. Thus it can be concluded that H1 is accepted and H0 is rejected.

The results of the pre-test and post-test analysis that have been described show that the minimum score achieved from the learning outcomes of students in the control class or not using the modelRealistic Mathematics Education(RME)is 12 of the maximum score of 100 and the maximum score achieved is 40 of 100. Meanwhile, the minimum score of student learning outcomes in the experimental class or by using the modelRealistic Mathematics Education(RME) is 64 of the ideal score of 100, the maximum score achieved is 88 of 100.

Through testShapiro-WilkCorrectionboth pre-test and post-test samples for both the control class and the experimental class are normally distributed. Furthermore, because it comes from a normally distributed population, a homogeneity test (Levene statistical test) is carried out with a significance level of 5% where for the pre-test homogeneity test of the experimental class and the control class the results of the hypothesis testing turn out to be homogeneous or have the same variance so it was decided that H0 and H1 were accepted. .. Meanwhile, the post-test homogeneity test of the experimental class and the control class results of the hypothesis testing were not homogeneous or had different variants so it was decided that H0 was accepted and H1 was rejected. Because the two post-test samples of the control class and the experimental class were normally distributed and not homogeneous, the next test was to test the hypothesis using the T test.

Based on the results of calculating the hypothesis test it is known that > = 16.74 > 1.701131, it can be concluded that the use of learning modelsT_(hitung) T_(tabel)RMEhave a significant effecton the results of learning mathematics flat shape fourth grade studentsat SD GMIM Sion Raanan Baru.

CONCLUSIONS AND RECOMMENDATIONS(5%)

Learning modelRealistic Mathematics Education(RME) is very necessary in learning in class IV elementary school. This statement is evidenced by the significance results which show that the learning modelRealistic Mathematics Education(RME) has a significant effect on mathematics

learning outcomes. Based on value…. These results indicate that there is a significant difference in the mathematics learning outcomes of students who take part in learning using the learning modelRealistic Mathematics Education(RME) and those who do not use the learning modelRealistic Mathematics Education(RME) or conventional. Therefore, it can be concluded that there is a significant increase related to the results of learning mathematics using learning models Realistic Mathematics Education(RME).

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