

Increasing Students' Problem Solving Abilities Through The Realistic Mathematics Education Model In Elementary Schools

Rahmi Hayati¹, Edi Syaputra², Edy Surya³, Rahmi Wahyuni⁴, Yessi Kartika⁵

^{1 4 5} Universitas Almuslim, Aceh, Indonesia

^{2 3} Universitas Negeri Medan, Medan, Indonesia

E-mail: haytirahmi@yahoo.com

edisyahputra01.es@gmail.com

edysurya@unimed.ac.id

rahmirusli@gmail.com

yessikartika@yahoo.com

ABSTRACT

This research was motivated by the low learning outcomes of students in Mathematics subject, Fractions. The purpose of this research is to describe student learning outcomes, determine teacher and student activities, and to determine student responses to the application of the Realistic Mathematical Education (RME) model to time unit material. The approach used in this research is qualitative research with the type of classroom action research. The subjects in this research were 21 Class III students. Data collection techniques used in this research were tests, interviews, observations and field notes. Data analysis techniques include student learning outcomes, teacher activities and student responses. The research results obtained (1) by applying the Realistic Mathematical Education (RME) model can increase student learning outcomes in fraction material obtained from the final test results of cycle I which were 45% complete and increased in cycle II to 89.47 and experienced an increase of 44.47%. (2) can increase the activity of teachers and students in accordance with the results of observations observed by observers. In cycle I, teacher activity was obtained with a percentage of 76.66% and increased in cycle II to 91.33%, student activity in cycle I was obtained with a percentage of 74.66% and increased in cycle II to 89.33%. (3) students' responses to the Realistic Mathematical Education (RME) learning model are very good because they can interact with their group friends and students are enthusiastic about learning because the class atmosphere is fun.

Keywords: problem solving abilities; Realistic Mathematics Education

1. INTRODUCTION

Realistic mathematics education can be considered an approach to mathematics learning that is centered on real and relevant experiences for students (Harefa & Surya, 2021). This approach emphasizes real-world problem solving, mathematical modeling, and making connections between mathematical concepts and everyday life situations (Zubainur et al., 2020)(Elaldi, 2022)One of the main goals of realistic mathematics education is to help students understand mathematical concepts better through application in real-life contexts. Students are invited to identify problems, formulate mathematical questions, collect data, analyze information, and present solutions in a form that is useful for everyday life (Ningsih, 2014).By using interesting and relevant learning strategies, realistic mathematics education can help make learning mathematics more fun and meaningful for students (Wiraprana & Surya, 2022).

One of the main benefits of realistic mathematics education is that it allows students to develop strong problem-solving skills (Hayati et al., 2023) They learn how to identify problems, formulate resolution strategies, and evaluate the solutions they find (Fitriani et al., 2022) This helps students to develop critical and analytical thinking, skills that are invaluable in everyday life and in future careers (Suyono et al., 2023)Apart from that, realistic mathematics education can also increase students' interest and motivation towards

mathematics. By seeing the relationship between mathematical concepts and real situations, students can more easily understand the relevance and usefulness of mathematics in everyday life. This can help reduce the perception that math is only relevant in the classroom, and inspire students to learn with more enthusiasm (Rafiela & Andhany, 2023). By using this approach, it is hoped that students can understand that mathematics is not just a series of formulas and rules, but is also a useful tool in solving real problems (Laurens et al., 2018) (Mesarius & Surya, 2017).

To improve students' problem-solving abilities, one strategy that can be implemented is to provide collaborative assignments or projects that encourage students to think critically and find creative solutions. Additionally, a problem-based learning approach can also be used, where students are given real-world problems that require solving, so that they can practice their analytical and problem-solving skills in a relevant context.

In addition, the systematic use of problem solving techniques such as the 5 step approach (problem identification, problem analysis, solution formulation, solution implementation, and evaluation) can also help students develop their ability to solve problems (Astriani et al., 2017). Supporting students to work independently and in groups can also be an effective strategy in improving their problem-solving abilities (Hayati et al., 2023). By providing opportunities for students to discuss and collaborate in solving problems, they can learn from each other's perspectives and develop different approaches to problem solving (Lubis & Syahputra, 2019)(Hayati et al., 2022).

2. METHOD

The approach used in this research is qualitative research. Qualitative research is descriptive in nature without using statistical analysis and is explained according to events in the field. The qualitative method is research to obtain data from certain natural (not artificial) places used to analyze and describe. In research, the researcher is the main instrument who plans, designs, implements, collects data and creates research reports. The type of research used is classroom action research. In this research, the researcher is the main instrument who plans, designs and implements, collects data, draws conclusions and makes research reports. Classroom action research is an action carried out on learning activities during class. In this research, it consists of four stages, namely: 1) Planning, 2) Implementation, 3) Observation and 4) Reflection. one of the objectives of classroom action research in general is to provide opportunities for teachers to take action in planned learning in the classroom.

3. RESULT

Cycle I

After all preparations had been prepared, the researcher (as facilitator) held a meeting in class which was observed by 1 class teacher and 1 colleague with the research subjects being 21 students in class V/A UPTD SD Negeri 4 Bireuen. In this cycle the researcher carried out learning activities in 2 meetings with the material being taught, namely speed and discharge by applying the learning model Realistic Mathematics education.

Based on the plan that has been designed, the researcher carries out the learning stages in accordance with the learning implementation plan. The implementation of cycle I, meeting I was held on Friday 19 October 2023 and meeting II was held on 24 October 2023. Learning activities in this cycle were carried out in three stages, namely initial activities, core activities and final activities. Where each stage is explained as follows: The teacher opens the lesson by

saying hello, then checks the students' attendance and directs the students to pray before teaching and learning activities begin. Before teaching, the researcher (as a teacher) informed the students that in the first meeting of this cycle they would learn about arithmetic operations material, then the teacher conveyed the learning objectives in language that was easy to understand. The teacher asks who knows the meaning of speed then the teacher gives an apperception and questions and answers about daily activities related to the material on arithmetic operations.

In phase I the teacher displays a learning video regarding arithmetic operations material, then divides the students into several groups heterogeneously and asks one representative from each group to come forward to practice and then the results of the practice are written down by each group. In phase II, the teacher provides understanding of the material and focuses students on the problem by directing students to the worksheet and the teacher asks students to work together to solve the problem. In phase III, the teacher guides and supervises students in solving problems and then asks each group to record the results of the discussion. Phase IV, namely the teacher helps each group develop the results of the discussion and asks representatives of each group to present the results of the group's work and other groups are asked to respond or provide opinions. Phase V analyzes and evaluates the problem solving process, namely together with students reflecting on class discussions or presentations. In the final activity, the teacher provides the opportunity to ask students about material about arithmetic operations that they have not yet understood, provides reinforcement regarding the material that has been presented and guides students in making a summary and ends the lesson by reciting Hamdallah and closing greetings.

Cycle I Analysis and Reflection

Based on the test results given in cycle I which was carried out on October 25 2023, students' abilities in the process of learning speed and discharge material by applying the Realistic mathematical education learning model can be seen in the table below:

Table 1.1 Final Test Scores for Cycle I

No	Name	Learning Analysis Results		
		Gender Score Information		
1	PS	F	100	Complete
2	AI	F	100	Complete
3	HS	M	74	Complete
4	IH	F	94	Complete
5	IR	M	55	Not Complete
6	GF	F	85	Complete
7	MZA	M	94	Complete
8	PS	F	95	Complete
9	GA	M	17	Not Complete
10	KA	M	17	Not Complete
11	MA	M	70	Complete
12	MN	M	70	Complete
13	MA	M	10	Not Complete
14	CNA	F	55	Not Complete
15	FK	M	20	Not Complete
16	NM	M	20	Not Complete
17	AH	M	85	Complete
18	F	m	34	Not Complete
Completion Percentage			55,55 %	
Percentage Not Completed			44,44 %	

Cycle II

The teacher opens the lesson by saying hello, then checks the students' attendance and directs the students to pray before teaching and learning activities begin. Before teaching, the researcher (as a teacher) informed the students that in the second meeting of this cycle they would learn about subtraction material, then the teacher conveyed the learning objectives in language that was easy to understand. The teacher relates the debit material to everyday life and asks questions.

In phase I the teacher explains the lesson regarding material d, then divides the students into several heterogeneous groups and focuses the students on the problem by directing them to the worksheets that have been distributed. In phase II, the teacher reinforces understanding of the material and the formula for determining debit, then the teacher asks students to work together to solve the problem. In phase III, the teacher guides and supervises students in solving problems and then asks each group to record the results of the discussion. Phase IV, namely the teacher helps each group develop the results of the discussion and asks representatives of each group to present the results of the group's work and other groups are asked to respond or provide opinions. Phase V analyzes and evaluates the problem solving process, namely together with students reflecting on class discussions or presentations.

In the final activity, the teacher provides the opportunity to ask students about material about arithmetic operations that they have not yet understood, provides reinforcement regarding the material that has been presented and guides students in making a summary and ends the lesson by reciting Hamdallah and closing greetings.

Based on the test results given in cycle II which was carried out on November 3 2023, students' abilities in the process of learning Calculation operations material by applying the RME learning model can be seen in the table below:

No	Name	Learning Analysis Results		
		gender	Score	Information
1	PS	F	100	Complete
2	AI	M	100	Not Complete
3	HS	M	90	Complete
4	IH	M	100	Complete
5	IR	F	100	Complete
6	GF	F	95	Complete
7	MZA	M	100	Complete
8	PS	F	95	Complete
9	GA	M	87	Complete
10	KA	M	70	Complete
11	MA	M	100	Complete
12	MN	M	100	Complete
13	MA	M	20	Not Complete
14	CNA	F	70	Complete
15	FK	F	70	Complete
16	NM	M	50	Not Complete
17	AH	F	100	Complete
18	F	F	98	Complete
19	M	f	100	Complete
Completion Percentage			89,47 %	
Percentage Not Complete			10,52 %	

4. DISCUSSION

The teaching and learning process that occurs in the classroom can attract students' interest so that they are actively involved so that learning objectives are achieved optimally.

The teaching and learning process that occurs is the same as usual, namely the teacher (researcher) remains the facilitator, but the difference is that students are formed into heterogeneous groups so that students can develop thinking skills in solving problems and can develop cooperative relationships with colleagues.

By applying the realistic mathematical education learning model, it can improve student learning outcomes in speed and debit material, according to the test results obtained in cycle I, namely 55.55% of students who meet the criteria for completeness and learning outcomes in cycle II increase, namely to 89.47%. By implementing the realistic mathematical education learning model, learning outcomes increased by 33.92%. By implementing the realistic mathematical education learning model, teacher and student activities also increased based on observations made by 2 observers.

In cycle I, meeting I, teacher activity obtained an average percentage of 76.47% and increased in cycle II, meeting I to 92%, student activity in cycle I, meeting I obtained an average percentage of 76.47% and increased in cycle II, meeting I to 89.33%. The first cycle of the second meeting obtained an average percentage of teacher activity of 78.66%, increasing in the second cycle of the second meeting to 93.33%, the student activity in the first cycle of the second meeting obtained an average percentage of 77.33%, increasing in the second cycle of the second meeting to 89.33%.

Based on the results of the analysis carried out using final test questions, it is evident that student learning outcomes have improved compared to the previous cycle, teacher activities have been carried out in accordance with planning by applying the Problem Based Learning model and student activities have been active and motivated to learn with their group of friends. Judging from the interviews conducted by researchers with 3 students, 1 person with high ability, 1 person with medium ability and 1 person with low ability, it is clear that by applying the realistic mathematical education model the teaching and learning process is more enjoyable because students are directly involved, it is easy to determine the formula for solve problems and can learn together with a group of friends so that the teaching and learning process becomes active and not only centered on the teacher but everyone is involved in the teaching and learning process. The realistic mathematical education learning model can be used by teachers so that students become active in learning.

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