PMR Application to increase Activity and Results of Learning about Reduction Additive Fractions in Elementary School

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Abstract— Learning mathematics in elementary school should be oriented to the creation of activities that encourage the acquisition of an understanding of mathematical concepts more profound by the students. Based on observations and interviews conducted in SDN Sukosari 01 Bondowoso, it is known that teachers have many students actively involved in learning. The lack of use of methods or models of innovative learning in every learning math become one of the causes of low student learning activities that adversely affects the learning results. To overcome these problems is used Realistic Mathematics Approach (PMR) to enhance the activity and student learning outcomes. The purpose of this study is to describe the application of PMR on the subject of addition and subtraction of fractions to increase the activity and student learning outcomes in class V SDN Sukosari 01 Bondowoso at 2016/2017. This type of research is the Classroom Action Research conducted as many as two cycles and each cycle consisting of 2 meetings and 4 stages, including planning, implementation, observation and reflection. Data collection methods used in this research is observation, interviews, tests, questionnaires and documentation. Based on the analysis, the average percentage of students in the classical learning activities in the first cycle increased from 62.92% to 77.42%. In the second cycle, the average student learning outcomes also increased from 65.11 into 75.54. Based on these results, it can be seen that the implementation of PMR can increase the activity and student learning outcomes.

I. INTRODUCTION

Science and Technology today are growing very rapidly, abundant and very easily obtained through a variety of sources and places around the world. This requires everyone, especially the students to have the ability to receive, select and manage all the information obtained to survive in a state that is always changing, uncertain and competitive. In connection with this condition, mathematics has a significant role in equipping students to have these skills. Through mathematical learners are expected to have critical thinking, systematic, logical, creative, and work together, so as to face the era of rapid change and challenges. Mathematics is one of the disciplines that can improve the ability to think and argue, as well as contributing in solving everyday problems in the workplace. Mathematics is also able to provide support in the development of science and technology. Therefore, mathematics students need to be controlled properly.

Education Ministry curriculum formulated in 2004 that the standard of competence which must be mastered mathematics students in elementary school is a cover of understanding mathematical concepts, mathematical communication, connection mathematical, reasoning and problem solving, as well as a positive attitude and interest towards mathematics. In particular, the Ministry of

Education (in Susanto, 2014: 190) formulate objectives in elementary mathematics, namely: (1) understand math concepts, explain the link between concepts and apply concepts or algorithms, are flexible, accurate, efficient, and precise, in problem-solving; (2) using the reasoning in the patterns and nature, perform mathematical manipulation in making generalizations, compile evidence, or explain the ideas and statements mathematics; (3) solve problems that include the ability to understand the problem, devised a mathematical model, solve the model and interpret the obtained solution; (4) communicate ideas with symbols, tables, diagrams, or other media to clarify the situation or problem; and (5) have respect for the use of mathematics in everyday life.

In fact the conditions in SDN Sukosari 01 Bondowoso yet many students actively involved in their activities, resulting in students having difficulty in understanding the subject matter, and consequently the learning outcomes of students is low. Based on data from the first daily test results of students with the subject of the Commission and the FPB, it is known that students who scored below the KKM is studengts who scored greater than or equal to the KKM is a total of 14 students (41.17%), while students who scored under KKM is 20 students (58.83%). There are several factors that affect the poor performance of student learning, namely, the first factor is the learning that was created by the teacher is still centered on the student, which means learning is still a teacher center, and teachers are also less engage students actively in learning activities, the second factor, due to lack of use model or innovative learning methods in each of mathematics, which leads to the boredom that appears on students and make students become less attentive in full to the teacher when the material being described. The condition is also possible result in the lack of students' understanding of the learning material. The last factor is due to the teachers who are less likely to bring learning in real contexts, or realistic with the daily life of students.

Efforts to treat the condition is through the application of learning-oriented students in the form of student activities to work, not a transfer of knowledge from teacher to student. There are various approaches / learning model that can be used by teachers in presenting the subject matter so that the subject matter can be well received by the students, such as by using a real problem in the learning process. Approach / model selected is the approach Realistic Mathematics (PMR). PMR is the process of teaching and learning that is oriented on human activity and associated with reality. This shows that the world of mathematics should be close to the students and also relevant to the situation of students in everyday life. Mathematics as a human activity is defined as the

provision of greater opportunities for students to reinvent the concept or algorithm as the discovery of the mathematical concepts. Soedjadi also revealed that PMR is basically utilization and environmental realities are understood learners to facilitate the learning process of mathematics, so as to achieve the purpose of mathematics education is better than the past. The learning process in PMR consists of five phases: (1) understand the contextual issues; (2) explains the contextual issues; (3) complete the contextual issues; (4) to compare and discuss the students' answers; and (5) concluded. The problem of this research is how the implementation of PMR on the subject of addition and subtraction of fractions can improve the activity and learning outcomes in grade V SDN Sukosari 01 Bondowoso 2016/2017 school year ?. How can increase students' learning activities on the subject of addition and subtraction of fractions through PMR in class V SDN Sukosari 01 Bondowoso 2016/2017 school year ?. As well, how improving student learning outcomes on the subject of addition and subtraction of fractions through PMR in class V SDN Sukosari 01 Bondowoso 2016/2017 school year?

II. METHODOLOGY

Type of research used in this research is a classroom action research. According Trianto PTK derived from the English term Classroom Action Research, which means that research is conducted on a class to find due to the actions implemented in a subject of research in the classroom. More broadly classroom action research interpreted as research-oriented application of the measures with the aim of improving the quality or solving problems in a group of subjects studied and observed the level of success or as a result of his actions, and then given further action that is improvement measures or adjustments to the conditions and situations that result better.

Place of execution of this research is in SDN Sukosari 01 Bondowoso in the second semester of the school year 2016/2017. The subject of this research is a fifth grade students numbering 35 students, comprising 16 girls and 19 boys. Phase of the study of mathematics by PMR on the subject of addition and subtraction of fractions include: 1) the delivery of contextual issues that teachers in the students; 2) The teacher tells the purpose of learning; 3) The teacher gives an explanation regarding the material addition and subtraction of fractions using shading card media; 4) teachers form students in small groups; 5) students complete contextual issues with members of the group; 6) students presented the group's work in front of the class; 6) the teacher asks students to make conclusions.

Data collection methods used in this study is the method of observation, interviews, tests, questionnaires and documentation. Here is a data analysis technique used in this study.

1) Analysis of the percentage of students learning activities can be done by analyzing the student's final test results after the implementation of PMR cycle. The data analysis of student learning activities can be done using the following formula.

$$Pa = A/N \times 100\%$$

Description:

Pa = activity of student learning

A = Number of scores achieved

N the maximum score of = Number of

Student activity classification criteria have been modified from Masyhud, can be seen in Table 1 below

Table 1. Criteria Activities Student

Activities Student Criteria	SpanningPercent
Very Good	$80\% \le P_A \le 100\%$
Good	$60\% \le P_a < 80\%$
Adequate	$40\% \le P_a < 60\%$
Less	$20\% \le P_a < 40\%$
Very Less	$0\% \le P_a < 20\%$

2) Analysis of student learning outcomes can be done using the formula average student learning outcomes in classical as follows.

$$E = n/N \times 100\%$$

Description:

E = Percentage of mastery learning

n = number of students who pass the study

N = The total number of

Students criteria for student learning outcomes can be seen in table 2 below.

Table 2. Criteria for Student Learning Outcomes

Learning Outcomes Criteria	The range of percentages
Very Good	$80\% \le E \le 100\%$
Good	$70\% \le E < 80\%$
Pretty Good	$60\% \le E < 70\%$
Not Good	$40\% \le E < 60\%$
Very Poor Good	$0\% \le E < 40\%$

3) Analysis of the result data questionnaire can be done using the percentage of student responses.

Percentage of Students Response = $A/B \times 100\%$

Remarks:

A = The proportion of students who choose

B = Number of students (respondents)

III. RESULTS AND DISCUSSION

Based on data analysis that has been done towards the end of the cycle test results of students, student learning activity data obtained after the implementation of PMR on a material addition and subtraction of fractions. The results of the analysis of student learning activities in the first cycle showed an increase in each of these aspects of the observed indicators 1 meeting to meeting 2. The average percentage of learning activity at the first meeting of 58.42% increase to 67.42% in the second meeting, thus obtained an average percentage of student learning activities in the first cycle is equal to 62.92%. These results show that the classical students are in the active category. Lowest activity indicator percentage of students in the first cycle is explained the problem contextual activities, while the highest rate of activity to compare and discuss answers (a class presentation). In the second cycle the results of student learning activities has increased, whereas in the first meeting, the average percentage of students' learning activities stood at 74.14%, and increased to 80.28% at the meeting 2. Then when seen average percentage of activity results learn a whole in cycle 2 then obtained a figure of 77.42% which indicates that classically categorized students actively engaged in learning with the adoption of PMR in the second cycle. The percentage of students learning activity results in the first cycle and the second cycle will be described in Figure 1 below.
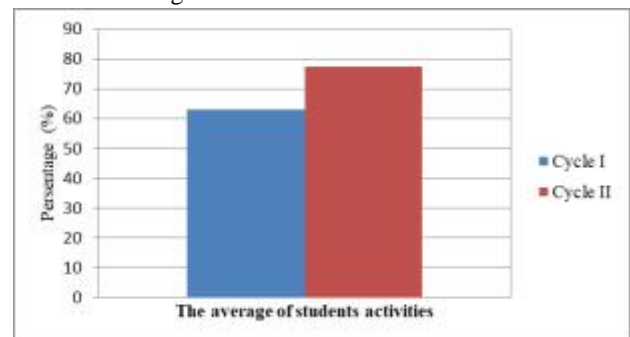

Fig.1: Diagram Percentage of Average Student Learning Activities Cycle I and Cycle II

Application PMR addition to improving student learning activities, also can improve student learning outcomes. It is evident after analysis of student learning outcomes in the first cycle, students who earn grades of learning outcomes with very good criteria is 14 students (40%), while students who get good grades criteria are as many as 5 students (14.28%), furthermore as much as 8 students (22.85%) to get the value of learning outcomes with sufficient criteria, as many as 2 students (5.71%) to get the value of learning outcomes with less criteria, and 6 students (17.14%) to get the value of learning outcomes criteria very poorly. An average score of 35 student

learning outcomes in attendance to follow the achievement test in the first cycle is at 65.11, so it belong to the criteria quite well. These results increased in the second cycle, the students who belong to the criteria very well be as many as 19 students (54.28%), students who belong to both criteria as much as 4 students (11.43%), students who belong to the sufficient criteria well as 6 students (17.14%), students who belong to the less good criteria by 1 students (2.87%), and students who belong to the very unfavorable criteria as much as 5 students (14.28%). Based on data from the value of student learning outcomes, it can be calculated the average student learning outcomes in the classical style, ie in the first cycle an average score of student learning outcomes is 65.11, increasing to 75.54 in the second cycle.
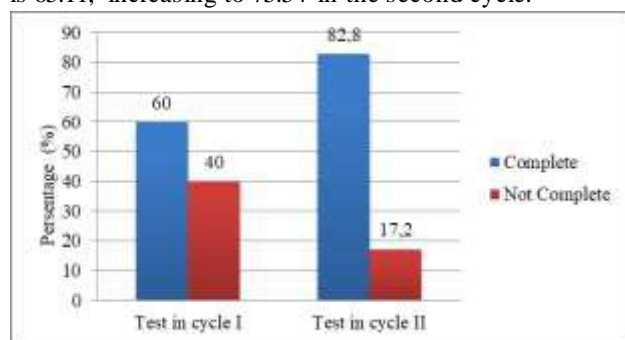

Fig.2: Diagram Percentage of Average Student Learning Outcomes in Cycle I and Cycle II

Based on data analysis activities and student learning outcomes before action or pre-cycle, it can be seen that the value of the activity and student learning outcomes that are in the low criteria. The low activity and student learning outcomes is because learning occurs in the classroom yet many students actively involved in their activities, resulting in students having difficulty in understanding the subject matter. Therefore, adoption of PMR is considered to increase the activity of learning and can improve student learning outcomes in the material addition and subtraction of fractions. This can be evidenced at the time of the study with the implementation of PMR, students are able to participate actively during the learning of mathematics in progress. In addition, the implementation of PMR in mathematics learning can help students in constructing mathematical knowledge independently through progressive that teachers using shading card as a medium of learning. PMR students' response to the application is considered very good when viewed from the focus groups indicate the overall statement has the percentage of respondents above 80%. This means that most students feel the learning of mathematics by PMR is able to help students understand the subject matter presented teacher, also

makes students become more active and confident in the learning process.

Application of PMR in the first cycle and the second cycle was successful, where each step or stage of this model can be done well in the classroom, but in practice there are several obstacles that occur, such as there are five students who still get the value of learning outcomes by criteria very poorly. This is because some students will have math skills below the average, and they are very low numeracy. That's what causes the learning outcomes of the fifth student is not increased from the first cycle to the second cycle. Later, some students still have difficulty in working on a visual form (picture). Most of these students work with one step, so that things which cause students to be wrong in answering. Problems or obstacles which will serve as a reflection of the implementation of the first cycle, resulting in the implementation of the second cycle of learning teachers provide instruction execution clearer on the students so that students become better understood. Thus as has been explained earlier that the implementation of PMR can increase the activity of class V student learning outcomes SDN Sukosari 01 Bondowoso on the subject of addition and subtraction of fractions. Based on the data obtained, the average score of the percentage of students in the classical learning activities in the first cycle was 62.92% and then increased to 77.42% with good criteria, then the learning outcomes of students in the first cycle showed an average of 65.11 that included in the criteria fairly and then increased in the second cycle into 75.54 by both criteria.

IV.   CONCLUSION

Based on the results and discussion of the actions taken in the fifth grade math learning the subject of addition and subtraction of fractions, it can be concluded that the implementation of PMR can increase the activity and student learning outcomes. It can be seen from the average percentage of students in the classical learning activities in the first cycle indicates the number 62.92%, then the average has increased to 77.42% in the second cycle with both criteria. Application of this PMR, also improving student learning outcomes, where the average student learning outcomes in the classical style in the first cycle was 65.11, then on the second cycle increased to 75.54 with both criteria.

Suggestions that need to be considered through the results of this study are teachers and researchers need to prepare all the needs of learning very well, doing specific guidance to improve the numeracy skills of students who are at the level of ability is very less. Teachers also need to provide an explanation or instruction workmanship matter clearly to students and

ensure every student understand the procedure is about the form of a picture (visual) in LKS.

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