

The Influence of the Realistic Nalaria Mathematics Method on the Mathematics Learning Outcomes of Grade 3 Students of Bosowa Bina Insani Elementary School

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Abstract

This study aims to determine the effect of the application of Mathematics Nalaria Realistic (MNR) method on the mathematics learning outcomes of 3rd grade students of SD Bosowa Bina Insani. This study used a quantitative approach with a quasi-experimental method involving two class groups, namely the control class and the experimental class. The design of this research is pretest-posttest control group design. The sample used was 46 students, consisting of 23 students of class 3A as the control class, and 23 students of class 3C as the experimental class. Data collection in this study used a test instrument consisting of 12 HOTS description questions and documentation studies. The results in the study obtained through the t test using the independent sample t test formula are that there is a significant influence between the application of the MNR method on the mathematics learning outcomes of grade 3 students, especially on fraction material with the results of $t_{\text{count}} < t_{\text{table}}$ with 2-tailed sig results of $0.000 < 0.05$ so that H_a is accepted and H_0 is rejected.

Keywords: Matematika Nalaria Realistik (MNR), Student Mathematics Learning Outcomes, Mathematics.

Abstrak

Penelitian ini bertujuan untuk menentukan pengaruh penerapan metode Matematika Nalaria Realistik (MNR) terhadap hasil belajar matematika siswa kelas 3 SD Bosowa Bina Insani. Penelitian ini menggunakan pendekatan kuantitatif dengan metode quasi-eksperimental yang melibatkan dua kelompok kelas, yaitu kelas kontrol dan kelas eksperimen. Desain penelitian ini adalah desain pretest-posttest dengan kelompok kontrol. Sampel yang digunakan adalah 46 siswa, terdiri dari 23 siswa kelas 3A sebagai kelas kontrol, dan 23 siswa kelas 3C sebagai kelas eksperimen. Pengumpulan data dalam penelitian ini menggunakan instrumen tes berupa 12 soal deskriptif HOTS dan studi dokumentasi. Hasil penelitian yang diperoleh melalui uji t menggunakan rumus uji t sampel independen menunjukkan adanya pengaruh yang signifikan antara penerapan metode MNR terhadap hasil belajar matematika siswa kelas 3, khususnya pada materi pecahan, dengan hasil $t_{\text{count}} < t_{\text{table}}$ dan hasil sig 2-tailed $0.000 < 0.05$, sehingga H_a diterima dan H_0 ditolak.

Kata kunci: Matematika Nalaria Realistik (MNR), Hasil Belajar Matematika Siswa, Matematika.

Introduction

Elementary education is the foundation in building academic intelligence and character in children. Elementary education in Bogor City continues to experience developments in terms of both curriculum and learning methods. However, there are still many challenges faced, especially the low learning outcomes in mathematics. Learning methods that are less appropriate, less varied and without an interactive approach that can increase students' interest, understanding and learning outcomes.

Learning outcomes are an important component in measuring the learning process that has been undergone by students. According to (Lestari et al., 2021), learning outcomes are students' abilities obtained after completing exercises during the learning process related to cognitive, affective and psychomotor aspects that can be measured and used as consideration for students and teachers in seeing the level of student graduation.

According to Bloom (1956) in (Ropii & Fahrurrozi, 2017) The scope of learning outcomes consists of three domains, namely the cognitive domain, the affective domain and the psychomotor domain. The comparison of Bloom's taxonomy in the cognitive domain according to Anderson in (Andari et al., 2021) is divided into three levels consisting of low-level thinking skills or LOTS (Lower Order Thinking Skills) which include aspects of the C1 level knowledge domain, namely remembering, then middle-level thinking skills or MOTS (Middle Order Thinking Skills) consisting of cognitive domains of levels C2 (understanding) and C3 (applying), and high-level thinking skills or HOTS (Higher Order Thinking Skills) which include cognitive domains of levels C4 (analyzing), C5 (evaluating) and C6 (creating). The classification of learning outcomes can be divided into four types, namely formative assessment, summative assessment, placement assessment and diagnostic assessment (Ropii & Fahrurrozi, 2017).

According to (Rahman, 2021) factors that can affect student learning outcomes are as follows Specifically, problems that originate from internal factors consisting of student character, attitude towards learning, learning motivation, learning concentration, ability to process learning materials, ability to explore learning outcomes, self-confidence, learning habits. In addition, there are also external factors consisting of teacher factors, social environment, especially including peers, school curriculum, facilities and infrastructure. Zulkardi in (Oktaviani et al., 2020) argues that students' mathematics learning outcomes are caused by various factors such as curriculum, learning media, learning strategies and methods used by teachers, evaluation systems, teachers' ability to increase students' learning motivation, or also because the learning approach is still conventional so that students are not much involved in the learning process.

Mathematics is sometimes considered difficult because it is related to complicated formulas so that the learning outcomes obtained tend to be small. This can be overcome by implementing the right learning method that is active, interactive and creative. (Wayan & Kadek, 2020). Various new learning methods have emerged to overcome these problems. One of them is the realistic mathematical method that focuses on reasoning and understanding real problems that are concrete in nature so that students are able to do problem solving in learning activities and in everyday life. (Pebriani et al., 2020). This is considered to be in accordance with the thinking stage

of elementary school students, namely the concrete operational stage.(Herman et al., 2022). The MNR method is a mathematical learning concept that focuses on reasoning in understanding mathematics to improve reasoning and skills, especially in everyday life.(Saputra, 2017).

The MNR method has various benefits as explained by(Pebriani et al., 2020)among others; facilitating the understanding of mathematics, training students' reasoning, improving the understanding of other subjects, and preparing students to be ready to face mathematics competitions. The MNR method has six stages of learning designed to help students understand mathematical concepts more deeply and applicatively, including giving real problems, understanding concepts, reasoning and communication, problem solving, applications in life, exploration and mathematical games.(Amran & Kurnia, 2023).

Based on the results of observations that have been carried out on April 17, 2025, students who can meet the value above the Minimum Completion Criteria (KKM) in class 3C with fraction material are only 12 students out of 23 students, and if presented, only 52% of students get formative learning outcomes above KKM, namely above 75. These students still have difficulty in distinguishing numerators and denominators, ordering fractions, and comparing fractions.

Therefore, from the various descriptions, the researcher is interested in conducting a thesis research entitled "The Influence of the Realistic Nalaria Mathematics Method on the Mathematics Learning Outcomes of Grade 3 Students of Bosowa Bina Insani Elementary School".

Method

This research uses a quantitative approach. This approach prioritizes the collection and analysis of data in the form of numbers or numerical variables to measure relationships between variables, understand a phenomenon objectively through statistical analysis, and produce findings that can be applied to a wider population.(Wajdi et al., 2024). The research method of this study is a quasi-experimental method. Quasi-experiments are defined as experiments that have treatments, impact measurements, experimental units but do not use random to create comparisons in order to provide conclusions on changes caused by treatment.(Abraham & Supriyati, 2022). There are two groups in the quasi-experiment, namely the experimental and control groups, which cannot be done randomly (nonrandom assignment). (Hapsari et al., 2023).

The design of this study uses Non-Equivalent Control Group Design. This design conducts a pre-test on both classes, namely the control class and the experimental class. The experimental class is the class that will be given treatment and the control class is the class that is not given treatment (usually using direct learning which is often known as a conventional approach). Furthermore, both classes are given a test before the learning activity (pre-test) and given a test after the learning activity (post-test)(Isnawan et al., 2020).

The population in this study was 114 students and the sample used was 46 students consisting of two classes, namely class 3A with 23 students as a control class applying the conventional method and class 3C 23 students as an experimental class applying the Realistic Nalaria Mathematics (MNR) method. This research was

conducted at SD Bosowa Bina Insani located on Jalan Seremped Wetan, Sukadamai, Tanah Sareal District, Bogor City, West Java 16164, with a research period starting from January to May 2025. The data collection technique used was through a test with 12 HOTS questions and a documentation study through documentation during learning activities. The data analysis technique used was the normality test and homogeneity test as prerequisite tests, and the independent sample t test as a hypothesis test.

Results and Discussion

Validity Test

The validity test of this study used SPSS 26.0. The number of data in this test was 22 students, so the r table for 22 students was 0.432. The results of the validity test of the test instrument in this study were:

Validity Test Results Table

Question Items	r Count	r Table	Information	Question Items	r Count	r Table	Information
1	0.564	0.423	Valid	9	0.633	0.423	Valid
2	0.608	0.423	Valid	10	0.476	0.423	Valid
3	0.542	0.423	Valid	11	0.521	0.423	Valid
4	0.625	0.423	Valid	12	0.623	0.423	Valid
5	0.678	0.423	Valid	13	0.444	0.423	Invalid
6	0.615	0.423	Valid	14	0.127	0.423	Invalid
7	0.689	0.423	Valid	15	0.234	0.423	Invalid
8	0.633	0.423	Valid				

Based on the table above, it can be seen that the number of questions included in the valid criteria because the table r value is greater than the calculated r value is 12 questions. It is in the form of HOTS descriptive questions consisting of questions number 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, and 12, while the questions included in the invalid criteria because the calculated r value is smaller than the table r value are 3 questions consisting of questions number 13, 14 and 15.

Reliability Test

A good instrument must be valid and reliable, meaning it is able to measure accurately and provide consistent results. Reliability testing aims to determine the extent to which the instrument can be trusted. The reliability test in this study used Alpha Cronbach's SPSS 26.0. The criteria used in this reliability test are as follows:

Reliability Test Criteria Table

Cronbach's Alpha	Interpretation
0.81-1.00	Very high
0.61-0.80	Tall
0.41-0.60	Currently
0.21-0.40	Low

0.00-0.20 Very low

After conducting a reliability test, the following results were obtained:

Reliability Test Results Table

<i>Reliability Statistics</i>	
<i>Cronbach's Alpha</i>	<i>N of Items</i>
0.806	15

Based on the validity test results table above, it shows that the tested test instrument questions are reliable with a coefficient value of 0.806 which has a very high interpretation so that the test instrument is reliable and can be used.

Normality Test

The normality test is a procedure used to determine whether data comes from a normally distributed population or is within a normal distribution.(Nuryadi et al., 2017). Normality test in this study using SPSS 26 based on the Shapiro-Wilk test. The results of this test are:

Normality Test Results Table

No.	Data	Significance Value	A	Information	
1.	Pre-Test Control Class	0.814	0.05	Normally Data	Distributed
2.	Post-Test Control Class	0.194	0.05	Normally Data	Distributed
3.	Experimental Class Pre-Test	0.134	0.05	Normally Data	Distributed
4.	Post-Test of Experimental Class	0.293	0.05	Normally Data	Distributed

Based on the data, the significant value obtained is > 0.05 , so the data in this study is normally distributed.

Homogeneity Test

The homogeneity test is a test of whether the variances of two or more data distributions are the same, which is carried out to determine whether the data in variables X and Y are homogeneous or not.(Setyawan, 2021). The results of this test are:

Homogeneity Test Results Table

Based on Mean	Levene Statistics	df1	df2	Sig.
	1,023	3	88	0.181

Based on the table, the significant value obtained is 0.181, which means it has a value > 0.05 , so it can be concluded that the data in this study is homogeneous.

Independent Sample t Test

Independent sample t-test is a statistical method used to compare the means of two unrelated or independent samples. Independent sample t-test is also called unpaired t-test which is used to compare two groups of samples that are not

statistically related, determine whether there is a significant difference between two groups in terms of the mean value of a variable, test the significance of the difference in the means of two groups and also to test the effect of the independent variable on the dependent variable (Syafriani et al., 2023).

Comparison Table of Average Mathematics Learning Outcomes of Students in Control Class and Experimental Class

No.	Data	Average
1	Post-Test Control Class	72.43
2	Post-Test of Experimental Class	88.00

Based on the table above, the average value obtained from the post-test data of the control class by applying the conventional method is 72.43, while the average post-test value of the experimental class by applying the Realistic Rational Mathematics method is 88. So it can be concluded that there is a difference in the results between the post-test values of the control class and the experimental class with the average value of the experimental class being higher, especially in the simple fraction material.

Hypothesis Test Results Table through Independent Sample t Test

No.	Data	Sig (2-tailed)
1.	Equal variance assumed	0.000
2.	Equal variances are not assumed	0.000

Based on the table above, the sig value (2-tailed) < 0.05 shows that H_0 is rejected and H_a is accepted, which means that there is a significant influence between the realistic nalaria mathematics method on the mathematics learning outcomes of grade 3 students at Bosowa Bina Insani Elementary School.

Conclusion

The Realistic Nalaria Mathematics (MNR) method has a significant influence on the mathematics learning outcomes of grade 3 students of SD Bosowa Bina Insani. The application of the Realistic Nalaria Mathematics (MNR) method can be said to be successful in improving students' mathematics learning outcomes. Further researchers are expected to study and develop this MNR method by combining it with other research variables to see how the application of this MNR method can affect other variables.

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