

Differences in Increasing Problem Solving Ability and Mathematical Disposition Between Students were Given Realistic Mathematical Approach with Inquiry Approach

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Abstract: This research aims to: 1) to increase the problem solving ability and disposition of students using Realistic Mathematics Approach, 2) To know the improvement of problem solving ability and disposition of students using Inquiry Approach, 3) To know the difference of improvement of problem solving ability of mathematics among student who were given learning through Realistic Mathematics Approach with students who were given the Inquiry Approach, 4) To know the difference of increasing the mathematical disposition between the students who were given the learning through Realistic Mathematics Approach with the students who were given the Inquiry Approach, 5) To know the process of completion of answers made by students in completing problems in each lesson. This type of research is quasi experiment (quasi experiment). The sample is 50 students of class VI coming from two classes in one of N 053984 Hinai Kanan District Hinai Sub-district of Langkat Regency. Both classes are given pretest and posttest. The experimental class is given in the form of a scale questionnaire to measure attitudes, students' opinions on the student's disposition in mathematics with a realistic approach with inquiry approach. The results showed that there was a difference in the improvement of students' mathematical problem solving abilities among students who were given learning through realistic mathematics approach with students who were given the learning through inquiry approach. Improving students problem solving skills using a realistic mathematics approach is better than improving students problem solving skills using inquiry approach. Student response process that is given by learning through realistic mathematics approach is better than the process of student's answer given by Inquiry learning approach.

Keywords - Problem Solving, Mathematical Disposition, Realistic Mathematical Approach, Inquiry Approach

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I. Introduction

Mathematics is a science that has a very important role in the various activities that humans do in life. Human activities in everyday life cannot be separated from the utilization and application of concepts that exist in mathematics. As a universal science, mathematics cannot be separated from the various other disciplines that exist in human life. Mathematics courses need to be provided to all students from elementary school to equipping students with logical, analytical, systematic, critical and creative abilities, and the ability to work together. These competencies are needed so that students can have the ability to acquire, manage, and utilize information to survive in an ever-changing state

Reference [1] stat that mathematical problem solving is essential in the teaching of mathematics, because: (1) students become skilled in selecting relevant information, then analyzing and ultimately researching the results; (2) intellectual satisfaction will arise from, an intrinsic problem for the student; (3) students' intellectual potential increases (4) Students learn how to make discovery through the process of discovery. However, the field shows that students' mathematical problem solving skills are low. The low ability of problem solving students can be seen from the results of initial ability tests that contain problem-solving problems, it is known that most students have not reached the Minimum Exhaustiveness Criteria is 75.

The purpose of other mathematics learning is the attitude of appreciating the usefulness of mathematics in life. Another term for this purpose is called mathematical disposition. Mathematical dispositions include curiosity, attention, and interest in learning math, as well as a tenacious attitude and confidence in problem solving. Most elementary students do not yet have a proud mathematical disposition. This is known from the results of interviews and observations at SD Negeri in Hinai sub-district.

The low ability of problem solving and mathematical disposition of students can be caused by several factors, including learning process implementation process. The learning process tends to be teacher-centered while students are more likely to be passive. Students do not have the opportunity to develop their mathematical

thinking skills. In addition, teachers are often haunted by worries of not being able to convey topics to be taught according to the time available. As a result, teachers prefer to teach in the traditional way by simply using expository methods.

One of the efforts made by teachers to improve students' mathematics learning outcomes is through the selection of learning models that can involve more students in learning. According to Lie (2004: 7) The atmosphere of the class needs to be planned and built in such a way that students get the opportunity to interact with each other. In this interaction the students will form a community that allows them to love the process of teaching and loving each other. In an atmosphere of learning that is full of competition and student isolation, negative attitudes and relationships will form and nourish the spirit of the students. Such an atmosphere will inhibit active knowledge formation. Therefore, teachers need to create an atmosphere of learning in such a way that students work together in mutual assistance.

But the reality in the field of learning mathematics that is implemented at this time has not met the expectations of teachers as a developer of learning strategies in the classroom. Primary school students still have difficulty in learning mathematics. Therefore, the quality of education should be improved both the learning curriculum and learning strategies in the classroom which involves the preparation of teachers in implementing the learning process, namely in choosing a variety of approaches in accordance with the material to be taught. As in [2] adds that the absence of emphasis on the teaching of mathematics in a real-life context causes some students to be unable to relate the mathematical material they learn with their real-life insights.

In response to the above problems, a learning strategy is needed that can improve the problem solving and mathematical disposition of students and make meaningful learning. One of the learning models that can be used to answer the problem is the model of Realistic Mathematics Approach (RMA). Reference [3] state that formulated five characteristics of the Realistic Approach of Mathematics, namely: 1) The use of context; 2) The use of models for progressive mathematics; 3) Utilization of student construction result; 4) Interactivity; 5) Linkage. Thus this characteristic corresponds to the expected learning in the Mathematics curriculum as in [4]. By proposing contextual issues, learners are gradually guided to master mathematical concepts.

In addition to Realistic Mathematics Approach, there is a fairly innovative learning applied to the learning process, namely inquiry learning. Inquiry learning can help students to integrate concepts they already knew with the events that they died. Inquiry learning can also change the misconceptions that students experience into a scientific concept. Learning by using inquiry learning is expected to become more creative students, innovative, and learning becomes more meaningful so that the achievement of learning mathematics can be improved. This is because the inquiry process contains higher level mental processes, such as formulating problems, designing experiments, conducting experiments, collecting and analyzing data, drawing conclusions, having objective, honest, curiosity, and openness.

The indicators of concept understanding developed in this study are: (1) Learners have difficulty in learning mathematics. (2) The ability to solve mathematical problems possessed by learners is still low so that learners have difficulty in solving problem-solving problems. (3) The mathematical disposition of the learners is still low so that mathematics is considered a difficult lesson and not interesting. (4) Teacher-centered learning process so that learning is still monotonous. (5) The approach used in the learning process is less precise so that the learning objectives have not been achieved. (6) The process of resolving answers made by students in solving problem-solving problems has not varied.

The Realistic Mathematics Approach (RMA) is a theory in mathematics education based on the idea that mathematics is a human activity and that mathematics must be linked significantly to the context of everyday life of the student. This is in line with the opinion as in [5] mathematics is not as a lesson, but as a human activity and must be associated with reality, students can not be viewed as passive recipients of mathematics so, students should be given the opportunity to reinvent mathematics under adult guidance.

The inquiry approach is essentially using a constructivist approach, in which each learner is the subject of learning, is freed to create new meanings and meanings based on the interaction between what has been possessed, known, trusted, with newly learned phenomena, ideas, or information. if students get information about what they do, then it will affect the next activity. Thus, in the learning process students have brought the initial understanding and knowledge to be supplemented, modified, updated, revised, and modified by new information gained in the learning process. students are freed to express their opinions freely without any fear of mistakes.

There are also Steps to apply inquiry learning models in the classroom are: (1) Forming inquiry groups. Each group is formed based on intellectual range and social skills. (2) Introduce the inquiry topic to all groups. (3) Establish a policy position related to the topic, which is the question of what to do. (4) Formulate all the terms contained in the policy proposition. (5) Investigate the internal logical and consistent validity of the proposition and its supporting elements. (6) Summarize the evidences (evidence) to support the proposition elements. (7) Analyze proposed solutions and seek group positions. (8) Assess group processes.

Problem solving is a means as well as a target of learning mathematics in school. In addition, a problem can lead students to investigate, explore patterns, and think critically. To solve problems, students need to make careful observations, make connections, ask questions and conclude. This is in accordance with [6] statement in [7]. Problem solving is a series of cognitive operations to find a solution to the problem. Cognitive operations are performed to involve two things, namely to understand the problem and context mentally and then actively manipulate to try the strategy or problem-solving model.

In mathematics learning, fostering affective domain components will form a mathematical disposition, namely: the desire, awareness, dedication and strong tendency in students to think and do mathematically in a positive way and based on faith, and noble attitude as in [8] The essence of mathematical disposition as written in [8], that mathematical disposition refers to the tendency to think and act in a positive way. This disposition is reflected in students' interest and confidence in mathematics. there is a strong relationship between mathematical disposition and learning. mathematics in addition to improving the ability of students' disposition or cognitive aspects, also fostering a mathematical disposition of students.

References [9] suggests several indicators of mathematical dispositions such as: the nature of confidence and diligence in doing mathematical tasks, solving problems, communicating mathematically, and in giving mathematical reasons, showing interest, and curiosity, monitor and reflect on the way they think, attempt to apply mathematics to other situations, to appreciate the role of mathematics in culture and values, to mathematics as a language tool.

Realistic mathematical approach is a learning approach that departs from the "real" things for students. This approach aims to bring students' thoughts on the lessons they learn so that the teaching materials are not too abstract for them. In this realistic mathematical approach the role of a teacher is nothing more than a facilitator, moderator, or evaluator for students while the student himself thinks, communicates ideas and ideas, and trains democratic nuance with respect for the opinions of others.

Mathematical learning using RMA can help to develop a student's mathematical disposition. Because with the RMA, students learn mathematics that is related to their daily life so that they feel that math is beneficial to them. Furthermore, students solve the problems of mathematics (contextual) by using the model they understand, and through discussion (interaction) with fellow students and or with teachers finally students are able to use the model they understand, and through discussion (interaction) with fellow students and or with teachers eventually students are able to use formal models to solve mathematical problems.

II. Method

Population in this research is all student of class VI SD N No 053984 Hinai Kanan Hinai Sub-district of Langkat Regency which consist of two study group that is class VI A and class VI B which each class amounts 25, so the research population is 50 people. This study uses population sampling technique, that is by taking the entire student population as a sample of research as in [10]. Therefore, the research sample used two classes, namely experimental class 1 with Realistic Mathematics Approach and experiment class 2 with Approach Inquiry Learning.

The method used in this research is quasi experiment (quasi experiment) with quasi experiment design with pretest-postes control group design, but the researcher accept the subject situation as it is. This design can be described as follows:

Table 1. Descriptive Analysis Results

Group	Pretest	Treatment	Posttest
Experiment 1	O-1	X-1	O-2
Experiment 2	O-1	X-2	O-2

Information:

X-1: Realistic Math Approach

X-2: Inquiry learning approach

O-1: Pretes troubleshooting capabilities

O-2: Postes troubleshooting ability

This study uses independent variables and dependent variables. The independent variable is mathematical learning using Realistic Mathematical Approach and Inquiry Learning Approach. While the dependent variable is the problem solving ability and mathematical disposition of the students.

The research instrument used to obtain the necessary data in this research is the test. Problems developed for the tests are descriptive questions. The test type instrument was developed by researchers of circular and rectangular materials. This instrument is used to measure students' mathematical problem solving abilities. Meanwhile, to measure the disposition of students used non-test type of instrument Likert scale. In order for good test quality and can measure the desired ability, the thing done is. Creating a grid problem, validating the problem, tested the problem, after the problem was tested on SD N 053985 Like Peace done item

analysis that is 1. Validity, 2 different power, 3 difficulty index, 4 test reliability. Analysis of item validity using Production moment correlation formula, and reliability using alpha formula, while different power formula and difficulty index are used for essay problem.

Based on the analysis conducted on the test question it is found that all valid questions, significance and difficulty index are medium category, so the problem can be used. After the problem is analyzed, the questions are given to experiment class 1 and experiment class 2 to obtain pretest and postes result of students problem solving abilities. the data obtained during the study were analyzed with the aim to find out whether the average score of problem solving skills of the experimental class 1 students is better than the experimental class 2. Before performing the statistical test to be used, then the prerequisite analysis test is tested normality test and homogeneity test. Based on the prerequisite analysis test obtained that the data is normal and homogeneous distributed, then the prerequisite test used is t test. whereas for the second hypothesis is done by comparing the average gain of the experimental class 1 and the gain of the experimental class 2. For the third and fourth hypotheses done by normalized gene test. And for the fifth hypothesis done descriptive qualitative.

III. Result And Discussion

1. Differences in problem solving skills of students who are given learning by Approach to Realistic Mathematics with Inquiry Approach

Table 2. T Test Results Problem Troubleshooting

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	T	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Nilai	Equal variances assumed	0,01	0,91	-7,35	48,00	0,00	-13,80	1,88	-17,58	-10,022
	Equal variances not assumed			-7,35	47,998	0,00	-13,80	1,88	-17,58	-10,022

From table 2 above can be seen that the t test independent sample t test where the value of sig. (2-tailed) by 0,000 with $\alpha = 0.005$. $0.00 < 0.05$ then H_0 rejected and H_1 accepted, with the conclusion there are differences in the ability to solve the problem solving students who are given the lesson with Realistic Mathematics Approach with the problem solving ability of students students who are given learning with the Inquiry Approach.

2. Differences in mathematical dispositions of the students given are given through the Realistic Approach to Mathematics with the students who are given the lesson by the Inquiry Approach.

Differences in student disposition can be seen in table 2 below:

Table 3. Differences in student disposition using the Inquiry Approach and the Inquiry Approach

Statistic	Postes Disposition Inkuiri	Postes Disposition RMA
N	25,000	25,000
Mean	134,960	152,720
Max Value	180,000	180,000
% Value	74,978	84,844
Differences	17,760	

From table 3 above can be seen the mean value of student disposition given learning with Realistic Approach of (152,72), the mean value of student disposition given learning by Inquiry Approach is (134,96). While the percentage of achievement score of student disposition given by learning with Realistic Mathematics Approach equal to (84,844%), percentage of student disposition achievement given by Inquiry Learning approach (79,978%). Differences in the disposition of students who are given learning with Realistic Approach to Mathematics with the disposition of students who are given learning with the Inquiry Approach of 17.760. Besides the score difference disposisi student students who were given RMA learning with Approach Inkuiri also shown in diagram 4.1 below:

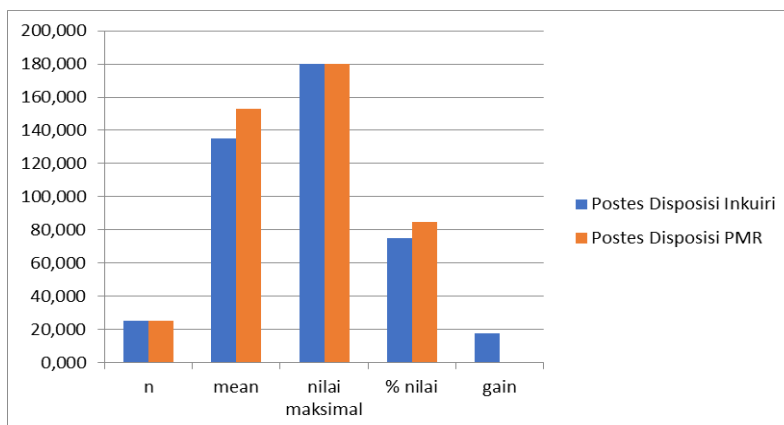


Figure 1. Diagram Difference Postes Disposition Inquiry And Disposition RMA

3. Improved Problem Solving Ability After Learning is given by Realistic Approach to Mathematics and Inquiry Approach

A. Improvement of Problem Solving Ability After Learning is given by Realistic Mathematics Approach

Table 4. Pretest and Postes Troubleshooting Capabilities RMA

Statistik	Pretes Problem solving of RMA	Postes Problem solving of RMA
N	25	25
Mean	62,84	79,6
Skor Maksimal	100	100
% Pencapaian Skor	62,84	79,6
Gain	16,76	
Gain Ternormalisasi	0,451	

From table 4 above can be seen the mean value of student problem solving after the learning given by Realistic Mathematics Approach (79,6) is higher than the mean value before given learning with Realistic Mathematics Approach (62,84), while the percentage of achievement of student problem solving score given the learning with Realistic Mathematics Approach (79,76%) higher than the percentage of achievement of student problem solving score before given learning with Realistic Mathematics Approach (62,84%). Improved student problem-solving abilities are grouped into medium because the normalized gain values are $0,3 < 0,451 < 0,7$.

In addition, the improvement of problem solving skills of students who are given learning with realistic mathematical approach can be shown in graph 2 below.

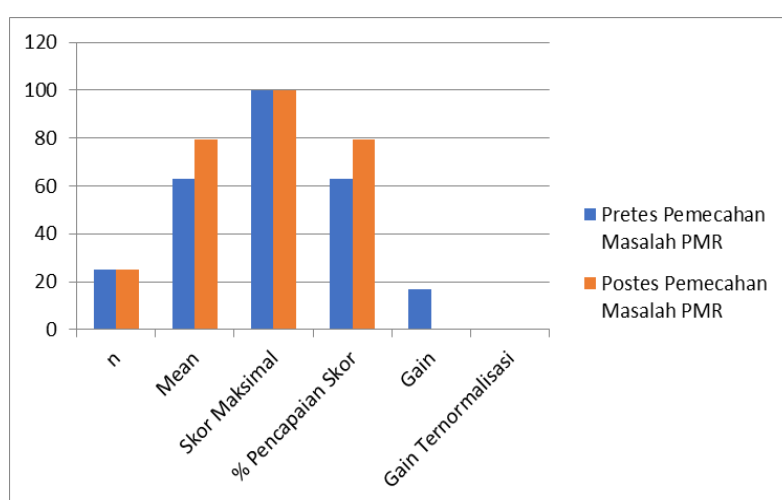


Figure 2. Problem solving diagram of students with RMA learning

B. Improved student disposition After being given the Learning with Realistic Mathematical Approach.

Increased student disposition after being given learning with Realistic Approach to Realistic Approach can be seen in table 4 below:

Table 5. Mathematical Disposition of Students Given Mathematical Approach Realistic

Statistik	Pretes Disposition PMR	Postes Disposition PMR
N	25	25
Mean	128,08	152,72
Max Value	180	180
% Value	71,15	84,84
Gain	24,64	
Normalize Gain	0,475	

From table 5 above can be seen the mean value of students' disposition after being given learning with Realistic Mathematics Approach (152,79) is higher than the mean value before being given learning with Realistic Mathematics Approach (128,08), while the percentage of achievement of student disposition given by learning with The Realistic Mathematics Approach (84,84%) was higher compared to the percentage of achievement of student disposition score before it was given realistic mathematics approach (71,15%). Increased student disposition abilities given by Realistic Mathematics Approaches were classified into moderate because the normalized gain values were $0,3 < 0,475 < 0,7$.

The improvement in the disposition of students given the lesson by Approach to Realistic Mathematics can be shown also in the following diagram 3.

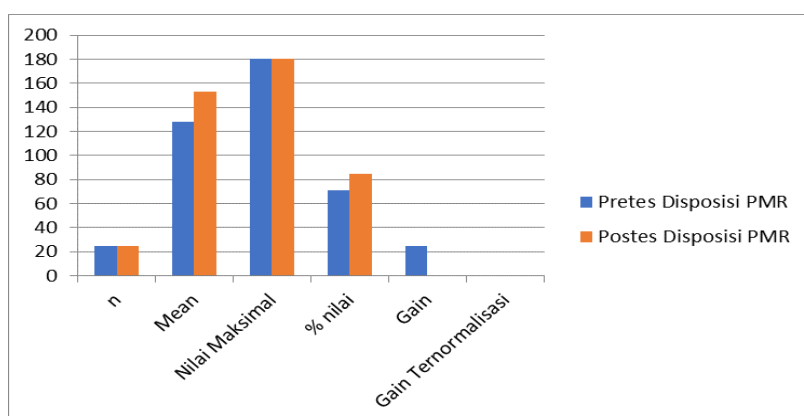


Figure 3. Ability of student disposition with RMA learning

4. Differences Ability Problem solving and disposition of students After given the Learning with Inquiry Approach

A. Student problem solving abilities after being given instruction with the Inquiry Approach

Students' problem-solving abilities after being given inquiry study can be seen from the following table.

Table. 6 Results Problem Solving Students Who Are Given Inquiry Approach

Statistic	Pretes Disposition Inquiry	Postes Disposition Inquiry
N	25	25
Mean	61,16	65,8
Max Score	100	100
% Score Achievement	61,16	65,8
Gain	4,64	
Normalize Gain	0,119	

From table 6 above we can see the mean value of student problem solving after given by Inquiry Learning approach (65,8) higher than the mean value before being given learning by the Inquiry Approach (61,16). Percentage of achievement of student problem solving score given by Inquiry study with higher approach (65,8%) in comparison with Percentage of achievement of student problem solving score before giving instruction with Inquiry (61,16%). Improved student problem-solving abilities with inquiry approaches were classified as low as the normalized gain value was $0,119 < 0,3$.

Improved student problem-solving abilities given by Inquiry learning approach are shown in graph 4 below:

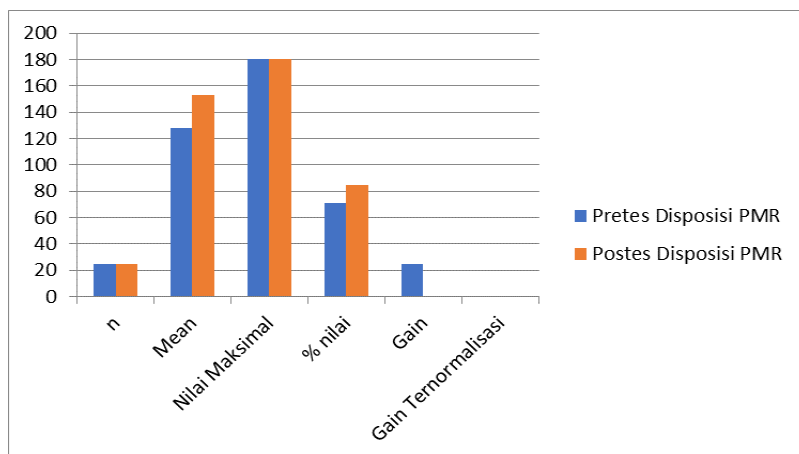


Figure 4. Student-solving abilities after Inquiry learning

B. Improved Student Disposition After Giving Learning with Inquiry Approach

Differences in student disposition After being given Learning by Inquiry Approach can be seen from table 7 below:

Table. 7 Student Disposition Using the Inquiry Approach

Statistic	Pretes Disposition Inquiry	Postes Disposition Inquiry
N	25,000	25,000
Mean	129,800	134,960
Max Value	180,000	180,000
% Value	72,111	74,978
Gain	5,160	0
Normalize Gain	0,103	0

From table 7 above, it can be seen the mean value of student disposition (134,96) after being given learning with inquiry approach higher than mean value before being given learning with inquiry approach (129,8). While the percentage of students achievement disposition given by inquiry study (74,978%) is higher than the percentage of student disposition score achievement before given by inquiry approach (72,111%). Increased student disposition abilities given by inquiry learning were classified as low because the normalized gain values were 0,103 < 0,3.

Differences in the disposition of students provided with Inquiry learning approach are shown in graph 5 as follows:

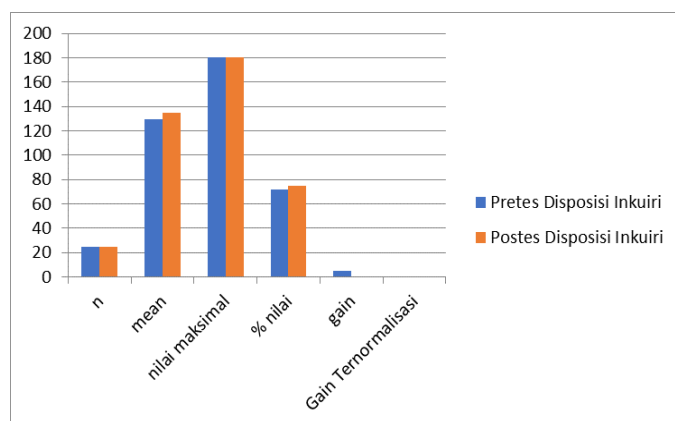


Figure 5. Differences in student disposition after inquiry learning

5. The process of answers of students who are given learning through Realistic Mathematics Approach is better than the students who are given the Inquiry Approach. To prove that the process of answers of students who are given learning through the Realistic Mathematics Approach is better than the students who are given the Inquiry Approach

IV. Conclusion

Ability to solve mathematical problems of students who are given learning through Realistic Mathematics Approach is better than the problem-solving skills of students who are given learning by Inquiry Approach on the material wake up flat that is the area of circle and rectangle in SDN 053984 Hinai Kanan, Kab. Langkat.

There is a difference of mathematical disposition of students between students who are given learning with Realistic Mathematics Approach (RMA) with students who are given learning with the Inquiry Approach. Where the difference of student disposition is given by Realistic Approach to Mathematical Approach with Approach Inquiry of 17,76.

There is an increase in problem solving abilities and dispositions of students who are given learning with the Realistic Mathematics Approach. Enhanced student problem solving ability is 16,76. Improved student problem-solving abilities given by Realistic Mathematics Approach are categorized medium with average normalized gain of 0,451. The improvement of students problem solving ability is 24,64, the improvement of the disposition of students who are given the Realistic Mathematics Approach is categorized as medium with normalized gain average of 0,475.

There is an increase in problem solving abilities and the disposition of students who are given learning by the Inquiry Approach. Enhanced student problem solving ability is 4,64. Increased problem solving skills of students who were given the Inquiry approach were categorized as low with a normalized gain average of 0,119. Increased student disposition after being given learning with the Inquiry Approach of 5,160. The improvement of students problem solving ability is 24,64, the improvement of the disposition of students who are given the Inquiry Approach belong to low category with normalized gain average of 0,103.

The process of student answers given the lesson by Approach to Realistic Mathematics is better than the process of student answers given learning through the Inquiry Approach. This can be seen from the students' achievement in solving each indicator of problem solving where the students who are given the lesson with Realistic Mathematics Approach are more correct and complete answer compared with the students who are given the learning with the Inquiry Approach. This difference is caused by the learning process that uses Realistic Approach to Much more train students in solving problems often experienced by students, in addition students are also required to think exploratively.

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