JPSD Vol. 7 No. 2, September 2021
ISSN 2540-9093
E-ISSN 2503-0558

IMPROVING STUDENT'S LEARNING OUTCOMES ON THE MULTIPLICATION CONCEPT OF WHOLE NUMBERS USING REALISTIC MATHEMATICS EDUCATION METHOD

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Article Info

History:
Submitted
March 3th, 2021

Revised
August 9th, 2021

Accepted
September 10th, 2021

Abstract

The research background is due to problems regarding multiplication. Considering that multiplication is an important and useful material for life, based on that, the researchers are interested in doing that research. This research was conducted in Mathematics learning at SDN Cibodas 2, with 30 students consisting of 16 boys students and 14 girls students. This research used the realistic mathematics education (RME) approach. The data collection in this research is by applying tests and observations. From the analysis results that have been carried out, it can be concluded that the learning using the RME approach shows a better improvement. This can be seen from the average score of students' learning activities and mathematics learning outcomes which have increased. The average score of students' learning activities has increased in each cycle. In the first cycle, the average score was 1.8 or 45%, in the second cycle, the average score was 2.7 or 67%, and in the third cycle, the average score was 3.2 or 80%. While the average score of students' mathematics learning outcomes in the pre-cycle is only 54, in the first cycle increased to 62, in the second cycle is 66, and in the third cycle is 78.

Keywords: *Learning Outcomes; Whole Numbers; RME*

A. Introduction

Mathematics is one of the subjects taught to students. The term of mathematics comes from the Greek "*mathein*" or "*mathenein*" which means to learn/study (to think). The word mathematics in English origin comes from "*mathema*" which means knowledge/science. Mathematics is very important to be taught because it links with other subjects and is also applied in everyday life. According to Anti Pitra, et al (2018) Mathematics learning is a teaching and learning process that contains inseparable two types of activities. That activity is teaching and learning. Therefore, mathematical ability is must be owned absolutely by every student. Mathematics teaching is required to always adapt to the progress of the times. For this reason, the mathematics teaching curriculum has changed with the 2013 Curriculum. With these curriculum changes, it is expected that students can better understand the mathematical concepts, especially the basic mathematics material. The theory of learning in mathematics learning is very important, so the learning methods should be adapted to the learning theory. Some of the existing learning theory opinions are applied in elementary mathematics assignments (Saleh M: 2012)

But in reality, the conditions in the field are not always in accordance with the desired expectations in mathematics learning. Based on an interview conducted at SDN Cibodas 2 in August 2020, with one of the teachers, it turned out that there were still students who did not understand the mathematical concepts, especially the multiplication of whole numbers. This proves that students have difficulties in doing the operations of whole numbers multiplication.

This is very unfortunate because considering that the material presented is much related to everyday life, besides that multiplication operations are also the basic ability that should be possessed by students. Basic ability is very supportive for the next stage of learning. If students are left offhanded, they will have difficulties when they receive the next material. Students' difficulties in solving multiplication problems can be caused by many things, one of which is the way of conveying the material is still traditional. In teaching, the teacher only lectures, or the learning is dominated by the teacher and taking notes of what is on the board about the material being taught, while students only act as listeners. They just listen, take notes, and memorize them, without being involved during the

learning process. Whereas, good learning is involving students so they can be active, not passive.

According to the survey results conducted in June 2020 at SDN Cibodas 2, Banjar District, there are 3 consequences that caused the learning of the multiplication concept of whole numbers to be hampered, namely: 1) the students' learning motivation of the multiplication concept of whole numbers is low, 2) students' attention and enthusiasm for mathematics material on the multiplication concept of whole numbers is low, 3) the active participation of students is low. These three obstacles have resulted in the acquisition of the low students' scores on the multiplication concept of whole numbers.

Learning activities at SDN Cibodas 2, Banjar District, in general, are still traditional, that the teacher just explains the concept, provides material, then after that, the children do the exercises. Children do not have more opportunities to be able to develop their reasoning and communicate their ideas. With such a learning process, many students cannot apply mathematical skills to the problems to be solved. Ujang Jamaludin, et al (2017) explained that as a supporter of the success of teaching and learning activities, teachers should be able to apply the learning media in accordance with the learning material. The use of learning media used should be in accordance with the learning objectives and the learning materials content as a way to facilitate the teacher when conveying the material in the book to all students, with the hope that students can get good learning outcomes.

The author wants to try using the Realistic Mathematics Education method in mathematics learning with the hope that the teacher is able to arouse students' enthusiasm in learning. Farida (2019) Realistic Mathematics Education (RME) learning also implies the existence of patterns or steps in the use of mathematical models. This method can be used as a learning innovation, so in the teaching and learning process, there are new variations so the children will not feel bored. Farida Soraya, et al (2018) argue that creative thinking is one of the most important abilities to be able to solve problems that will later be obtained by students, especially during the learning process, so it expands knowledge in finding new ideas. When the child feels comfortable with his teaching, the child will also like the lesson, so there is no longer impression that mathematics is something scary.

In the application of the Realistic Mathematics Education method in the teaching and learning process, it is expected that there will be significant changes in students' learning outcomes. Where the

students can more easily understand the subject material explained through the RME method because through this method students can learn something from what they have experienced. RME brings students to the real world from everyday experiences, so the lessons learned in math classes are not separated from the real world (Tasya AR. et al :2019).

Learning activities are the interaction activities between students, teachers, and the learning resources (books). Learning is given to students as a means by teachers, so the students can understand the material or science, and have a high motivation as forming attitudes and students' self-confidence. Gagne & Briggs, 1979 (http//krisna1.bloguns.ac.id) expressed that learning is a system that aims to assist the student learning process, which contains a series of events that are designed and arranged in such a way as to influence and support the occurrence of internal student learning processes.

According to Piaget (Kusnandar, 2010), the uniqueness and characteristics of elementary school-age children's learning activities prioritize a unique way for a teacher to encourage the learning process for them. Teachers can form a learning atmosphere with experimental situations, by forming a learning environment where the teacher provides facilities for student findings. The teacher only provides motivation, observation as an effort to encourage children's growth and development.

The characteristics of children in mathematics learning are when they solve problems they will be happy together. From these joint activities, they learn many important things in the study, such as respecting the opinions of friends, not being dependent on others, having a sense of responsibility for what they did, learning to compete in a healthy or sporting manner. For this reason, teachers need to design learning models that can make students work or study in groups. Learning activities that teachers can do are by forming small groups of 4-5 students, and then they are asked to complete the tasks given by the teacher.

About the characteristics according to Sutarya (2017) Characteristics of students in the age range of students who are between 9-11. At this stage, students have started to use clear and logical rules, their logical thinking skills are limited to concrete objects, classifying, grouping, and setting the problems.

In learning conduction, the right approach is needed, because the right approach can ease to achieve the expected goals. An approach is said to be appropriate

if it produces something that is expected or can be said that the expected goal is achieved. The approach used should be adapted to the material and the thinking development stage of elementary school children. Because children's ways of thinking are still not complex, different from adults' ways of thinking.

As an effort to improve student's learning outcomes, one of them is by applying learning with the RME model. According to Artika, et al (2019) learning using the RME model is that students should be given the opportunity to reinvent the mathematical concepts with adult guidance. In line with the opinion of Eti Herawati (2017) the student's success in learning depends on how to present the learning materials, learning media, and teaching methods used by teachers in the teaching and learning process. The RME approach can encourage students in active learning activities when they find the concept of teaching materials with teacher guidance (Silvia Dani, dkk: 2017). Apart from that, according to (Mashudi: 2016) Realistic Mathematics Education (RME) is one approach to mathematics learning oriented towards the mathematization of everyday experiences and applying it in everyday life. According to Sembiring in (Iwan Junaedi, M. Asikin, and Masrukan: 2015), Real-world realistic mathematics is used as a starting point to the development of mathematical ideas and concepts. Learning is departed from the surrounding life, which can be easily understood by students, real, affordable by their imagination, and imaginable, so it is easy for them to find the possible solutions using their owned mathematics abilities. It is expected that mathematics learning by prioritizing the realistic conditions can help students in processing the mathematical knowledge construction by the students themselves. So it can be said that the formation of a new concept is built from what they know or are familiar with.

Realistic Mathematics Education (RME) is a form of learning model in conveying the mathematics materials. RME learning was first carried out by the Netherlands in the 1970s by the Freudenthal institute. The theory explains that mathematics learning is associated with real things and mathematics cannot be separated from human activities. This proves that mathematics learning should be very close to children and refers to the activities carried out in real everyday life. Mathematics is a part of human daily activities, so it is necessary to be given the opportunity to find new things such as mathematical ideas or concepts with adults' guidance. According to

Sri S.M (2019) Problem-solving is also seen as the intellectual activity to find the encountered solutions to problems by using the knowledge they have. This means that in mathematics learning, students are not fully given ready-made concepts and then memorize them, but search for their own concepts, of course under the teacher's guidance. As the opinion of Emmi Susiyanti (2017) that students gain the experience that can form strong memories, students avoided the mistakes in taking a conclusion. In addition, it needs the teacher's knowledge in responding to the various differences in the characteristics of students' ways of learning, as stated by Geri Syahril Sidik (2016) that teacher should understand the differences of every individual student, in order to be able to serve education in accordance with these differences. Students will develop according to their respective abilities.

The action hypothesis is the temporary answer given in the research related to the problem or issue that will be scientifically tested. The hypothesis testing is based on empirical data and obtained from the research results.

Based on this, the researchers formulate an action hypothesis that “if you use the RME approach, the mathematics learning outcomes on the multiplication concept of whole numbers will improve”.

B. Research Methodology

This research was conducted at SDN Cibodas 2, Banjar District, Pandeglang Regency in the 6th grade students with a total of 30 students, consisting of 16 boys students and 14 girls students. In carrying out this research, the researchers used classroom action research which is a form of reflective study. Classroom action research can be defined as classroom action research conducted by teachers who in this case are the researchers in their class and collaborate with others or collaborate in research activities that design, implement, and reflect the collaborative and participatory actions, which aim to increase and improve the quality of the learning process in the classroom through a certain action (treatment) in a cycle. The main purpose of CAR is to solve the real problems that occur in the classroom and improve the teachers' real activities in their profession’s development activities (Kunandar, 2008).

According to Nurhaeni (2018) Classroom action research (CAR) is a type of research that is taken in this research because it prioritizes the efforts to increase and improve the learning quality held in the classroom. Briefly, the Classroom Action

Research (CAR) can be defined as a form of reflective research by taking certain actions in order to improve and or increase the learning practices in the classroom more operationally.

In this research, the researchers used a Classroom Action Research (CAR) design. The researchers' reason uses the CAR method is that action research is conducted with the aim to improve the quality of learning practices in the classroom (Arikunto, 2006). This is in accordance with the CAR model used is the model of Suharsimi Arikunto's. Suharsimi Arikunto's Classroom Action Research Model consists of four components namely, planning, action, observation, and reflection.

Research technique is a way to collect the data needed in research. After the required data is obtained, the next step is to process the data. The data collection technique used in this research was an assessment instrument. The research instruments applied in this research were tests and observations.

The test is a systematic and objective tool or procedure to obtain the desired data or information about a person in a way that can be said to be precise and fast. Amir Daien Indrakusuma (Suharsimi.A, 2007). The test given is in the form of a written test (test sheet), with the aim to obtain data on mathematics learning outcomes obtained by students in the concept of multiplication.

Besides that, observation is a technique carried out by conducting careful observations and noting systematically (Suharsimi.A, 2007). Observation is a direct observation towards the students by paying attention to their behavior (Slameto, 1988). Briefly, observation can be interpreted as an activity to observe or pay attention to the behavior of a person or group.

From the results of conducted research activities, the researchers obtain the data that still needs to be analyzed in order to get information from these data.. Thus, the research instrument is an assistive tool in obtaining data from the research activities. According to K.R Aprilistiandita, and M.R Florean (2020) the intention of the instruments or research tools in quantitative research is the results of all forms that have been given in the form of scores obtained at the end of a research.

The activity of analyzing data is conducted at the reflection time from each cycle of classroom action research. It is recommended that when analyzing research data, the researchers must apply qualitative analysis in the form of application analysis of interactive analysis techniques developed by Miles and Huberman, 1984 (Kunandar, 2008). The interactive analysis consists of

three components of interrelated activities, namely data reduction, data display, and drawing conclusions. The intended data reduction is by selecting data, determining data focus, simplifying data, summarizing data, and converting raw data into finished data obtained from observations. In the process, the data analysis is conducted by focusing, eliminating, sharpening, and completing the lacking data and rearranging it in such a way based on the data, so the final conclusions can be drawn and verified. The research's conclusions can be used as the reference of the changes that have occurred during the research, either for improvement on the next research or as the reference for improvement when carrying out the next research activity. The conclusion results at the beginning of the research will be related to the final conclusions of the research, so the differences obtained as a reference for the success or failure of the research.

Student learning outcomes can be seen after the learning evaluation using test instruments and can be linked as the final score whether the students' learning outcomes increase or decrease. Learning should be the changes in all realistic individual behavior as the result of experience from an interaction with the environment and involves cognitive thinking. Students' learning outcomes are the abilities that students have after they receive a learning experience (Sudjana, 2009). Also according to Ayu Restianingrum (2016) Learning outcomes are measured to determine the success of learning, then evaluation is needed.

C. Result and Discussion

In this pre-cycle learning process, the teacher starts to learn by reading prayers and taking attendance, then directs to the material in the book. Students seem to follow the learning process well, but students only listen and take notes to what is taught by the teacher. After the teacher has finished explaining the material, the teacher gives tasks related to the material that has been explained. In working on the questions, there are still many students who have difficulties, they still have to ask about how to solve it to the teacher or peers. From the test results in the pre-cycle, it shows that there are no mathematics learning outcomes that are in line with the expectation. This can be seen from the results obtained by students are still low, which only reaches an average of 54.

From the results of tests and observations that have been conducted in the first cycle, it shows that there are still deficiencies that occur in the learning

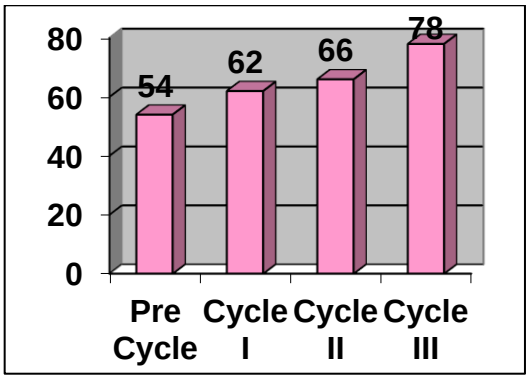
implementation that result in the low students' learning outcomes. This is proven from the students' acquisition scores of the first cycle is still low, which only reaches an average score of 62. Some of the weaknesses that occurred during the first cycle namely, the delivery of material that was too fast that resulted in the lack of students' understanding of the material presented and eventually the mathematics learning outcomes obtained by students were low, the teacher did not motivate students to be active in the learning.

Based on the results of mathematics learning obtained by students in the second cycle, it can be seen that the average score of students' acquisition is 66. This result is better than the test result on the previous cycle. Although there has been an improvement in the average score of students' acquisition, it has not reached the expected result of 70. For this reason, it is necessary to take further actions to achieve the expected results.

Based on the results of mathematics learning obtained by students in the third cycle, it can be seen that the average score of students' acquisition is 78. This result is much better than the previous result. And there has been an improvement, although it has not achieved the perfect results, what has been expected in this research has been achieved, namely the acquisition of an average score of 70. For this reason, the actions taken are only enough in the third cycle of action.

Table 1. Recapitulation of Students' Learning Outcomes

No	Students' Name	Pre-Cycle	Cycle I	Cycle II	Cycle III
1	Maharani	60	70	80	80
2	Dimas	60	40	80	80
3	Sholeh	30	50	40	80
4	Leni	60	70	80	100
5	Mona	40	50	40	50
6	Mira	80	80	100	100
7	Aah	50	60	50	60
8	Sulis	60	60	80	90
9	Irni	40	60	50	70
10	Mia	30	50	50	60
11	Ahmad	60	70	70	90
12	Naura	60	60	50	70
13	Dodi	60	70	60	80
14	Santi	70	80	80	80
15	Ihsan	50	60	70	(3)
16	Thoha	40	40	60	70
17	Dade	40	50	60	60
18	Sifa	40	60	(3)	70
19	Seidi	60	50	60	80
20	Rahmi	80	(3)	90	80
21	Atikah	50	60	40	70
22	Hasbi	50	60	50	70
23	Tb. Alawi	80	90	90	100
24	Anita	70	80	80	100
25	Aqiel	60	60	80	90
26	Marwati	60	60	70	80
27	Alifan	40	60	50	80
28	Malika	30	50	70	80
29	Lala	60	60	90	80
30	Anshori	40	60	60	80
Total		**1610**	**870**	**1970**	**2330**
Average		**54**	**62**	**66**	**78**



Picture 1. Recapitulation of Mathematics Learning Outcomes

Based on the research results that have been obtained from the first to the third cycle, shows that there is a fairly good improvement in mathematics learning using the RME approach. This can be seen from the acquisition of the average score of students' learning activities and mathematics learning outcomes obtained by students. The average score of students' learning activities in the first cycle is 1.8 or 45%, in the second cycle 2.7 or 67%, and in the third cycle 3.2 or 80%. This improvement of the activity is because the students have started to know how to learn by applying RME learning, so the students become active. While the average score of mathematics learning outcomes obtained by students during the pre-cycle was 54, the first cycle was 62, the second cycle was 66, and the third cycle was 78. This is because the students can better understand the concept of whole numbers multiplication well, so they can solve the problems given by the teacher.

Asni and Urip (2020) as explained by Freudenthal, the Netherlands in 1971 had gone through a process of testing and research for more than 25 years, Its implementation has proven successful in stimulating reasoning of student learning activities, the Freudenthal Institute developed a theoretical approach to mathematics learning, known as Realistic Mathematics Education (RME). RME combines views on what is mathematics, it must be taught so students are not passive.

Based on the research data, it can be one of the shreds of evidence that the RME approach can improve the students' learning activities and students' learning outcomes in mathematics. Because in the RME approach, the students are given the opportunity to find their own mathematical concepts, of course still under the guidance of adults (teachers), so students do not accept ready-made concepts.

In accordance with the opinion of Ayuk Rismaya Putri and Irul (2019) Learn with Realistic Mathematics Education (RME) approach can facilitate students to gain knowledge, so it will be easy to remember and last much longer because the RME approach are directly related to the real

world, besides of that the students can solve the problems in their own way.

D. Conclusion

Based on the observation results that have been conducted starting from pre-cycle activities to cycle III, the data shows that the average score of mathematics learning outcomes obtained by students has increased quite well if compared to before using the realistic mathematics education (RME) approach. This can be seen from the increasing test results of every cycle, although it has not reached 100%. The average score of mathematics learning outcomes in the pre-cycle only reached 54, but after using the RME approach the average score of mathematics learning outcomes increased. In the first cycle, the average score of learning outcomes was 62, in the second cycle, the average score was 66, and in the third cycle, the average score was 78.

By applying the RME approach, student activity can be increased, students are no longer quiet as the recipients of information but are directly involved in learning, so the learning is not passive and teacher-centered. Because in the realistic approach, students are expected to be able to find their own concepts, of course, under the adult guidance (in this case is the teacher). The RME approach makes the learning activities be more meaningful for students because the students are given the opportunity to develop their prior knowledge and students will experience it themselves to find concepts, not just accept the ready-made concepts.

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