

REALISTIC MATHEMATICS EDUCATION ON MATHEMATICS LEARNING OUTCOMES IN FRACTIONS MATERIALS OF CLASS III STUDENTS

Yeyen Febrilia^{1*}, Rahayu Condro Murti², Jarmi³, Asih Mardati⁴,
Julianto Saputra⁵

^{1*,2} Universitas Negeri Yogyakarta, Daerah Istimewa Yogyakarta, Indonesia

³ SD Negeri 2 Riau Silip, Bangka Belitung, Indonesia

⁴ Universitas Ahmad Dahlan, Daerah Istimewa Yogyakarta, Indonesia

**Corresponding author. Bantul, Daerah Istimewa Yogyakarta, Indonesia.*

E-mail: Yeyenfebrilia.2021@student.uny.ac.id¹⁾
Rahayu_cm@uny.ac.id²⁾
Jarmi12@guru.sd.belajar.id³⁾
Asih.mardati@pgsd.uad.ac.id⁴⁾
juliantosaputra.2022@student.uny.ac.id⁵⁾

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Abstract

Indonesia student's understanding of Mathematics is very low. This study aims to determine the positive effect of the Realistic Mathematical Education learning approach on the learning outcomes of grade III fractions at SD Negeri 2 Riau Silip. This research method is pre-experimental with one group pretest-posttest design. Population Data collection techniques use an instrument with a total of 5 questions, both pretest and posttest. Data were analyzed with descriptive statistics and inferential analysis with the help of the SPSS 23 program on prerequisite tests and hypothesis tests. The results of the study stated that the results of the descriptive analysis showed an increase in the average score of students' learning outcomes was 40.72 to 72.55. In addition, the results of the inferential analysis showed a significance value of $0.001 < 0.05$ so H_0 was rejected and H_a was accepted. This states that RME has a positive influence on the learning outcomes of class III students at SD Negeri 2 Riau Silip.

Keywords: Fractions, learning outcomes, RME.

Abstrak

Pemahaman Matematika Peserta didik Indonesia sangat rendah. Penelitian ini bertujuan untuk mengetahui pengaruh positif pendekatan pembelajaran Realistic Mathematical Education terhadap hasil belajar pecahan kelas III di SD Negeri 2 Riau Silip. Metode penelitian ini adalah pre-experimental dengan one group pretest-posttest design. Populasi Teknik pengumpulan data menggunakan instrumen dengan jumlah soal sebanyak 5 soal, baik pretest maupun posttest. Data dianalisis dengan statistik deskriptif dan analisis inferensial dengan bantuan program SPSS 23 pada uji prasyarat dan uji hipotesis. Hasil penelitian menyatakan bahwa hasil analisis deskriptif menunjukkan peningkatan skor rata-rata hasil belajar siswa dari 40,72 menjadi 72,55. Selain itu, hasil analisis inferensial menunjukkan nilai signifikansi $0,001 < 0,05$ sehingga H_0 ditolak dan H_a diterima. Hal ini menyatakan bahwa RME berpengaruh positif terhadap hasil belajar siswa kelas III SD Negeri 2 Riau Silip.

Kata Kunci : Hasil belajar, pecahan, RME .



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INTRODUCTION

Learning mathematics is learning that exists at every level of education in Indonesia. This is in line with the

opinion Mulyati & Evendi (2020) that learning mathematics is learning that must be given from elementary school to the next level. This is because

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learning mathematics can be used to get used to everyday problems in life (Suyatno et al., 2019; Ratna Windianti Utami, Bakti Toni Endaryanto, 2018; Santoso, 2020). Behind the importance of learning mathematics, many problems that occur both based on national and international research.

Learning mathematics in Indonesia has a relatively low ranking compared to other countries in the world. The 2018 PISA study also stated that 72% of Indonesian students had low mathematical abilities with an average score of 379 (Putrawangsa & Hasanah, 2022). In addition, the average score on PISA in 2018 decreased compared to 2015, namely 386 to 379 (OECD., 2019). This is also evidenced by the results of a preliminary study at SD Negeri 2 Riau Silip with the class average in the grade III 2021/2022 mathematics daily test scores still as follows the KKM, namely 51 with 52% not completing KKM and 48% having completed KKM. This shows that student's understanding of mathematics is very low.

One of the factors causing the low mathematics learning outcomes of students is student's lack of understanding of mathematics (Salasiyah, 2022; Sujadi & Kholidah, 2018; Winata & Friantini, 2020). The problems of learning mathematics are still considered boring by students (Mulyati & Evendi, 2020). In addition, learning mathematics is still considered difficult and frightening by elementary school students (Utami & Cahyono, 2020; Kurniani Ningsih et al., 2021; Nisa, MZ & Vebrianto, 2021; Octafian et al., 2021). One of the mathematics learning materials that is considered difficult is fractions. This is proven by the following research Rasvani (2021); Murniasih (2020); Pangaribuan et al.,

(2021). This requires realistic learning in mathematics learning or it is called Realistic Mathematics Education (RME).

This is in line with the opinion RME is learning related to its environment and can be in the form of real or imagined problems by students and emphasizes process skills in solving given problems (Mulyati & Evendi, 2020). The problems raised in RME are problems that can provide students with habituation in dealing with everyday problems.

RME in learning mathematics fraction material is discussed by previous research, namely Fitriani (2019) which states that RME with the pair checks technique has a positive effect on learning outcomes for fractions in the Mathematics Subject of fourth-grade students at SDN Babakan; Haqina et.al. (2022) states that the realistic mathematics education (RME) learning model can be applied in class V at SDN 6 Cakranegara; besides that Agustina (2020) states that the RME learning approach can improve students' understanding of fraction addition material; Pramita (2018) states that Realistic Mathematics Education (RME) assists media puzzles to improve student learning outcomes and; Afiani (2022) stated that the use of the Real Math Teaching (RMT) learning model in students' mathematics learning achievement. This research then became a reference for researchers in conducting the same research, namely the use of RME on fractional material learning outcomes at SD Negeri 2 Riau Silip which still had a low mathematical understanding of fractional material.

Based on the discussion, this research was carried out specifically to discuss how the influence of RME on mathematics learning outcomes in

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fractional material at SD Negeri 2 Riau Silip. In addition, this research is expected to be able to provide evaluation and development in learning mathematics by applying realistic-based learning to learning mathematics, especially fraction material and other materials.

RESEARCH METHOD

This type of research is pre-experimental research with the *One Group Pretest-Posttest approach*. One Group Pretest-Posttest is an approach by giving a pretest after which treatment is given and posttests are carried out (Arikunto, 2010). Retrieval of data with Pretest without treatment and Posttest with *Realistic Mathematics Education*. The data collection instruments were tested by lecturers in the field of basic mathematics education and teachers at SD Negeri 2 Riau Silip.

This research was conducted at SD Negeri 2 Riau Silip which is located on Jl. Belinyu-Sungailiat, Silip Village, Riau Silip District, Kab. Bangka. The research timeframe is an observation on May 9, 2022. Instrument-making was carried out in May 2022. Instrument trials were carried out on August 30, 2022. Research data collection and processing were carried out in September-November 2022. The research variables consisted of independent variables and variables dependent. The independent variable or independent variable in this study is the use of the RME approach (X), while the dependent variable or dependent variable in this study is the results of students' mathematics learning (Y).

The population in this study were all class III students for the 2021/2022

academic year consisting of class IIIA and IIIB, a total of 58 people. The sample that represents the population in this study is class B as many as 29 students as an experimental class. The sampling technique used was *purposive sampling*. Sampling with certain considerations. Furthermore, the stages of research in Tabel 1.

Tabel 1. Stages of research

Num	Step	Description
1	Pretest	Problem 5 Description
2	Treatment	RME Approach 1. Activities 2. Reality 3. Understanding 4. Intertwinements 5. Interaction 6. Guidance
3	Posttest	Problem 5 Description

The instrument in this study was a matter of learning outcomes test. The test questions are in the form of 5-digit descriptions. Data collection techniques by giving tests at the beginning of the meeting (pretest) and at the end of the meeting (posttest). The data obtained through the tests were then analyzed. Analysis of the assessment of learning outcomes using descriptive analysis and inferential analysis with the help of the SPSS 23 program on prerequisite tests and hypothesis testing.

RESULTS AND DISCUSSION

This research was conducted at SD Negeri 2 Riau Silip involving 29 grade III students. As for the things that are obtained from the stage of learning mathematics with the Realistic Mathematics Education approach in Table 2.

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Table 2. RME learning steps

Syntax	Application
Activity	Students study the problems given by the teacher. Students are given the opportunity to realize active participants (Student Center). Teacher gives
Reality	The teacher gives problems related to real problems in accordance with the daily lives of students. It is hoped that students will be more sensitive to the circumstances of everyday life.
Understanding	Students understand the problems given and find the concept of fractions, schemes and formulas for working on problems in the form of existing problems.
Intertwinements	This activity provides an opportunity for students to use the understanding that has been obtained to solve other problems.
Interaction	This activity also provides opportunities for students to discuss with each other so that they are able to provide habituation in exchanging thoughts and being critical.
Guidance	This activity provides an opportunity for the teacher to also provide reinforcement and clarification of the understanding received by students.

Based on table 2, learning mathematics using the RME method provides benefits to students in terms of understanding the material presented, independence, cooperation, criticality, and open mindedness. This is evidenced

by the results of learning through tests related to fractional material as a research instrument. The results of the analysis of the description of this study are in Table 3.

Table 3. Research description analysis

KELAS			Statistic	Std. Error
TEST	PRETEST	Mean	40.72	1.500
		95% Confidence Interval for Mean		
		Lower Bound	37.65	
		Upper Bound	43.80	
		5% Trimmed Mean	40.54	
		Median	40.00	
		Variance	65.278	
		Std. Deviation	8.080	
		Minimum	26	
		Maximum	60	
	POSTTEST	Range	34	
		Interquartile Range	11	
		Skewness	.390	.434
		Kurtosis	-.099	.845
		Mean	72.55	1.402
		95% Confidence Interval for Mean		
		Lower Bound	69.68	
		Upper Bound	75.42	
		5% Trimmed Mean	72.57	
		Median	75.00	
		Variance	57.042	
		Std. Deviation	7.553	
		Minimum	59	
		Maximum	88	
		Range	29	
		Interquartile Range	11	
		Skewness	-.356	.434
		Kurtosis	-.530	.845

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Based on the Tabel 3, this study found that in the pretest class the average value was 40.72; the Median value was 40.00; the variant value was 62.278; the Standard Deviation was 8.080; the minimum value was 26, and; the maximum value is 60. While in the posttest class the average value is 72.55; the Median value was 75.00; the variant value was 57.042; the Standard Deviation was 7.553; The minimum score was 59; and the maximum score of 88.

These results show that the research above states that *Realistic Mathematics Education* (RME) is an approach capable of improving the learning outcomes of elementary school students. This is indicated by the average value that has not been given treatment which is 40.72, which is smaller than after being given the RME approach treatment. The value after being given treatment with the RME learning approach the average value rose to 72.55. The increase in student learning outcomes is caused by several things related to learning that are easy to understand because they are not monotonous and fun. This is also explained by Ediyanto (2020); Radiusman (2020); Ulfa (2019) that fun lessons can provide experience by being able to more easily understand mathematical concepts.

In addition, RME is used as a way of habituating students in solving problems related to the realities of life through the experiences and daily activities of students. This is also mentioned in research Armiati & Sutiaharni (2021); Asih et al. (2017); Gee, (2019); Noviyana & Fitriani (2019); Rosyada et al. (2019); Setyaningsih et al. (2021); Sintawati et al. (2020); Tantra et al. (2022); Yetri et al. (2019).

Efforts made by teachers in improving learning outcomes by implementing concrete learning based on real facts. This was done in research using RME-based teaching aids to model abstract mathematical concepts so that they are more understandable. Furthermore, the teacher also plays a role in showing different representations of a mathematical situation. The teacher also accompanies students in using prior knowledge to construct new knowledge. In addition, teachers can use their new knowledge to solve problems. In addition, the teacher guides so that students can see the relationships between the mathematics they are studying. This is proven by Handayani & AlFarhatan Noor Asri (2021); Marto (2020); Patandung & Saragih (2020); Putri & Aji Pradana 2021; D. A. Sari (2020); Sihalocho (2020) in his research that the teacher's role is to provide motivational guidance to students so that students can work on questions or complete learning well.

Besides that, teachers can also use the representation method in explaining new concepts in mathematics. This has been done by Pagiling & Munfarikhatin (2020) who stated that representation can be used as a tool that can improve student learning outcomes through new concept teacher activities, providing illustrations in the problem-solving process, and making connections between several mathematical concepts.

Furthermore, inferential data analysis techniques are used to determine the effect of the independent variable (*Realistic Mathematics Education*) on the dependent variable (learning outcomes) in this study is the analysis of the Independent Sample T Test (t-test). Before the t-test, a prerequisite test was carried out which included a normality test using the

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Shapiro-Wilk analysis and a homogeneity test using Levene's Test of Equality of Error Variances with the help of SPSS 23. The results of the

Normality Test analysis are presented in Table 4.

Table 4. Normality test results

KELAS	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	Df	Sig.	Statistic	Df	Sig.
TEST PRETEST	.092	29	.200*	.982	29	.882
POSTTEST	.144	29	.126	.932	29	.061

Based on the analysis results of the Shapiro-Wilk Normality Test that the value of Sig. is 0.882 in the Pretests class and 0.61 in the Posttest class. This shows that the value is greater (> 0.05) and indicates that the Pretest and Posttest classes have values that are normally distributed and can be continued to the Hypothesis Test. Before carrying out the Hypothesis Test, a Homogeneity Test was carried out. The results of the Homogeneity Test are in Table 7.

Based on the results of the homogeneity test analysis that the value

of Sig. is 0.824. This shows that the value is greater (> 0.05) and indicates that the Pretest and Posttest classes have homogeneous values and can be continued to the Hypothesis Test. Next, a hypothesis test is carried out by applying the Independent Sample T Test (t-test). The results of the Independent Sample T Test (t-test) are in table 6.

Table 7. Homogeneity test results

Levene Statistic	df1	df2	Sig.
.050	1	56	.824

Table 6. Independent Sample T-Test Results

		t-test for Equality of Means						
TEST		T	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
							Lower	Upper
TEST	Equal variances assumed	-15.497	56	.000	-31.828	2.054	-35.942	-27.713
	Equal variances not assumed	-15.497	55.747	.000	-31.828	2.054	-35.942	-27.713

Based on the results of the analysis of the Independent Sample T-Test, it states that the Sig. (2-tailed) is 0.000. This shows that the value is less than 0.005 (< 0.005) and indicates that there is a difference between the pretest and posttest classes with the RME treatment.

The difference between the Pretest and Posttest we can conclude

that the learning outcomes with the treatment affect the learning outcomes of students. This is also conveyed in research Andari & Komsiatun (2018); Armianti & Sutiaharni (2021); Aspriyani & Suzana (2020); Cesaria (2022); Chahyanti (2021); Pramita (2018); Fiangga (2022); Purwati (2021); Setyaningsih (2021); Suciana (2020).

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RME is very effective and influential in providing a significant impact on mathematics learning not only in Indonesia but also in the world. This is evidenced by the large number of studies that discuss the implementation of RME, namely Andison & Armiati (2020); Cobanoglu, F., Yurek (2018); Garcia (2021); Jessen (2022); Julie & Gierdien (2020); Loc & Tien, (2020); Papadakis (2021); Rewah (2021); Van Zanten & Van Den Heuvel-Panhuizen (2021); Voigt (2020). The RME approach is one approach that can be used to improve student understanding and student learning outcomes.

From the results of research and discussion, it is suggested that in learning it is necessary to choose the right learning approach and according to the material. Other researchers can conduct a more in-depth study of the effect of the RME approach on learning outcomes in fractional material.

CONCLUSIONS AND SUGGESTIONS

Based on the results of the research and discussion above, the Pretest and Posttest classes have significant differences in the learning outcomes of class III students at SD Negeri 2 Riau Silip. This is evidenced by the results of the descriptive analysis which shows an increase in the average score of student learning outcomes is 40.72 to 72.55. In addition, the results of the inferential analysis show a significance value of $0.00 < 0.05$ so H_0 is rejected and H_a is accepted. This states that RME has a positive influence on the learning outcomes of class III students at SD Negeri 2 Riau Silip.

From the results of research and discussion, it is suggested that in learning it is necessary to select a

learning approach that is appropriate and by following the material. Other researchers, can conduct a more in-depth study regarding the effect of the RME approach on learning outcomes of fractional material.

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