ICEE-2

Application of Realistic Mathematic Education (RME) Approach in learning Mathematic to Improve Student Learning Outcomes

Ratna Purwati✉

Institut Agama Islam Bunga Bangsa Cirebon
✉ ratnaapurwati@gmail.com

Abstract. The study is motivated low value math test results on material the principal fragments, it marked the average value of repeat students who are still at the bottom of the KKM with 20 students who did not reach the KKM. Based on these problems, the aim of the research is to describe implementation of the realistic mathematic education approach in planning, implementation and increase student learning outcome in mathematics learning in class V matter fractions in SDN 3 Cibodas.This research used classroom action research, which adapts the Kemmis & Mc. Taggart with three cycles. The techniques of collecting data were observation and test. The result of research indicated the score of cognitive in cycle I got 67,73, increase in cycle II became 76,92 and in cycle III got 82,76. In the affective students when doing LKS in their groups with a percentage of cycle I 64.90 % cycle II Increased 71.85% and cycle III reached 77.08%. Based on the above research results it can be concluded that the use of the *Realistic Mathematic Education* model can improve student learning outcomes in mathematics with fraction subject matter.

Keywords: Realistic mathematic education approach, Learning Outcomes

INTRODUCTION ~ In the National Education System Law No.20 of 2003, that education must be able to ensure equal distribution of educational opportunities, quality improvement as well as the relevance and efficiency of education management to face challenges in accordance with the changing demands of local, national and global life so it is necessary to reform education in a way planned, directed and sustainable. Therefore, the curriculum is compiled by education units to enable the adjustment of educational programs to the needs and potentials in the area called the Education Unit Level Curriculum. One of the subjects in KTSP is Mathematics. Mathematics is a universal science that underlies the development of modern technology, has an important role in various disciplines and advances human thinking. Mathematics subjects need to be given to all students starting from elementary school to equip students with the ability to think logically, analytically, systematically, critically, and creatively, as well as the ability to cooperate.

Based on the results of observations and data acquisition about class V learning outcomes in mathematics, fraction material shows that students are not yet skilled in solving fraction problems and understand fraction material well. This is reinforced by the data obtained about the daily test scores of fifth grade students in solving fraction problems showing that there are 20 children who cannot reach the KKM and 17 children who have reached the KKM with an average grade of mathematics V grade students is 51.38 have not yet reached the KKM.

The low student learning outcomes are also caused because in mathematics learning, teacher delivery tends to be

monotonous, the approach used in learning activities is also still mechanistic, almost without creative variation.

Some other concrete problems from students found include students who do not seem enthusiastic in participating in learning mathematics, often chat when learning takes place, are lazy to listen to the teacher's explanation, busy themselves when explained, and often in and out of class. The behavior of these students makes it very difficult for children to accept and digest learning material. The impact of this is the level of difficulty students in understanding mathematical concepts that cause student learning outcomes are less satisfactory.

These problems indicate that the process of learning mathematics still requires innovation and the development of models, approaches or learning methods that can enable students to find concepts and facilitate teachers in achieving learning objectives. Through the *Realistic Mathematic Education* approach , students can build their own knowledge through the interaction of teachers and students with concrete matters in the form of problems that can be imagined by students, then with semi-concrete things in the form of pictures, floor plans or graphics, and ultimately towards on the concept of learning that will be given to students in the form of symbols.

Realistic Mathematics Education Approach is a learning approach that does not always focus on everyday problems but rather refers to the focus of Realistic Mathematics Education in placing emphasis on the use of a situation that can be imagined by students. So, learning mathematics with a realistic approach is basically the use of reality or environment that is understood by students to facilitate the process of learning mathematics so that it can achieve the goals of mathematics education better than in the past (Swangsih, E and Tiurlina , 2001: 2)

The five characteristics of PMR according to Soedjadi (Wijaya, 2012: 19) are as follows.

1. Using contextual issues *(the use of context*)

Learning begins by using contextual problems (the real world), not starting from the formal system. Contextual problems raised as the initial topic of learning must be simple problems that are "known" by students. Through the use of context, students are actively involved in conducting problem exploration activities. The results of student exploration not only aim to find the final answer to the problem given, but are also directed to develop various problem-solving strategies that can be used.

2. Using *models* (use *models, bridging by vertical instruments*)

The thing to understand from the word "model" is that "model" does not refer to props. "Model" is a tool "vertical" in mathematics that cannot be separated from the process of mathematical (i.e. horizontal mathematical and vertical

mathematical) because the model is a process of transitioning from the informal level to the level of formal mathematics (Wijaya, 2012: 22)

3. Using *the* contributions of students (*students' contribution*)

A large contribution to the learning process is expected to come from students, meaning that all thoughts (construction and production) of students are considered. According to Wijaya (2012: 22) the third characteristic of realistic mathematics education is not only useful in helping students understand mathematical concepts, but also at the same time developing student activities and creativity

4. Interactivity *(interactivity*)

Optimizing the learning process through the interaction of students with students, students with teachers and students with facilities and infrastructure is important in learning *Realistic Mathematic Education*, until the construction process carried out by students with students, students and teachers are obtained so that the interaction is beneficial.

5. Integrated with other topics *(*intertwining)

Mathematical structures and concepts are interrelated, therefore the interconnection and integration between topics (unit of study) must be explored to support the *occurrence* of a more meaningful learning process.

Learning and learning is a process that has a goal that is a change in behavior, where someone who has a change in behavior is in the form of knowledge, skills and skills and so on, so that someone has succeeded in learning. Changes in behavior are learning outcomes. As stated by According to Oemar Hamalik in (slameto, 2010: 12),

"When someone has learned there will be a change in behavior in that person, for example from not knowing to knowing, and from not understanding to understanding. Learning outcomes are a final assessment of the process and recognition that has been done repeatedly. And will be stored for a long time or even will not be lost forever because the results of learning participate in forming the individual who always wants to achieve better results so that it will change the way of thinking and produce better work behavior".

However, the learning outcomes referred to in this study are the grades or scores obtained by fifth grade students after the learning process through the mathematics test on fraction material with the application of the *Realistic Mathematic Education* (RME) approach.

METHOD

This research was conducted using the classroom action research (CAR) method, which consisted of three cycles. In this class action research researchers adopted a model developed by Kemmis and Mc Taggart. This model according to Kemmis and Mc Taggart in Sukmadinata (2010: 75-76) includes four components, namely: planning (planning), action (action), observation (observation), and reflection

(reflection). This research procedure cycle can be visualized as follows:

This research was conducted at SDN 3 Cibodas Kp. Cibodas, Suntenjaya Village, Lembang District, West Bandung Regency. The subjects in this study were VA class students at SDN 3 Cibodas in semester 2 of the 2012/2013 academic year with 37 students consisting of 18 men and 19 women. The expected grade average is 80 with 80% completeness.

Data collected through observation and test techniques. The research instruments used were teacher and student activity observation sheets, student affective observation sheets, student work sheets and pre-test and post-test question sheets in the form of essays.

FINDINGS AND DISCUSSION

1. Findings from Cycle I Research Results

At the planning stage of cycle I for actions I and II, it is outlined in the form of a lesson plan (RPP) with reference to the learning steps of a realistic mathematical approach with competency standards (SK): 5. Using fractions in problem solving and basic competencies (KD) : 5.1 adding and subtracting various forms of fractions by adding the same denominated material for action I and adding different fractions of the material. This learning is designed with a time allocation of 3 x 35 minutes. For student learning outcomes in the first cycle based on the results of the test scores and post-test in the first cycle, the following data are obtained:

1. The highest *post - test* score is 100 and *the* lowest *post-test* score is 18
2. Normalized gain in learning cycle I is 0.45 in the medium category.
3. The average value of students at the initial observation reached 49.68. Whereas in the post-test the average grade reached 67.73
4. From the data of the initial observation of the first cycle showed 12 students or 32.43% of students declared complete (graduated) and the remaining 25 students or 67.57% of students declared not graduated.
5. From the data of the first cycle *post-test* results showed 26 students or 70.27% of students declared complete (passed) in the *post-test* and the remaining 11 students or 29.73% of students declared not passed the *post-test*

2. Findings from Cycle II Research Results

In the planning phase of the second cycle, it is outlined in the form of a lesson plan (RPP) with competency standards (SK): 5. Using fractions in problem solving and basic competencies (KD): 5.1 adding and subtracting various forms of fractions with the material for reducing the same denominated fractions and the material for reducing fractions is different. This learning is designed with a time allocation of 3 x 35 minutes. For student learning outcomes in cycle II based on the results of the test scores and post-test in cycle I, the following data are obtained:

a. The highest *post - test* score is 100 and *the* lowest *post-test* score is 34
b. Normalized gain in cycle II learning is 0.46 with a high category.
c. The average value of students in the first cycle reached 67.73. While in the post-test the average acquisition of classes increased to 76.92.
d. From the data of the results of the first cycle showed 26 students or 70.27% of students declared complete (passed) and on the second cycle of student learning completeness increased to 78.37% or 29 students declared complete (passed) in the *post-test.*
e. While students who did not complete their studies or had not yet reached KKM decreased from 11 students or 29.73% in the first cycle to 8 students or 21.67% of students were declared to have not passed the *post-test.*

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4. Findings from Cycle III Research Results

At the stage of cycle III, the teacher carries out learning activities as contained in the RPP with the Competency standards for cycle III are (SK): 5. Using fractions in problem solving and basic competence (KD): 5.1 multiplying and dividing various forms of fractions with various multiplication materials fractional form. For student learning outcomes in cycle III based on the results of the test scores and post-test in cycle II, the following data are obtained:

a. The highest *post - test* score is 100 and *the* lowest *post-test* score is 30
b. Normalized gain in learning cycle III is 0.72 with a high category.
c. The average value of students in the second cycle is 76.92. Whereas in the

post-test cycle III the average grade gain increased to 82.76 in line with the researchers' expectations.

d. From the data of the results of the second cycle showed 29 students or 78.37% of students declared complete (graduated) and in the third cycle of student learning completeness increased to 83.78% or 31 students declared complete (passed) in the *post-test*.
e. While students who did not complete study or had not yet reached KKM decreased from 8 students or 21.67% in the second cycle, to 6 students or 16.22% of students declared not passed the *post-test*.

RESEARCH DISCUSSION

1. Learning Planning

Learning planning is an important part of creating conducive learning. For this reason, the planning of each cycle is arranged systematically. The lesson plans developed in this study refer to the steps and principles of a realistic mathematical approach by using contextual problems as the beginning of learning. Changes are more visible from the teacher's preparation in teaching, especially the use of instructional media that is more varied, interesting, and easily understood by students. Changes were also made in the CSP by changing the steps of the core activities to fit the time allocation and target of the researchers. Changes in the planning of each cycle based on the results of observation and reflection provide learning outcomes that are increasing from each cycle. So that researchers can achieve the expected learning outcomes.

2. Learning Implementation

In the implementation of learning, teacher at essentially already implementing learning in accordance with the steps and principles approach realistic mathematics. But in its implementation, there are still shortcomings experienced by researchers as an improvement for further action. The implementation of teacher and student activities during this learning has an effect on student learning outcomes from the results of the post-test both cycle I, II and cycle III. The implementation of teacher and student activities is the result of observation from the observer. From the observations it can be seen that the overall learning process both teacher and student activities have been good and have increased from cycle I, II to cycle III.

3. Improved Student Learning Outcomes

Based on the data obtained in learning in cycles I, II, and III, it can be concluded that the cognitive learning outcomes of students shown through the *post-test* scores in each cycle experienced a significant increase after taking action by applying a realistic mathematical approach. Improved student learning outcomes are shown through the average *post-test* scores that increase in each cycle. In the first cycle, the average value of students only reached 67.73, but

in the second cycle increased to 76.92. After better learning with improvements from cycles I and II, student learning outcomes again increased to 82.76.

Likewise, the normalized gain score <g> in each cycle has increased based on the pre-test and post-test results. In the first cycle, the normalized gain reached 0.45 with the medium category, in the second cycle it reached 0.46 with the moderate category and increased in the third cycle to 0.72 with the high category.

Student learning outcomes are also shown by students who have achieved KKM in each learning. The KKM in mathematics learning at SDN 3 Cibodas is 58. In the first cycle students who passed the KKM only reached 25 students, but in the second cycle it increased to 29 students. While in cycle III there was a significant increase, 32 students had passed the KKM.

In learning in the first cycle to the third cycle, learning mathematics is packaged into learning situations that require students to find and construct mathematical concepts that are useful in helping students understand mathematical concepts. This is in line with the characteristics of realistic mathematics education that is the utilization of student construction results according to Treffers (in Wijaya, 2012) states that:

"Mathematics is not given to students as a product that is ready to use but as a concept developed by students. Student work results and subsequent construction are used to ground the development of mathematical concepts".

Likewise with the application of the five characteristics of a realistic mathematical approach that is used as a basis in the steps of learning mathematics indirectly makes it easier for students to understand a concept systematically. In this learning the teacher has applied the five characteristics according to what Treffers has stated (in Wijaya, 2012), namely:

1. Using contextual issues *(the use of context*)
2. Using models (use *models, bridging by vertical instruments*)
3. Using the contributions of students (*students' contribution*)
4. Interactivity *(interactivity*)
5. Integrated with other topics *(intertwining*)

CONCLUSION

Based on the results of research and discussion it can be concluded:

1. Learning planning using the *Realistic Mathematic Education* approach is good until the third cycle with reference to the SBC. Seen in the use of learning media that are easily understood by students, teacher and student observation sheets that are appropriate to the stages in the lesson plan, and student worksheets and evaluation tests that are appropriate for SK and KD.

2. The implementation of learning with the *Realistic Mathematic Education* approach on the subject matter in class V has been well implemented based on observations in cycles I, II, and III by referring to the stages

of the *Realistic Mathematic Education* approach.

3. The improvement of mathematics learning outcomes has reached the target of researchers with an improvement from the cycles I, II, and III based on students' cognitive learning outcomes. In cycle I the *average* cognitive learning outcomes of students reached 67.73, cycle II increased to 76.92 and cycle III reached 82.76. In addition, there is also an increase in student learning completeness in each cycle. In cycle I there were 25 students or 70.27% who had finished learning, cycle II there were 29 students or 78.73 who had finished learning and in cycle III there were 32 students or 86.49% who had finished.

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