

**Application of Realistic Mathematics Education  
and Classroom Assessment Approach Toward Cuboid Materials  
on The Effectiveness of Learning Outcomes for 5<sup>th</sup> Grade Students**

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**Abstract**

*This thesis discusses the effectiveness of applying the Realistic Mathematics Education (RME) Approach and Classroom Assessment to the learning outcomes of Class V students on cuboids material in MI Miftahul Ulum I and II in the academic year 2019/2020. This study is motivated by the lack of students' understanding of mathematics which is closely related to the real things that are around. From the research that has been carried out regarding the effectiveness of the application of the Realistic Mathematics Education (RME) and Classroom Assessment approach to Mathematics learning outcomes of the subject matter of cuboids material of students in class V MI Miftahul Ulum I and II Honggosoco in the academic year 2019/2020, the research was conducted using the method experiment, and it can be concluded that, based on data analysis and discussion stated earlier in chapter IV and also based on the average test of one party, then the analysis of learning outcomes based on the average difference test of one party is obtained  $t_{count} = 3,832$  dan  $t_{table} = 2,011$ . Because  $t_{count} > t_{table}$ , then it is significant and the proposed hypothesis can be accepted. The average learning outcomes of students given teaching by applying the development of a Realistic Mathematic Education (RME) approach and Classroom Assessment is better at 66.64 compared to the average learning outcomes of students given teaching using conventional learning that is 54.92.*

**Keywords:** *Realistic Mathematics Education (RME), Classroom Assessment, Cuboid Materials*



## **INTRODUCTION**

In essence, education is a learning process as an effort to develop the activities and creativity of students, through interaction and learning experiences (Mulyasa, 2008). To develop students' activities and creativity, educational planning is needed.

Education, of course, cannot be separated from a problem. The problem of education is a problem for everyone from then until now. Trying to educate his children or other children who are submitted to him to be educated. Likewise, the problem of learning and teaching, which can be said to be an act of implementing educational efforts is a problem for everyone (Suryabrata, 2014).

Mathematics is one of the core subjects in almost every level of education in Indonesia. Therefore, mathematics must be understood by everyone, even if only at its basic level. Mathematics is very closely related to human life in society, so it is wrong if there is still an opinion that mathematics has absolutely no benefit in social life (Sinambela, 2017). In terms of education, mathematics also requires a special approach. This approach can be applied in learning activities inside or outside the classroom.

An approach is needed in the implementation of learning because the approach is a starting point or point of view of the learning process which refers to the view of the occurrence of a process that is still very general in nature, in which it accommodates, inspires, strengthens, and provides a basis for learning methods with a certain theoretical scope.

There are many kinds of approaches in education, one of which is a realistic approach. The realistic approach is one of the efforts to improve students' ability to understand mathematics by way of real learning to students by being given tasks that are closer to reality (Komariah, 2007). A popular realistic approach is the realistic mathematical approach. In mathematics, it is known as Realistic Mathematics Education (RME) (Putri, Hasratuddin and Syahputra, 2019).

Realistic Mathematics Education (RME) is a mathematics learning theory developed in the Netherlands by Freudenthal in 1973. According to Freudenthal, mathematics is a human activity (mathematics as a human activity) and must be monitored by reality (Asri and S, 2014). Mathematics is one of the disciplines that can improve thinking and argumentation skills, contribute to solving daily problems and in

the world of work, and provide support in the development of science and technology (Susanto, 2013). Therefore, a realistic approach is deemed appropriate to be applied in mathematics learning. Mathematics learning built by the teacher aims to develop students' creative thinking.

The realistic mathematics education approach provides an opportunity for students to rediscover mathematical ideas and concepts with adult guidance through exploring various situations and real-world problems. The process of developing mathematical concepts and ideas starting from the real world by De Lange is called mathematical concepts and has a schematic model of the learning process. The three main principles in the realistic mathematics education approach (Gravemeijer, 1994): guided discovery and advanced mathematics; didactic phenomenon; independent model development. In RME, learning starts from the contextual problem (real world) for students that emphasize ability, discussion, and provides arguments so students can use mathematics to solve problems with more meaningful processes. Arisetyawan expressed the same that the use of real experiences in students' daily activities will make mathematics learning more meaningful and successful (Arisetyawan *et al.*, 2014). Therefore, it is expected that teachers can design existing learning with the environment to achieve the goals set (Sapta, Hamid and Syahputra, 2014)

As is well known, learning is a process of change, namely changes in behaviour as a result of interaction with the environment to meet their daily needs (Hanafy, 2014). Many things are closely related to studying. Not only that, changes for each individual are also different and cannot be equated. Collaborated class assessment to see and learn students with the RME approach to learning activities. Class assessment is a teacher activity that involves making decisions about the competencies or learning outcomes of students who follow a particular learning process (Hamid, 2011).

Based on this brief explanation, the background of this research is to provide understanding to students that mathematics is a subject that has a close relationship with real and real things, not just memorizing formulas that have been for students known. From this description, the authors are interested in researching with the title "Application of the Realistic Mathematics Education (RME) Approach and Class

Assessment on Cuboids Material on the Effectiveness of the Learning Outcomes of Class V Students of MI Miftahul Ulum I and II".

## **METHOD**

The research technique carried out by researchers is a quantitative approach with experimental methods. It is called quantitative research because the research data is in the form of numbers, and analysis uses statistics (Heryana, 2020). While the experimental method is a method used to find the effect of certain treatments on others under controlled conditions.

In more detail, this research uses the experimental method of True Experimental Design (real experiment), because in this design the researcher can control all external variables that affect the course of the experiment (Prastini and Retnowati, 2014). Thus internal validity (the quality of the research design implementation ) can be high. The main characteristic of true experimental design is that the sample used for experimentation and as a control group is random from a certain population. So the characteristic is that there is a control group, and the sample is chosen randomly. There are two forms of True Experimental Design, namely: Posttest Only Control Design and Pretest Group Design (Sugiono, 2006).

This research was conducted in class V MI Miftahul Ulum I and II, Honggosoco Village, Jekulo-Kudus in the even semester of the 2019/2020 school year. Researchers chose this place as the research subject because of the following: (1) Because the school still lacks creativity in developing completely new learning methods, (2) Mathematics teachers still use conventional learning styles so that it often creates an impression of boredom in children.

This study uses two variables, namely (1) independent variables (independent) and (2) dependent variables (dependent). Independent variable (independent) is a variable that affects or causes changes or the emergence of the dependent variable. In this case, the independent variables are the development of the RME approach and Classroom Assessment. Meanwhile, dependent variables are variables that are influenced or become a result of the independent variables. In this case, the dependent variable is the activeness and learning outcomes of class V students in mathematics at MI Miftahul Ulum I Honggosoco Jekulo Kudus.

The data collection techniques used in this study were documentation techniques and written test results (pretest and posttest) of grade V students of MI Miftahul Ulum I and II Honggosoco, Jekulo-Kudus.

The data analysis method in this research is the analysis of the instrument trial by testing the validity, reliability, difficulty level and distinguishing power. Henceforth, the initial data test was carried out, namely by performing the normality test, homogeneity test, and the two mean similarity test. The final stage analysis was carried out to test the data from the posttest results or daily tests in the quadrilateral learning experiment class and the control class. In this test, the normality and homogeneity test formulas are used as in the early stages. The next stage is a one-sided test. This test is used to test the hypothesis proposed before the study.

The following shows the results of the data analysis:

Table 1. Normality Test Result

No	Grade	Average	$\chi^2_{count}$	$\chi^2_{table}$	Information
1	V MI I	76,04	8,136	11,07	Normal
2	V MI II	73,44	8,909	11,07	Normal

From the table above, it is known that grade V MI I and V MI II are the values of  $\chi^2_{count} < \chi^2_{table}$  so that  $H_0$  is accepted. Therefore, the data in the two classes are normally distributed.

Table 2. Homogeneity Test Result

No	Grade	Average	Variants	$F_{count}$	$F_{table}$
1	V MI I	76,04	28,4567	1,36548	1,98376
2	V MI II	73,44	20,84		

From the table above, it is known that grade V MI I and V MI II have the value of  $F_{count} < F_{table}$ , so that  $H_0$  is accepted. Therefore, the two classes are in a homogeneous or the same state.

The two-mean similarity test is used to determine whether the difference in the mean of the two samples is significant or not. Based on the research data, it was found that the experimental class average (V MI II)  $\bar{x}_1 = 73,44$  and average of control grade (V MI I)  $\bar{x}_2 = 76,04$  with  $n_1 = 25$  and  $n_2 = 25$  obtained  $t_{count} = -1,851$ , with  $\alpha = 5\%$  and  $dk = 48$  obtained  $t_{table} = 2,011$ , with  $\alpha = 5\%$  and  $dk = 25 + 25 - 2 = 48$ . Because  $-t = -2,011 < t_{count} = -1,851 < t = 2,011$ , then there is no significant average difference between the experimental class and the control class.

## **RESULTS AND DISCUSSION**

The first stage is referring to the Early Stage Test Analysis (Pre Test Value). In the early stages of this research, the data used were the Odd Final Semester Assessment (PAS) scores of class V MI Miftahul Ulum I and II Honggosoco students which were used as the basis for conducting research. The initial ability of the class that will be used as the object of research needs to be known whether it departs from the same situation or not. The researcher took the odd PAS value of class V students as the initial data value.

Based on the normality test and the homogeneity test of the data on the initial ability of the experimental class and control class, it was found that the data were normally distributed and homogeneous. It can be said that the conditions of students' initial abilities before being subjected to treatment with the two lessons are the same. Therefore, the two classes deserve to be used as the experimental class and the control class. The results of the similarity test results between the experimental class and the control class showed that at the initial stage the mean scores of the two classes were the same or identical, there was no significant difference.

The second stage is the Final Test Analysis (Post Test Value). This stage is giving treatment to each class, namely the application of the development of the RME approach and Classroom Assessment in the experimental class and conventional learning in the control class by being given the same final test (post-test), namely 15 multiple-choice items. Based on the calculation of research data analysis obtained  $t_{count} = 3,832$  dan  $t_{table} = 2,011$ . Because  $t_{count} > t_{table}$  so  $H_0$  is rejected dan  $H_1$  is accepted. More details can be seen from the average acquisition of experimental class learning outcomes which is higher than the average learning outcomes of the control

class. The experimental class has an average value of 66.64 with the highest score of 87 and the lowest score of 47. While the average value of the control class is 54.92, with the highest score is 73, and the lowest score is 40.

From the description of the results above, it can be concluded that the application of the development of the RME approach and the Classroom Assessment in Mathematics learning in the subject Cuboids materials is effective on the learning outcomes of class V students of MI Miftahul Ulum I and II Honggosoco for the 2019/2020 academic year. So that learning by applying the development of the RME approach and Classroom Assessment in Mathematics learning the subject Cuboids materials can be used as an alternative to improve student learning outcomes.

The research data shows positive results, but in the implementation of learning cuboids material by applying the development of the RME approach and Classroom Assessment there are several drawbacks, including (a) The RME and Classroom Assessment approaches take quite a long time, so it is necessary to allocate appropriate time for learning activities; and (b) If the available tools and materials are incomplete, the learning activities carried out are less effective.

This research refers to Piaget's theory of development. In this theory describes the stages of a person's cognitive development. The stages of a person's cognitive development between birth and adulthood, namely: the sensorimotor stage, preoperational, concrete operations, and formal operations (Hanafi and Sumitro, 2020). The speed of development of each individual is different, and no individual has jumped over either of these stages. Each stage is marked by the emergence of new intellectual abilities that enable people to understand the world in increasingly complex ways.

The cognitive development stage in accordance with this research is at the concrete operation stage, from the age of 7 to 11 years (Juwantara, 2019). That, at that stage, a person begins to be able to think logically and is not limited by the concentricity of problem-solving.

This is meant in terms of cooperation with the study group. Students in this study were SD / MI students (ages 9-11 years), where some of the students had started to be able to organize and learn with everything that was real and had been experienced.

The suitability of research with Piaget's theory of development is in the results of research that show the results of data analysis,  $t_{count} = 3.832$  and  $t_{table} = 2.011$ . Because this shows that there is a significant difference between the learning outcomes of the experimental class and the control class. So it can be interpreted that learning that gets special treatment in accordance with existing learning theories and can apply it well will get good learning outcomes too.

## **CONCLUSION**

From the research that has been carried out regarding the effectiveness of implementing the development of the Realistic Mathematics Education (RME) approach and Classroom Assessment on Mathematics learning outcomes on the cuboids materials subject for class V students of MI Miftahul Ulum I and II Honggosoco for the 2019/2020 academic year, it is concluded that, based on the data analysis and discussion stated earlier in chapter IV and also based on the one-party average test, the analysis of learning outcomes based on the one-party mean difference test was obtained  $t_{count} = 3.832$  and  $t_{table} = 2.011$ . Because  $t_{count} > t_{table}$ , it is significant, and the proposed hypothesis can be accepted. The average learning outcomes of students who were given teaching by applying the development of the Realistic Mathematics Education (RME) approach and Classroom Assessment were better; namely, 66.64 compared to the average value of learning outcomes of students who were given teaching using conventional learning, namely 54.92. Because of the application of the development of the Realistic Mathematics Education (RME) and Classroom Assessment approaches to be effective to apply to the learning outcomes of mathematics Cuboids materials subject of class V MI Miftahul Ulum I and II Honggosoco academic year 2019/2020 because of the compatibility between those who implement tasks with goals to be achieved.

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