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The Effect of the Rme (*Realistic Mathematics Education*) Model on Reducing Mathematics Anxiety and the Ability to Operate Fractions in Grade 5 Elementary School Students

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*Fitriko[a]
[123]Universitas Pahlawan Tuanku Tambusai, Indonesia
Correspondening Author: fitriko67@guru.sd.belajar.id

A B S T R A C T

This research aims to examine the effectiveness of the Realistic Mathematics Education (RME) learning model in reducing mathematics anxiety and improving fraction operation skills among fifth-grade elementary school students. Using an experimental research design with control and experimental groups, each consisting of 17 students, this study implemented the RME model in the experimental group while the control group received conventional learning. Hypothesis testing results using independent sample t-tests showed no significant differences in the pretest of both variables ($p > 0.05$), but there were highly significant differences in the posttest of mathematics anxiety ($p = 0.000$) and fraction operation skills ($p = 0.005$). These findings prove that the RME learning model is effective in reducing mathematics anxiety and improving fraction operation skills among fifth-grade elementary school students, indicating that a realistic and contextual learning approach can be an effective alternative to improve the quality of mathematics instruction in elementary schools.

Keywords: *Realistic Mathematics Education (RME), Mathematics Anxiety, Fraction Operation Skills.*

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INTRODUCTION

Education plays a crucial role in the development of a person's character and abilities. Successful learning does not only emphasize mastery of the material, but also needs to pay attention to psychological aspects that have an impact on student learning achievement. In the context of mathematics education, there are many challenges that students must face. Anxiety about mathematics is often an inhibiting factor for students in achieving maximum learning achievement (Parwati et al., 2019). Based on initial observations on February 18, 2025 at SDN 40 Bengkalis class 5A in the mathematics subject about fractional operation, out of 17 students, only about 7 students seemed enthusiastic about participating in learning and got complete scores in operating fractions and 10 students still felt afraid and anxious in participating in learning and got scores below KKM. Students' difficulties in understanding and operating fractional concepts are an important foundation in advanced mathematics learning. Many students experience confusion and frustration when working with fractions, even though this concept is fundamental to more complex math material. The learning approach is sometimes less

able to address both problems, as it does not always encourage active and contextual student involvement in the learning process. Therefore, an alternative learning model is needed that is able to simultaneously reduce mathematical anxiety while improving students' skills in operating fractions. Models *Realistic Mathematics Education* (RME) is an approach in mathematics learning that emphasizes the use of real-life situations as the initial basis for the learning process. This approach was developed by Hans Freudenthal in the Netherlands and is based on the principle that mathematics should be associated with students' daily experiences and relevant to social life (Gravemeijer, 1994).

Research that has been carried out by Haqina et al (2022) entitled "The Influence of Learning Models *Realistic Mathematics Education* (RME) on the Mathematics Learning Outcomes of Grade V Students of SDN 6 Cakranegara in 2020/2021". The results of the study show that the application of the learning model *Realistic Mathematics Education* (RME) has a significant effect on the mathematics learning outcomes of grade V students of SDN 6 Cakranegara for the 2020/2021 school year.

METHODS

Research Type and Design

This study uses a pseudo-experimental method with a nonequivalent control group design. This research method uses a quantitative approach in processing data, by conducting statistical analysis on the results of the pretest and posttest of both groups. The analysis process includes normality, homogeneity, and hypothesis testing through t-tests to see the differences between groups simultaneously on two bound variables. With this pseudo-experimental approach, the research aims to produce empirical evidence regarding the effectiveness of the Realistic *Mathematics Education* (RME) Model in reducing mathematical anxiety and improving students' ability to operate fractions, which can make a significant contribution to the development of mathematics learning methods at the elementary school level.

Population and Sample

The population is 5th grade elementary school students, with a sample of 34 students from SDN 40 Bengkalis.

Research Instruments

The instruments used in this study were adapted from previous research conducted by (Irawan et al., 2023). To assess the level of mathematical anxiety, a mathematical anxiety questionnaire has been specially prepared. This questionnaire contains a number of statements that describe situations related to anxiety in the face of math lessons. This questionnaire uses the Likert scale, which allows students to give responses from strongly disagree to strongly agree with the statements submitted. The initial questionnaire consisted of 25 statement items. Each item uses a Yes or No rating scale.

Tests to measure the ability to operate fractions consist of written tests that focus on fractional problems, such as addition, subtraction, multiplication, and division of fractions. This test is designed to measure the extent to which students understand and can complete basic fractional operations. The test questions given to students are questions that have been used in previous research by (Ibrahim et al., 2022). The questions in this test will cover varying levels of difficulty, ranging from simple questions to more complex questions, the test instrument consists of 10 questions according to the indicators.

Data Analysis Techniques

In this study, data was analyzed using a quantitative approach through several stages to test the proposed hypothesis. The analysis process is assisted by the SPSS statistical software version 26.

Descriptive Analysis

Describe the data characteristics for mathematical anxiety variables and the ability to operate fractions. Statistical analysis includes the calculation of averages, median values, most frequently occurring values, data spreads, as well as smallest and largest values. Data analysis was carried out at the pretest and posttest stages for both groups, both experimental and control. The findings are displayed in the form of tables and graphs to make them easier to understand and interpret.

Analysis Prerequisites Test

The normality test used is Shapiro-Wilk

The homogeneity test serves to assess the similarity of variance between the groups being compared.

FINDINGS AND DISCUSSION

Results of the Normality Test of Mathematical Anxiety

Tests of Normality

	Kolmogorov-Smirnova			Shapiro-Wilk		
	Statistic	df	Say.	Statistic	df	Say.
Experimental Class Math Anxiety Pretest	.247	17	.076	.853	17	.089
Experimental Class Math Anxiety Posttest	.160	17	.200*	.920	17	.150
Control Class Math Anxiety Pretest	.205	17	.075	.893	17	.115
Posttest Math Anxiety Control Class	.241	17	.110	.872	17	.124

Based on the results of the Kolmogorov-Smirnov normality test, all of these significance values were greater than 0.05 ($p > 0.05$), which indicates that the data is normally distributed. Especially in the experimental class posttest which showed the highest significance value (0.200), it showed that the data was very close to the perfect normal distribution.

Results of the Normality Test of Fractional Operating Ability

Tests of Normality

	Kolmogorov-Smirnova			Shapiro-Wilk		
	Statistic	df	Say.	Statistic	df	Say.
Pretest of the Ability to Operate Fractional Experimental Classes	.257	17	.370	.799	17	.201
Posttest of Ability to Operate Fractional Experimental Classes	.244	17	.208	.874	17	.126
Pretest of the Ability to Operate Control Class Fractions	.270	17	.109	.878	17	.140
Posttest Ability to Operate Control Class Fractions	.219	17	.130	.880	17	.132

Based on the results of the Kolmogorov-Smirnov test, all of these significance values were much greater than 0.05 ($p > 0.05$), indicating that the data on the ability to operate fractions is normally distributed. A very high significance value in the experimental class pretest (0.370) indicates that the data is very close to a perfectly normal distribution.

Homogeneity Test Results

Test of Homogeneity of Variances

Variabel		**Say.**
Math Anxiety	Pretest	.541
	Posttest	.145
Ability to operate fractions	Pretest	.536
	Posttest	.343

Based on Both values, they were greater than 0.05 ($p > 0.05$), which indicates that the variance of mathematical anxiety data in both groups (experiment and control) was homogeneous or equivalent

Test Results t

Independent Samples Test		
Variabel		**Say.**
Math Anxiety	Pretest	.187
	Posttest	.000
Ability to operate fractions	Pretest	.532
	Posttest	.005

Showed a very significant difference between the two groups after treatment. For the variable ability to operate fractions, the results of the t-test in the pretest showed a significance value of 0.532 greater than 0.05 ($p > 0.05$), confirming that both groups also had equal initial ability to operate fractions. However, in the posttest the significance value was 0.005 which was smaller than 0.05 ($p < 0.05$), which showed a significant difference between the two groups after treatment.

Discussion

The RME model has been shown to be effective in lowering math anxiety because it provides a contextual learning experience that helps students understand the relevance of math in real life, thereby reducing the perception that math is a difficult and abstract lesson.

These findings are in line with the characteristics of the RME learning model which emphasizes realistic and meaningful context in mathematics learning. In its implementation, students in the experimental class were involved in learning activities that related the concept of fractions to real-life situations such as the division of cakes, the measurement of cooking ingredients, and the division of time in daily activities. This contextual approach helps students understand the relevance of mathematics in their lives, thereby reducing the perception that mathematics is an abstract and difficult subject (Subekhi et al., 2024).

Furthermore, the RME approach that provides opportunities for students to develop conceptual understanding through the exploration of realistic situations helps them build a strong foundation in understanding fractional operations. When students understand concepts well, they tend to be more confident and less anxious in dealing with math problems (Series, 2023).

CONCLUSION

Based on the results of the research and discussion that has been described, it can be concluded that the *Realistic Mathematics Education* (RME) learning model has a significant influence on reducing mathematical anxiety and improving the ability to operate fractions in grade 5 elementary school students. This is evidenced by the results of the t-test which showed a significant difference between the experimental class and the control class on the two variables. The RME model, which emphasizes the use of realistic context in mathematics learning, has been proven to be able to create a positive and meaningful learning environment for students, thereby reducing math anxiety while improving their cognitive ability to operate fractions. These findings underscore the importance of adopting a learning approach that can simultaneously address affective and cognitive problems in mathematics learning in primary schools.

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