

# INCREASE THE STUDENTS' ABILITY IN MATHEMATICS PROBLEM SOLVING ON STUDENT FIFTH GRADE SD NEGERI 064997 KECAMATAN MEDAN LABUHAN THROUGH REALISTIC MATHEMATICS EDUCATION

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**Abstract**-the aims of this study were to: (1) increase the student's ability of problem solving, and (2) discover the effectiveness of realistic mathematics education in student's learning mathematics. This study was a classroom action research which was conducted in the fifth grade sd negeri 064997 kecamatan medan labuhan by the number of student's 19 people. The instruments used to collect data, which were consisted of test, observation of student's and teacher activity sheets, and student respond questionnaire. The RESULTS of this study are: (1) realistic mathematics education can increase student's ability of problem solving, for the classical completeness increased in the first cycle was 65,20%, in the second cycle to 70,40%, and in the third cycle to 80,45%, and (2) implementation of realistic mathematics education in the student learning process is effective because (i) classical completeness was 88,89% exceed up to criteria 85%, (ii) mastery learning objectives in the third cycle was 88,88% who achieve mastery of learning objectives by 75% for each individual, (iii) percentage of students activities observe with "moderate" category was 77,78% at the first meeting and at the second meeting was 86,8% in the third cycle, for ability of teacher to manage learning was 83,33% exceed up to criteria 80%, (iv) time efficiency, implementation of learning has been implemented in accordance with the time on the lesson plan (v) student's response to realistic mathematics education is very good, student's respond questionnaire score is 81,25 at third cycle. The recommendation for the teacher to teach realistic mathematics education as one of alternative effort to increase student's ability of problem solving.

**Keywords:** problem solving, realistic mathematics education

## 1. INTRODUCTION

The optimal mathematics learning should be able to make students become good on solved the problem which this goal can be achieved when the principles of learning mathematics is applied in two-way, so that students can actually mastery mathematics concepts. Moreover, students are expected to clever in mathematics and able to performing calculations correctly and precisely match the creativity of each student. In essence, learning mathematics must be started from the problem related to daily life. With work on known issues and place in real life, students can build concepts and understanding with instinct, the power of reason, and the concepts that had been known.

The importance of problem solving ability was expressed on one of the goals of learning mathematics according to Permendiknas no. 22 of 2006, i.e. "subjects of mathematics aims that to learners to solve problems include the ability to understand the problem, designing a mathematics model, complete mathematics model, and interpret the solution obtained". Problem solving is important in learning mathematics because students gain experiences using the knowledge and skill that students already owned to apply problem solving that is not routine.

The learning problem above can be seen when the teacher gives daily tests at the grade 5 SD Negeri 064997 kecamatan medan labuhan, most of the students were wrong in solving a problem. As a results of the 19 students, as many as 14 students or 73,68% have not been thoroughly studied in the get value and the average value daily tests less than 65, as well as the students do not understand in solving problem.

In learning process student response towards learning also become something very important concern. This is because learning is the process of interaction performed teachers and students within and outside of the classroom using a variety of learning resources as material for research. The interaction between teacher and students will be effective, if conducted a two-way interaction.

Teachers are expected to create a way of learning process that can bring up student response. Student response can be seen from the participation of student during the learning process.

Thus, based on the background of the problem above, then the outline of the problem in this research are: 1) how to increase the ability of students mathematical problem solving?, 2) how the affective of the application realistic mathematics education at grade V SD Negeri 064997 Medan Labuhan year 2014/2015?

The purpose of this research are: 1) increase the student's ability of problem solving, and (2) discover the effectiveness of realistic mathematics education in student's learning mathematics at grade 5 SD Negeri 064997 year 2014-2015 Kecamatan Medan Labuhan.

[4] that problem solving is the process of applied the knowledge that has been acquired previously on new and different situation. In addition, NCTM also reveals the purpose of teaching problem solving in general is to: 1) build new mathematics knowledge, 2) solve problem that arise in mathematics and in the context of the other context, 3) apply and costume the various appropriate strategies to solve the problem, and 4) monitor and reflect on the process of mathematical problem solving.

In daily life and the world of work, being a good problem solver can bring huge benefits. Because it solved the problem for students can be meaningful process to accept the challenge. The steps of the famous mathematical problem solving advanced by G. Polya in his book's "How to Solve it". The four steps of problem solving are: 1) understanding the problem, 2) devising Plan, 3) carrying out, and 4) looking back.

The main criteria for learning process successful if is to achieved the goals that have been set previously. The process to achieve that goal should pay attention to several factors, one of which is its effectiveness in learning. According to [3] "the effectiveness of the implementation of all the tasks relating to the subject matters, the achievement of objectives, timeliness, and the active participation of members". Learning effective when stated in the learning process of the overall functions of each element, participants feel happy, satisfied with learning out comes, bring impression, means/facilities adequate, affordable learning methods and material, and professional teacher. The effectiveness of the program in term of not only learning from the learning achievement levels, but rather in term of processes and supporting facilities.

According to [5] the criterion of the effectiveness refers to: 1) the completeness of learning, learning is said to be complete if at least 75% of the number of students has gained value = 65 in improved learning achievement. 2) The learning model is said to be effective at enhancing student learning outcomes, when student learning results showed significant difference between early understanding and after learning understanding. 3) The learning model is said to be effective if it can increase interest and motivation in learning after students become more motivated to learn more enterprising and obtain a better learning results.

While according [7], learning is to be effective in achieving the learning effectiveness indicators such as: 1) the achieved of effectiveness of students' activities, namely the achieved of the ideal time used students to perform any activity in the learning plan. 2) The achieved of teachers' ability to manage learning. 3) Student response against positive learning. 4) The achieved of completeness of learning.

Realistic Mathematics Education (RME) is an approach to the study of mathematics was developed since 1971 by a group of mathematicians from *Freudenthal Institute, Utrecht University* in the Netherlands. This approach is based on the assumptions of Hans Freudenthal (1905-1990) that mathematics is a human activity. According this approach, the mathematics class is not a place to move mathematics from teachers to students, but rather place students rediscover the mathematical ideas and concepts through the exploration of real problems.

Characterization of RME is using realistic context, models, production and construction, interactive, and intertwinment [8]. (1) using realistic context, learning start with realistic problems, so as to enable them to use previous experiences directly. (2) using mathematization models, the term models related to models situation and mathematics self developed models as a bridge for students from the real to abstract situations or from informal to formal mathematics. (3) using of production and construction, students are driven to perform reflection on the the part they consider important in the learning processes. (4) using interactive, explicitly interaction form can be negotiations, explanations, justifications, agreement, disagreement, question or reflections, and (5) using

intertwinment, in the RME integration units of mathematics is essential, if we ignore the learning in relation with the other areas, then it will effect on solving the problem.

According to [8] implementation RME processed includes three phases, namely: (1) introduction phases, teachers introduce realistic problem to all student as well as helping to give problem solving.(2) student exploration phase, in this phase students trying to model a problem as making the allegation. (3) summarize phase, the role of the students in this phase is the filling alleged, ask questions to other students, negotiating, ask problem solvingalternatives, giving reasons, improving strategies and their allegations, as well as making intertwinment. As a results discussion, students are expected to find the initial concept or formal mathematical knowledge in accordance with the objectives of the material.

## 2. METHODS

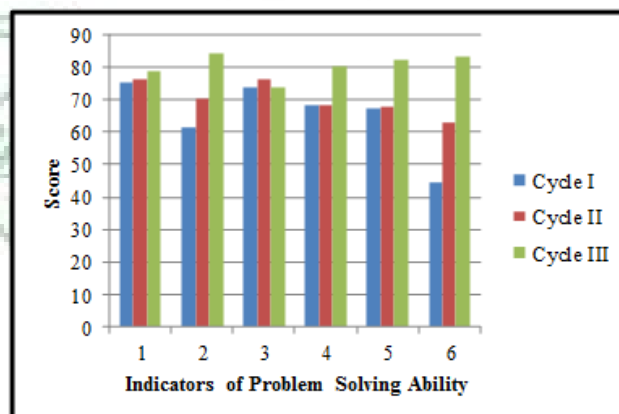
The research was conducted by classroom action research as a form of teacher research conducted to improve the learning process. In this case the researchers collaborate with classroom teacher grade V SD Negeri 064997 Medan Labuhan to perform research activities actions on learning math in school. The subjects of the study are students in grade V SD Negeri 064997 Medan Labuhan year 2014/2015, which amounted to 19 students. The instrumentwas conducted by using a test cycle performed as many as 3 times now, student response questionnaire and the observation sheet activity of students and teachers.

## 3. RESULTS AND DISCUSSION

The research is an attempt to answer the question in the formulation of research problem, namely: 1) how to increase the ability of mathematical problem solving in students, 2) how the effectiveness of the application of realistic mathematics education at fifth grade SD Negeri 064997 Medan Labuhan year 2014/2015. The increase of efforts made through the application of mathematical learning, discipline as one of the innovative learning alternative. Based on the data analysis the results obtained in the study of this action, then answer the question above formulation is done in the following discussion.

### 3.1 Mathematical Problem Solving Ability Improvement of Student Learning Through The Application of Realistic Mathematics Education

Based on data analysis of test results of the cycle, the ability of the mathematical problem solving of students showed an increase at each cycle. There is the description of the problem-solving ability improvement of first cycle up to third cycle is presented in the following Figure 1.



**Figure 1.** The Graph of The Acquisition of Mathematical Problem Solving Ability Score Students per Cycle

Description:

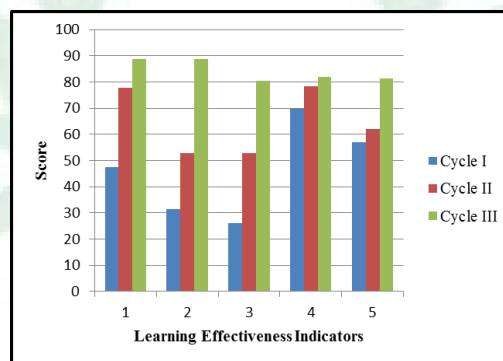
1. Identify the item is known, asked and the adequacy of the element.
2. Create mathematical models.
3. Implement a strategy to resolve problems in/outside of mathematics.
4. Explain/interpret results.

5. Complete a mathematical model and a real problem. Using mathematics in meaningful.

Based on the above description, obtaining test results the ability of problem solving from first cycle to third cycle have elevated in classical. The average achievement indicators of problem-solving ability of the cycle I-cycle II increased by 5.2 points from 65.20 % to 70,40%. The achievement indicators of problem-solving ability of the cycle II-cycle III also experienced an increase of 10.05 points i.e. from 70.40% to 80,45%. Thus, the problem-solving ability of the students in cycle III already has been completed because the classical completeness has gone through a defined characteristic that is 80% and the action stopped.

### 3.2 The effectiveness of application of realistic mathematics education in mathematics learning

Based on the data analysis of the test results of the cycle, the observation activities of the students and teachers, and student response questionnaire from cycle I up to III obtained an increase in cycle on each of the indicators of effectiveness. As for the Figure of the effectiveness of the realistic mathematics education is seen from an increase in each of the indicators the effectiveness such as learning classical completeness, mastery learning objectives, activity of students and teachers, and student response from first cycle up to third cycle is presented in Figure 2 below.



**Figure 2.** The Graph of The Acquisition of Mathematical Problem Solving Ability Score Students per Cycle

Description:

- 1: classical learning completeness
- 2: mastery learning objectives
- 3: student activity
- 4: teacher activity
- 5: student response

Based on the above figure 2 can be seen as follows: the data from cycle I up to cycle III acquired classical learning completeness of students has increased. On cycle I classical learning completeness only reached 47,37%, then in cycle II increased to 77.78% similarly, cycle III becomes 88,89%. The achievement score in cycle III already meets the criteria specified on chapter III classical learning completeness i.e. 85%. Whereas, mastery learning objectives are obtained based on the data analysis the results of the exercise the students who performed each of the meetings has increased each cycle. On the first cycle in first meeting percentage of mastery learning objectives students is 27.78% or 5 of 18 students who obtain the mastery learning objectives of 75% and at the second meeting of obtained the percentage of mastery learning objectives of 35.29% or 6 of the 17 students who obtain the mastery learning objectives to 75%.so the cycle I gained an average of students' mastery learning objectives of 31.53%. Cycle II in the first meeting percentage of students mastery learning objectives is 44.44% or 8 of the 18 students who obtain the mastery learning objectives of 75% and at the second meeting of obtained the percentage of mastery learning objectives of 61.11% or 11 of the 18 students who obtain the mastery learning objectives to 75%. So on cycle ii obtained an average student's mastery learning objectives of 52.77%. And in cycle III at the first meeting of percentage students' mastery learning objectives is 83.33% or 15 of the 18 students who obtain the mastery learning objectives of 75% and at second meeting of obtained the percentage of mastery learning objectives of



94.44% or 17 of the 18 students who obtain the mastery learning objectives to 75%. So in cycle III gained an average students mastery learning objectives of 88.88%.

As with the acquisition of classical completeness score who get good categories, students activities score also increased each cycle. First cycle there is 11.11% of students gained a good category on the first meeting and the second meeting on 41.18%, so that the average score of the student activity on the acquisition first cycle is 26.15%. The second Cycle experience increased where there are 44.44% of students who obtain good category at the first meeting and the second meeting on 61.11%, so that the average score of the student activity on the acquisition cycle ii is 52.77%. Similarly in cycle III increased 77.78% of the students acquire a good category on the first meeting and the second meeting on 83.33%, so that the average score of the student activity on the acquisition cycle III is 80.55%.

The ability of the teacher to manage learning also experienced an increase, which gains an average score of teacher's activity cycle I there is a 68.63% at the first meeting and 71.13% in the second meeting, so that the average score on the teacher activity acquisition cycle I is 69.88%. Cycle II experience increased where obtaining an average score of 77.13% of the teachers there was activity at the first meeting and the second meeting on 79.50%, so that the average score on the teacher activity acquisition cycle II is 78.31%. Similarly, in cycle III increased again became 80.75% at the first meeting and 83.38% in the second meeting, so that the average teacher activity score gains in cycle III is 82.05%.

Whereas the efficiency of the management of time during the learning process takes place has been researcher mentioned above in the beginning research results action every cycle, which at the time of cycle III used by teachers in the application of this learning process is in compliance with the allocation of time has been planned in the RPP. However, in the end of each meeting of the respective cycle students are given extra time for 10 minutes. The addition time was performed upon the approval of the master class and deal with the observer. it is a given that the students must fill out the question form student response towards learning to each end of the cycle.

Student response towards learning also showed an increase of 5.07 points i.e. from 57.08% in cycle I became 62.15% in cycle II. Then rise again of 19.1 points i.e. from 62.15% in cycle II becomes 81.25% in third cycle.

#### 4. CONCLUSIONS

Based on results of the analysis study data, presented some of the following conclusions: (1) Increase ability of problem solving mathematics students from first cycle to second cycle amounted to 5,2%, where the percentage of first cycle is 65,2% and second cycle is 70,4%. Further improvement of the students' mathematical problem solving abilities from cycle II to cycle III amounted to 10,5%. Where the percentage of cycle II is 70,4% and cycle III is 80,45%. So realistic mathematics education can enhance students' mathematical the problem solving ability on student fifth grade SD Negeri 064997 Medan Labuhan year 2014/2015 material fractions. (2) The application of realistic mathematics education effective against learning mathematics on student fifth grade SD Negeri 064997 Medan Labuhan material fractions. Realistic mathematics education is said to be effective because of the classical learning completeness reaches 85%, mastery learning objectives achieved 75% each individuals, 80% of students gained a good category and activity with an average score of teacher's ability to manage learning achieve 80%. In this case, cycle I there is a 26.13% of students gained good activity categories. The acquisition of this score increased in cycle II became 52.77% of students gained a good activity categories, as well as cycle III increased to 80,55%. while the teacher's ability to manage the learning cycle I is 69.88% and cycle II became 78.31% then in cycle III increased to 82,06%. The time used by the teacher in accordance with the draft which had been made earlier in the RPP. Students' response against realistic mathematics education showed a positive response. Where an increase in percentage student response, on cycle I obtained the percentage of 57.08% with student response category is enough. The acquisition increased in cycle II, namely 62.15% with student response categories are enough then in cycle III increased to 81.25% with students' response good categories.

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