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Improvement of Student Learning Activities and Mathematic Communication Skills with Realistic Mathematics Education (RME) Approaches in Class IV Students at SD Negeri 02 Supayang

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Abstract:
This study aims to improve students' learning activities and mathematical communication skills with the Realistic Mathematics Education (RME) approach for fourth grade students of SD Negeri 02 Supayang. The research is a classroom action research conducted in class IV SD Negeri 02 Supayang with 21 students. The instrument used to collect data consisted of observation sheets, documentation, and test questions. The results showed that the RME approach could increase students' learning activities in which it reached 75.40% in the first cycle to 87.22% in the second cycle. Furthermore, students' mathematical communication skills using RME increased from 52.38% in the first cycle to 71.43% in the second cycle.

Keywords: *Learning activities, mathematical communication skills, realistic mathematic education*

1. Introduction

Mathematics is one of studies in the Indonesian curriculum that learn by every level of education ranging from elementary schools, secondary schools, to universities. Mathematics is important subject for every student in school because their daily activities inseparable with mathematics. Therefore, in the process of learning mathematics there is a need for learning activities that can lead students to understand the concept of learning so that it becomes more meaningful.

Learning activities will be created if in the learning process there is good communication between students and students and between students and teachers. That means communication skills is needed. mathematical communication skills is students' ability to convey their mathematical ideas through mathematical symbols, pictures, diagrams, tables, make reasoning on images in the form of mathematical models, and write information found in mathematical language. . [8], [17], [24]. The role of mathematical communication skills in learning mathematics is to make students able to construct the knowledge that they have. Making the students are able to solve mathematical problems, and confident in conveying mathematical ideas or ideas that they have. [15], [19], [23].

Mathematical communication skills as mentioned above can be realized if students are directly involved in every learning activity, in other words learning is not only centered on the teacher. The teacher have to act as a facilitator and motivator that means the teacher should be able to guide and motivate students to formulate ideas or ideas that they have using tangible (concrete) tools that are close to students' daily lives, so students can easily imagine what mathematical concepts can be found through these teaching aids . [2], [20], [22], [25]

Learning that is closer to real situations or that is close to students can create learning activities that are interesting and fun because students can adjust or can interact directly with the learning situation [18]. So that in that learning students will be provoked to think creatively based on the knowledge they have, students will be able to think for themselves if the opportunity to do it is given to them [3].

The implementation of mathematics learning as described above is still in contrast to the current implementation of mathematics learning. The learning the method used by the teacher is still dominated by the lecture method. Teacher writes the learning steps on the board, after that students are expected to understand, thenthe students are given the practice questions that are done as exemplified by the teacher. So students do not have the opportunity to develop ideas or mathematical ideas based on the knowledge they have, students tend to accept and listen to what is explained by the teacher. For students who have high level students conditions like this may not be a problem but for low level students it is not become a meaningful learning experience for students. So that when given a math test questions students they got

minimum standards. This can be seen in the results of mathematics tests both daily tests, end of semester tests and even the national mathematics test as found by previous researchers [27].

Researchers as well as teacher at SD Negeri 02 Supayang also feel this condition. The teacher is more active than students, teachers explain more steps in solving mathematical problems compared to students who find themselves based on the knowledge they have. So, students remember more than they try. Conditions of learning mathematics like this make students get bored quickly in learning, so students often ask permission to leave the classroom with the reason to go to the toilet even though students are lazy to follow the lesson. Although there are people who understand the material presented, but only a few people. While other students showed lethargic faces and were not enthusiastic in learning because they were confused about how to solve the given problems, so they assumed that mathematics was a difficult subject.

Based on this situation it motivate us as researchers to make improvements in the way of learning mathematics by applying a learning approach that can make students active, creative and fun while at the same time improving students' mathematical communication skills. As has been done by previous researchers [6], [9], [29] that one of the approaches that can be used is Realistic Mathematics Education (RME).

RME is a learning approach that can make students active, creative and fun because learning begins with contextual problems or problems that are close to students' daily lives. [32] In solving these contextual problems the teacher as a facilitator guides student to find and use mathematical ideas based on their initial knowledge or better known as informal ideas [4], [11], [26], [27]. In solving mathematical problems, students are guided to conduct discussions with other students so students can exchange opinions or ideas in the context of discovering mathematical concepts. In addition, discussion activities also lead students to demonstrate mathematical communication skills including the presence of confidence to convey their ideas. [5]

The application of RME in mathematics learning has several characteristics namely; (1) The use of contextual problems; (2) Use of the model for mathematization; (3) utilization of the results of student contributions; (4) interactive learning; (5) linkages with other topics [7], [31], [24, [12]].

Besides having characteristics, RME also has principles in its application so that the learning process continues optimally. These principles are; (1) Guided rediscovery means that through mathematical topics students are given the opportunity to solve contextual questions in various ways based on their knowledge until students discover their own mathematical concepts learned; (2) Didactic phenomena, namely the topics taught should be related to daily life. (3) Modeling (emerging models) namely in solving contextual problems students are guided to develop their own models based on informal ideas they have. [10], [14], [13], [31].

The use of the RME approach in learning mathematics will not mean anything, if you only rely on student activities without the skills and readiness of the teacher as a facilitator [1]. Therefore, before learning by using the RME approach, the teacher must prepare a lesson plan, determine contextual problems related to the mathematical material to be taught and prepare teaching aids that are close to students' daily lives.

1.1. Research Methods

The type of research used is Classroom Action Research. Classroom Action Research (CAR) is research conducted by teachers in the classroom through self-reflection, with the aim of improving performance as a teacher, so that student-learning outcomes become more improved [30]. In this case, the researchers collaborated with the fifth grade teacher at SD Negeri 02 Supayang to conduct action research activities on learning mathematics at school. The subjects in this study were the fourth grade students of SD Negeri 02 Supayang 2018/2019 Academic Year, amounting to 21 people. The instrument used in this study was the observation sheet, documentation during the study and the cycle test carried out twice.

1.2. Results and Discussion

This action research was conducted to answer the questions in the formulation of the research problem, namely: (1) How to increase student learning activities with the RME approach in grade IV SD Negeri 02 Supayang; (2) How to improve students' mathematical communication skills with the RME approach in class IV SD Negeri 02 Supayang for the 2018/2019 Academic Year.

Based on the analysis of research data in this action research, the following discussion is needed to answer the two research problem formulations.

2. The Improvement of Student Learning Activities with RME

Student learning activities in the first cycle begins by giving contextual problems to students as characteristic of the RME. At this stage students are invited to observe objects, pictures or other props that are close to the daily lives of students as has been done by previous researchers [21] Based on these observations students develop mathematical models based on their initial knowledge. After developing a mathematical model, students discuss mathematical models created with other students to find the mathematical concepts being studied. Based on the results of observations of student activities in this first cycle there are still many students who do not attend the lessons enthusiastically. For example, when a teacher shows a teaching aid that not all students pay attention to the teacher's explanation, there are still students who are preoccupied with their own work. Likewise in writing ideas or mathematical ideas, not all students want to make them. In the discussion activities are still dominated by smart students so that other students are just silent

and not confident in expressing opinions. Likewise in answering questions there are still many students who are shy to answer because they are fear to give wrong answer. This situation was also found by previous researchers [31].
Based on the analysis of observations of student learning activities, it is known that in the first cycle of mathematics learning activities, students have not yet reached the established criteria. After determining the percentage of student learning activities as much as five meetings and averaged, the learning activities of new students reached a level of 75.40% with sufficient criteria. Meanwhile, according to [28] learning is said to be successful if the student's mathematics learning activity is at least "good".

The first cycle found that the causes of the mathematics learning activity criteria that have not been achieved. They are (1) the teacher in explaining teaching aids is only fixed in front of the class so that there are students who are not noticed by the teacher when the teacher explains the learning. (2) In guiding students the teacher only explains in front of the class without visiting each group of students so that not all students participate in group work. (3) as well as in discussions teachers rarely give praise that is useful to provoke student confidence so that students are less motivated to conduct discussions. By not achieving the criteria for student learning activities in the first cycle, the study continued to cycle II.

Based on the results of reflection in cycle I, In order to improve student-learning activities, it is necessary to improve learning in cycle II, especially using the RME approach. Some efforts made by the teacher are (1) a well prepare learning plan, (2) determine contextual problems that are more interesting to students, (3) guide students in developing mathematical models directly to each group of students, (4) give praise to students who dare to express opinions and want to answer questions in discussion activities.

After analyzing the results of observations in the second cycle with four meetings, it can be explained that the learning activities of students in the context of contextual problem solving have shown improvement. This can be seen from the level of student attention to the teacher's explanation in problem solving has increased even though there are still not paying attention but only a few people. Likewise in the development of mathematical models students are guided by the teacher to each group and given the opportunity to write down their ideas as previously done by researchers [16]. So, most students are willing to write their ideas. In the discussion activities as a form of student contributions and creating interactive learning, many students are confident in expressing their opinions and dare to answer questions both posed by friends and by the teacher.

Based on the analysis of the results of observations of student learning activities it is known that in cycle II with four meetings obtained an average student learning activity that is 87.02%. Thus, an increase in student mathematics learning activities from 75.40% in the first cycle to 87.02% in the second cycle so that the success criteria for learning activities have been reached.
The description of increasing student-learning activities in the first cycle to second cycle is presented in the figure 1.

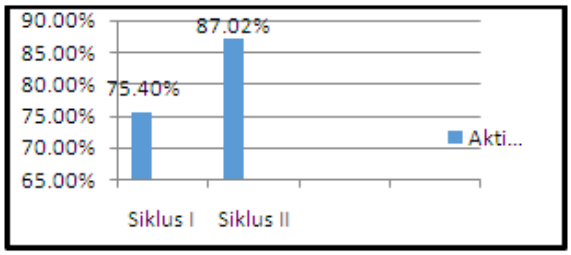

Figure 1: The Improvement of Student Learning Activities Cycle I-II

2. The improvement of Student' Mathematical Communication Ability with RME

Based on students' mathematical communication test results in the first cycle, the data obtained for indicator 1, namely connecting real objects, pictures, and diagrams into mathematical ideas. Students are given problems in the form of bar charts about results of sale fruits that are known by students in their everyday life, based on these diagrams students do the problem solving in the diagram based on their ideas. After evaluating the students' answers turns out, there are students who do not understand how to solve them, so they only repeat writing questions on the answer sheet. Being averaged classically, the level of mathematical communication skills of students for indicator 1 is 72.62. These results are not too low but need to be increased. Especially for students who have not been able to make a solution to the given problem. For indicator 2, namely explaining mathematical ideas with pictures, tables or diagrams, students are given a problem that is compiling random data into tabular form. In answering the question about indicator 2 there are students who are wrong in compiling data so that the arrangement of data in tabular form is not correct. For this indicator 2 the results of students' mathematical communication skills are classically 79.76.This result are not too low. For indicator 3, which is expressing everyday events in mathematical language. Questions given to students relate to the list of items. Students solve problems in the form of their mathematical language. After evaluating the students' answers for indicator 3, many students got score below 3, some of them get score 0 because these students did not write their answers to the problem. After averaged classically the level of mathematical communication skills of students only 45.24. This means students ability for indicator 3 is still low. For indicator 4, namely writing mathematical solutions students are given questions in the form of contextual question, students are asked to complete data that are still empty, in solving these problems students are asked to write the mathematical form. The results of student answers to the question indicator 4

found that student acquisition scores are mostly under 3 and some are not answering. After analyzing individually the results of students' mathematical communication skills with 4 indicators, the students who are able to get a score of ≥ 70 are only 11 people (52.38%). these results indicate that students' mathematical communication skills in the first cycle are still low so it needs to be improved again in the next cycle.

Based on the analysis of test results in the first cycle where the mathematical communication skills of students are still low, the research continues to the second cycle. The research step in the second cycle to increase the ability of mathematical communication is still the same as the steps in the first cycle by providing test questions with four indicators. In cycle II the topic of mathematics is related to angle measurement. For indicator 1, students are presented with an image of one of the angular shapes in a location. Then students are asked to take measurements of the angle image. Students write the measurement results on the answer sheet. Based on the results of students' answers to the problem indicator 1 in a classical level the ability of students to connect images into mathematical ideas obtained an average of 75.00, this result shows an increase compared with cycle I. For indicator 2 students are given problems related to the angle and then students are asked to draw shape the angle using a protractor. To draw angular shapes most students are able to draw it correctly even though there are still some people who have not been able to draw correctly. Classically student scores after averaged for indicator 2 obtained 80.95 this result shows a good improvement of cycle I. For indicator 3 questions given to students related to the plane of the student determine the number of angles that exist on the plane. Students write their understanding in mathematical language on the answer sheet. After evaluating, the results for classical indicator 3 were 72, 62 these results also showed an increase from cycle I. For indicator 4, students presented irregular rectangular images and then students determined the unknown angles of the images. Without taking measurements on the picture the student writes a mathematical form to solve the problem based on the knowledge they have. After evaluating the 4 indicator questions, the students' average score is 66.67, this result also shows an improvement from cycle I. For the mathematical communication skills of individual students from the four indicators in the second cycle it is known that students who achieved a value of ≥ 70 have increased from the first cycle to 15 people (71.43%).

Based on the results of the analysis of students 'mathematical communication skills tests in the first cycle and second cycle it is known that there is an increase in students' mathematical communication skills from 52.38% in the first cycle to 71.43% in the second cycle. So the increment from cycle I to cycle II is 19.05%. Thus, the RME approach can improve students' mathematical communication skills.

An illustration of the improvement in each indicator of students' mathematical communication abilities classically from cycle I to cycle II is presented with the figure 2;

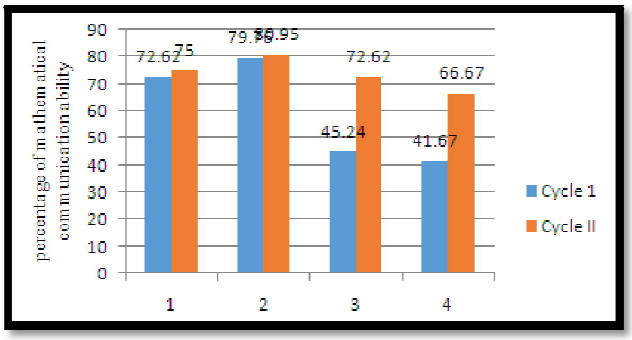

Figure 2: The Improvement of Mathematics Communication Abilty of Cycle I and Cycle II

3. Conclusion

The conclusions from the results of this study are:

- Student learning activities increased by 11.62% from cycle I to cycle II, where the achievements of student learning activities in cycle I with five meetings averaged 75.40% and increased in cycle II with four meetings obtained average 87.02%. Thus Realistic Mathematics Education (RME) can increase learning activities of students in grade IV SD Negeri 02 Supayang with good categories.
- Students' mathematical communication skills have increased by 19.05% from cycle I to cycle II, where the mathematical communication skills of students in cycle I amounted to 52.38% and increased in cycle II which was 71.43%. Thus the application of Realistic Mathematics Education (RME) can improve the mathematical communication skills of class IV SD Negeri 02 Supayang students.

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