Application Of Realistic Mathematics Education To The Problem Solving Ability Of Fraction Number Materials In Class Iv Elementary School

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Abstract. The nature of learning mathematics in elementary schools is learning that challenges students. Challenging learning is certainly learning that can hone problem solving skills. One of the learning approaches that can bridge problem solving skills is the Realistic Mathematics Education. RME is an approach to learning mathematics that has the view that mathematics needs to be taught contextually. Seeing learning at school tends to be less related to everyday life. The teacher does not facilitate students in orienting contextual daily problems. The daily assessment learning outcomes of fourth grade students at SDN Mega Eltra are 70%, or as many as 12 students out of 17 students in total, still below the minimum completeness criteria. This type of research is classroom action research. The research subjects were students of grade IV (four) SD Negeri Mega Eltra, Kesambi District, Cirebon City, the data collection technique was using a test. From the results of the research that has been done, the problem-solving ability in the first cycle obtained from the test shows that the average value of the problem-solving ability test results is 60 with a percentage of 60% with an ability level of Fairly Able. And in cycle II the average value of problem solving ability is 85 with a percentage of 85% with the ability level Able. This shows that the application of RME can improve problem solving skills in fractional material.

Keywords: Realistic Mathematics Education, Problem Solving Ability, Fractional Material.

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INTRODUCTION

One of the most important factors in achieving the overall level of human intelligence is education.The only path to mobility in terms of understanding, awareness, and personal success is education.Education can serve as a solid foundation for life that must be strengthened.This is consistent with the idea that education is the process of passing on knowledge, skills, and habits from one generation to the next.Education also has the potential to improve one's intelligence, noble character, personality, and skills, all of which are advantageous for both oneself and the general public.Because a person's level of intelligence is typically measured by how well educated they are, education is crucial.The government takes quality education very seriously.

This is evident in the curriculum, which has undergone revisions to address the challenges posed by future developments.Students are able to solve a variety of problems in the future thanks to the 2013 Curriculum, which has begun to be implemented.It is expected that elementary school students will have a fun and meaningful time learning applied mathematics. Additionally, real learning resources and the students' immediate environment (contextual) must be utilized to support learning activities. Learning mathematics can also be used to solve problems and improve reasoning skills.However, Indonesian students still have a very low level of problem-solving skills.

According to a 2011 Trends in International Mathematics and Science Study (TIMSS) study, only 5% of Indonesian students were able to solve problems that required thinking, and the remaining 95% were only able to solve rote problems at the intermediate level.This demonstrates that Indonesian education is conceptually based only.Because of this, one of the solutions that can shape a person's mindset to be critical, disciplined, and able to solve a variety of life issues is to learn mathematics.

In elementary schools, learning mathematics should be fun, engaging, interactive, and challenging. It should also encourage students to actively participate and give them enough room for initiative, creativity, and independence to suit their talents, interests, and physical and mental

development.Fractions in phase B in fourth grade is one of the materials in the Independent Curriculum's mathematics subject.

According to Kania (2018), fractional numbers are those whose symbols can be written as a/b, where a and b are integers and b is less than or equal to zero.A is referred to as the fraction's quantifier in a/b fractions, and b is referred to as the fraction's denominator.When talking about the parts of an object or a set of equal parts, we use a type of number called a fraction.As a result, fractional numbers can be represented by an object or a portion of a set.The meaning of each component of the whole can be conveyed through the use of fractions.

The idea of divisions is partitioned into two sections, in particular portions as numbers and divisions as an expansion of numbers (Park et al.,2013).The idea of fractions as an extension of integers is not something elementary school students have grasped because they only understand fractions as numbers.so that fractions aren't considered to be the same as integers or valid numbers.The definition, properties, and operations for calculating fractions are all part of fractions, which are an extension of integers.

Students still compare fractions based on their denominators in fraction counting operations.In adding parts as well, understudies frequently add the numerator and denominator independently and overlook the unit of option.When learning mathematics, students must master the ability to solve problems.This is based on what is taught in Indonesian schools.At the higher levels of education, students' ability to solve mathematical problems is heavily influenced by their elementary school experiences.Therefore, it is essential to teach math problem solving at the elementary school level.

At least two skills are required to be able to solve problems (problem solving), which are the ability to identify problems and the ability to plan solutions. The capacity to take care of issues is a type of mental abilities. As a result, at least two factors will be required to resolve this issue. First, the students' initial knowledge (previous knowledge).

Second, students' capacity to recall long-term memory-based information.According to Polya (1973, p. 6) and Amir (2015), there are four steps that must be taken in order to solve a problem: (1) comprehending the issue, (2) preparing a settlement plan, (3) carrying out a settlement plan, and (4) re-examining the solution.Students can explain the most crucial part of the question once they understand the problem.The students then plan how to solve problems and gather data or information about what they've learned.Students use the solution plan to solve problems.Last but not least, students reevaluate the outcomes to improve their understanding and problem-solving skills.

An educator must, of course, design and implement supportive learning for their students **in** light of their ability to solve mathematical problems.In elementary schools, students are expected to be able to think critically and solve problems using mathematics.However, in reality, school learning is more focused on textbooks, so it is less relevant to everyday life.Utilize the teacher-centered strategy in learning activities; student-centered has not yet been mentioned.In mathematics material that is directly based on symbols, students are still concentrating on listening and taking notes (abstract).

Models and learning approaches are still not used in a variety of ways by teachers.The instructor does not help students understand the context of everyday problems.so that students' opportunities to solve mathematical problems are not expanded and their diversity is not diminished.Students are asked questions about their ability to solve problem**s** using data from field notes.A story about the material for simplifying fractions is the format of the question.Students discover that the responses to questions are only numerical and do not include a workflow after seeing the work's process and outcomes.At the point when gotten some information about the progression of work so they find the solution, understudies can't make sense of.

The other students gave answers that were close to correct, but the fraction had not been simplified, so something was missed in the problem-solving strategy.For fourth-grade students, this has an effect on their learning outcomes on formative mathematics tests. For fourth-graders at SDN Mega Eltra, the learning outcomes of formative tests are 70%, which means that 12 out of

17 students have not yet achieved the achievement of learning mathematics with fractions.According to the data, students still lack an understanding of fractions.

In light of these circumstances, an instructional strategy for learning mathematics in elementary schools is necessary for comprehensive learning.The Realistic Mathematics approach is the one that can be used.The Netherlands' Hans Freudenthal inspired the Realistic Mathematics Approach, a method of teaching mathematics.This method of education believes that mathematics instruction needs to be contextualized.

That is to say, learning is connected to everyday life.The constructivism learning theory is the foundation of this theory, which encourages students to construct their own knowledge.The Practical Science approach has 5 standards, including: (1) Contextual issues are the foundation for learning.2) The existence of a mathematical model that serves as an intermediary between concrete and abstract mathematics.3) Guided Innovation 4) Interacting with students and teachers to learn together 5) A connection exists between various aspects of mathematics (Hartono, 2007)There are two kinds of mathematicalization in realistic mathematics instruction:vertical and horizontal mathematicians.A process known as horizontal mathematization involves students using mathematics to organize and solve real-world problems.Reorganization through the use of mathematics itself is known as vertical mathematization.Students begin by solving contextual problems formally and in their native tongue (horizontal mathematization).They begin using a more formal language after becoming familiar with similar methods of solving problems and eventually discover an algorithm (vertical mathematization).According to one study, Realistic Mathematics Learning (Sumaryanta, 2013), the major obstacle to learning mathematics is thought to be learning that places an emphasis on knowledge inheritance rather than active student acquisition.Learning models that can be utilized as choices to make understudies.

METHOD

Classroom action research is the term for this kind of research. Fourteen female and four male fourth-grade students from Cirebon City's SD Negeri Mega Eltra, Kesambi District, served as the study's subjects.The ability of students to solve problems is the subject of research.Mega Eltra Public Elementary School in the Kesambi District of Cirebon City serves as the research site.

Arikunto, as stated in 2010:130), classroom action research is a study of classroom activities that are intentionally promoted and carried out.In the meantime, Wiriaatmadja (2012:13) states that classroom action research is a method by which a group of educators can organize the learning practice conditions in which they work and learn from their own experiences.They can test an idea for improving their learning practices and observe the actual results.The researcher came to the conclusion from the literature review that it is abundantly clear that CAR is one of the research methods utilized by teachers who are also researchers to enhance the teaching quality of classroom teachers.

The PTK model utilized in this study is the winding model from Kemmis and Taggart (1988) which incorporates arranging, activity, perception, and reflection stages.The researcher administered a test to assess students' listening skills at the end of each lesson.Move on to the next cycle if the results of the student tests are not satisfactory.The researcher used two cycles because the results from cycles I and II demonstrated that students' learning changed and their listening skills improved.The Kemmis and Taggart models of Classroom Action Research are utilized in this study.According to Arikunto (2010:), there are several steps in the Kemmis and Taggart models.66-67) Every activity is carried out during the planning (plan), action (act), observation (observation), and reflection phases.

The researcher begins by preparing everything necessary before beginning the preliminary stage, which will be followed by the action stage, prior to beginning this research. The first step is the preparatory stage, which involves observing the situation in the classroom and the students in SD Negeri Mega Eltra's fourth grade. Making a Learning Implementation Plan (RPP) and creating learning media are the next steps in the cycle 1 action stage. The act of carrying out what has been planned takes place in the classroom as part of the teaching and learning process.

Observation (observation), which is done during learning activities by observing situations and teaching performance.

Reflecting, the purpose of this stage is to talk about what happened during the implementation—everything was written down at the observation stage—so that the flaws or deficiencies in the implementation of cycle II can be fixed and carried out for the subsequent cycle, cycle II.

The stages of cycle II are the same as those of the cycle—planning, carrying out, observing, and wrapping up.Planning (Planning) at the planning stage of cycle II is based on the results of cycle I's reflections. Implementation (Acting) at the planning stage of cycle II is when the teacher implements the planning and continues to use Realistic Mathematic Education .Perception (Perception), at the perception stage the onlooker actually sees the growing experience completed by the model educator utilizing the Practical Math Approach.Conclusion: At this point, the researcher reached a conclusion about how to improve students' problem-solving skills in fraction material in class IV by using a Realistic Mathematic Education for the two cycles that had already been completed (four).

Observation sheets, evaluation (question) sheets, and note sheets were used for data collection in this study.Arikunto, as stated in 2010:30) defines observation as "a technique that is carried out by making careful observations and recording systematically."Observers engage in direct observation activities as part of the Realistic Mathematics Education's learning activities to collect data.The information is class perception which expects to get an outline connected with the exercises of educators and understudies.

Additionally, according to Arikunto (2010:33), "The test is an information gathering tool, but when compared to other tools, this test is more formal because it is filled with limitations."In this study, a set of tests based on student work serve as the test.And studies of documentation, according to Arikunto (2010:"Documentation studies are looking for data about things or variables in the form of notes, transcripts, books, newspapers, magazines, etc." is stated in 231).Photos, a list of student scores, and LKS are the documents used in this study.The purpose of photo documents is to convey a more authentic picture of student group activities and the classroom environment during learning activities.

RESULTS

The planning, implementation, and evaluation phases of the Realistic Mathematic Education are all involved in developing problem-solving skills. A lesson plan is created, followed by its implementation in accordance with the lesson plan and an evaluation.Students are asked questions on tests as part of evaluation.The following is the assessment's rubric, which is based on indicators of problem solving: the test results are analyzed.

Table 1. Rubric for Assessment of Problem Solving Ability Indicators

Aspects assessed	Reactions to Questions/Problems	Score
Understanding the problem	a. Don't understand the problem/no answer	0
	b. Not heeding the terms of the question/interpretation of the question is not quite right	1
	c. There are no wrong answers	2
Planning a settlement	a. No settlement strategy plan	0
	b. The strategy implemented is less relevant	1
	c. Using one particular strategy but can't continue/one wrong step	2

Aspects assessed	Reactions to Questions/Problems	Score
	d. Using one particular strategy but leading to the wrong answer	3
	e. Using the right strategies and leading to the right answers	4
Carry out settlement	a. No resolution at all	0
	b. There is a workaround, but the procedure is not clear	1
	c. Using a certain procedure that leads to the correct answer	2
	d. Using one particular procedure that is correct but wrong in calculating	3
	e. Using certain correct procedures and correct results	4
Check answers	a. No checking of answers	0
	b. Checking only on answers (calculations)	1
	c. Checking only on process	2
	d. Checking the process and answers	3

Table 2. Problem Solving Ability Level

Score Interval	Ability Level
69 < L ≤ 100	Able
31 < L ≤ 69	Quite Capable
0 ≤ L ≤ 31	Not Able

The problem-solving ability in cycle I, which I obtained from the test after evaluating and processing the data, showed that the ability level Quite Able was attained when the average value of the problem-solving ability test result was 60, or 60%.The lowest score was 28, while the highest was 85.When compared to the PH value of mathematics, the ability to solve fractional material problem solved by using the Realistic Mathematic Education increased by 30%.Since learning cycle I has not been entirely fruitful, it is necessary to complete cycle II in order to enhance learning and outcomes.

In cycle II, the results of the test of problem-solving ability revealed that the average value for this ability was 85, with an ability level of 85 percent.95 was the highest score, while 75 was the lowest.When compared to the PH value of mathematics, the ability to solve fractional material problems increased by 25% when the Realistic Mathematic Education was used.This demonstrates that fractional material problem-solving abilities can be enhanced through RME application.

DISCUSSION

To give a general image of the aftereffects of this homeroom activity research, the show will start with arranging, execution which is the consequence of perception, learning results and reflection.The creation of a Learning Implementation Plan (RPP) is the first stage of cycle planning.The RPP is structured to focus on using a Realistic Mathematic Education to improve students' fractional material problem-solving skills.KD 3.1, Using concrete illustrations and models to explain equivalent fractions, is the fundamental skill.Additionally, the relationship between the various forms of fractions—ordinary, mixed, decimal, and percent—is explained in KD 3.2.

The implementation phase of cycle I was carried out in one meeting with 14 research subjects on October 3, 2022, and learning was done offline (in person).The teacher uses bread media to communicate contextual problems as part of the implementation of the learning.Divide the bread into equal portions and have the students come to the front of the class to solve the problem.The students then talked about and drew bread on the LKPD.Students then write the symbols for fractions after drawing them.

One of the tenets of the Realistic Mathematic Education, progressive mathematization modeling, is demonstrated in this manner.In order to demonstrate the concept of equivalent fractions, the teacher then invites the students to construct pizzas out of cardboard and to calculate fractions.The idea of equivalent fractions refers to the fact that when pieces of pizza are combined, they form a new slice.The reflection can be explained as follows learning in cycle I so that students can understand the concept of equivalent fractions through the application of a Realistic Mathematic Education: based on the description of the results of the action.

However, only 60% of students are able to solve problems.The scientist estimates that the shortcomings that emerge in learning are made conceivable by the educator's apparent absence of study hall molding.Certain groups dominate class learning.In the division of groups, there is less gender and intelligence disparity.Students are not motivated by teachers.The second suggestion for planning cycle is that students' intelligence levels and genders should be used to differentiate groups.All students, particularly female students who are still passive, require the teacher to be able to pay attention, attract, and encourage them to ask questions and participate actively in learning.

The findings from cycle I regarding the learning process and student learning outcomes in learning fractions and constraints during the implementation of learning prompted revisions to the learning steps in the planning for cycle II.The RPP is structured to focus on using a Realistic Mathematic Education to improve students' fractional material problem-solving skills.Explaining the relationships between the various forms of fractions—ordinary, mixed, decimal, and percent—is the fundamental competency in KD 3.2.The implementation phase of cycle II was carried out in one meeting with 14 research subjects on October 17, 2022. Learning was done offline (in person).

application of knowledge in accordance with RME principles.Contextual problems involving fractional material serve as the foundation for learning.The issue at hand is how to use PowerPoint slides to show fractional forms alongside stories about everyday life.Then the educator gives an upgrade by posing inquiries about the types of parts.The instructor assigns LKPD to groups to work on.The teacher leads the discussion among the students.The teacher explains how to convert common fractions into decimal fractions after students have identified the forms of fractions.Students frequently inquire about the procedure for dividing the numerator and denominator.The "divide brackets" approach to dividing the numerator and denominator is demonstrated by the instructor.

The teacher asked the students what they didn't understand after she finished explaining.The instructor concludes that students have comprehended the material because all students remain silent.The instructor provides students with five practice questions and instructions on how to answer them.The instructor follows up on student work and goes around checking it.The teacher collects questions and provides students with feedback on what she sees when going through student work.Today's lesson is finished by teachers and students together.The instructor provides structured assignments and reflections.The instructor concluded the lesson with a group song.

Cycle II experiences a 25 percent increase in score when compared to cycle I, where the average score for learning outcomes is 60 and cycle II, where the average score for learning outcomes is 85.The percentage of students who meet the KKM learning outcomes in cycle I is 60%, and the percentage of students who meet the learning outcomes in cycle II, which is 85%, has also increased by 25%.As a result, it is said that learning in cycle II was not entirely successful, but research is sufficient up to cycle II.

The implementation of learning has also adhered to the guidelines for implementing RME and paid attention to the principles and characteristics of RME on problem solving abilities in connection with the carefully prepared planning.It is evident that students become enthusiastic, engaged, and interested in learning mathematics through their activities.During the initial activities, the instructor was able to convey students' perceptions and learning objectives sufficiently to introduce them to the material.Additionally, students are interested in real-world issues that are brought up at the start of the core activities.Through question-and-answer sessions, teachers can guide students toward posing a real problem to encourage learning.The instructor can also use fictional stories, create a math game, or ask and answer questions.As a result, the instructor ought to be required to come up with imaginative solutions to real-world problems that can pique the interest of the students.

Realistic problems will develop into a mathematical problem that encourages students to model and enhances their ability to solve problems.Modeling can benefit from the surrounding environment.Boxes, origami paper, cardboard, and other items closely associated with student life serve as the props.In order for students to easily comprehend the material that is being presented, this teaching aid will help to concretize abstract mathematical concepts.Before developing strategies for solving problems, this will assist students in identifying issues.

CONCLUSION

The following conclusions can be drawn from the research and discussion described in Chapter IV:

1.The Realistic Mathematics Approach (RME) is used to create the Learning Implementation Plan (RPP) for Fractional Material Learning in Grade IV SDN Mega Eltra, Kesambi District, Cirebon City. This plan is basically made in the same systematic way that the teacher usually makes a lesson plan.However, the RPP for fractional material learning with RME is unique in that it places a greater emphasis on the use of context in its learning activities, then models using the results of student construction, interactivity, and material linkages.Planning also looks at indicators of problem-solving abilities, in addition to looking at the characteristics of RME.Because this study utilized a Realistic Mathematic Education, in which students were required to actively participate in each learning process in order to enhance their problem-solving abilities, the planning that was carried out underwent revisions throughout each cycle.The exploration plan that has been made is utilized as signs and references during the examination.

2.Students' problem-solving abilities can be improved when a Realistic Mathematic Education is used to learn fractional material. These improvements include students' interest in contextual problems, their ability to identify contextual problems, their ability to plan and implement problem-solving strategies, and their ability to check their work again.

3. When learning fractions, a Realistic Mathematic Education can help students solve problems better.The first cycle's average value is 60, representing a 60% KKM achievement rate.In cycle II, the average value was 85, with an 85 percent KKM achievement rate.The two cycles demonstrate that the average score and percentage of KKM achievement are higher than they were before the realistic mathematics approach was used, at 55 and 55 percent, respectively.From pre-cycle to cycle I, the average increase in students' problem-solving abilities was 30 percent, and 60% of students achieved KKM scores.The percentage of students who achieved KKM scores was 25%, and the average increase in student learning outcomes between cycles I and II was 25 percent.

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