

## The Differences of the Student Learning Outcome Using Realistic Mathematics Learning Approaches (PMR) And Contextual Learning Approaches (CTL) on the Sets Material

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### Abstract

This research aims to determine differences in learning outcomes of students who use Realistic Mathematics Learning (PMR) and Contextual Approach (CTL) approaches on the set Material. This research method is quasi experiment with posttest only control design. The sampling technique was used cluster random sampling with 2 experimental classes These are experimental class 1 (the class was treated with the Realistic Mathematics Education (PMR) approach and experimental class 2 (the class was treated with the Contextual Learning (CTL) approach The hypothesis test is used the t-test. The results of the research is found that there were differences between the student learning outcome in the set material using Realistic Mathematics Learning (PMR) approach and the student learning outcome in the set material using the Contextual Learning approach (CTL). Because the student learning outcome in the set material using Realistic Mathematics Learning (PMR) approach better than the student learning outcome in the set material using the Contextual Learning approach (CTL).

**Keywords:** Contextual Learning ; Learning Outcomes; Realistic Mathematics Learning.

### INTRODUCTION

The mathematics learning is currently undergoing a paradigm shift from the teacher-centered learning to the student-centered learning (Lusiana, Budiyono, & Sutanto, 2013). The student-centered learning aims to activate the students in the learning process, but there are schools that still implement teacher-centered learning such as in MTsN 33 Jakarta so that the student learning outcomes are not satisfactory. It can be seen from the questionnaire test of all 7th grade students of MTsN 33 Jakarta, about 40% of students are less interested or do not like learning mathematics, especially on the set material. This result is supported by the results of the students' grade data based on the 2016-2017 school teacher value data with the average results of grades VII students for the set material is still low at 60 with kkm 85.

. Based on the results of interviews with the teacher of the mathematics subjects it was found that the model used in learning was the conventional method (lecture) and the lack of use of teaching tools because the use of teaching tools was considered to be quite expensive. As the result, the teacher finds it difficult to explain what they want to conveys to the students that make the students will tend to be lesactive, creative, and critical in learning (Wirama, Pudjawan, & Dibia, 2014). The mastery and understanding of students towards mathematical concepts is weak because it is not profound so the participants receive what is conveyed by the teacher without understanding and knowing what the teacher is conveyed. In addition, the knowledge is quickly forgotten by the student and also not able to be applied to everyday life because it makes low learning outcomes of students (Firdaus, Novita & Khairunnisak, 2014; Septianawati, Budiyono , & Subanti, 2013)

It is caused the inappropriate learning strategies to the students , the learning strategy is presented by the teacher is very important. There are various learning strategies that can be used one of them by using the realistic Mathematics Learning approach (PMR) and the Contextual Learning approach (CTL).The PMR approach is one of the approaches to learning mathematics that is oriented towards mathematical experiences and applying mathematics in everyday life (Ardiawan, Budiyo, & Subanti, 2013).

The various advantages of the PMR approach have been shown from the results of previous research, such as PMR making it easier for the students to understand algebraic concepts (Chang & Huang, 2014), PMR can improve learning achievement (Zainal, 2017), PMR can improve students' understanding of fractions (Mustikahadi, Suyanto, & Chamdani, 2015; E. Safitri, Wahyudi, & Warsiti, 2014), PMR affects student learning outcomes (Hanisah, Hamizi, & Erlisnawati, 2016; Julita, Marhadi, & Noviana, 2016; Jumiati, N, & Zulkifli, 2014; Miftahurahmah, Marhadi, & Noviana, 2016; Wirama et al., 2014), PMR influences the student problem solving abilities (Krismiati, 2013; Susana & Zubir, 2014), and PMR can improve mathematical reasoning abilities (Lestari, Prahmana, & Wijayanti, 2016).

The CTL approach is a holistic learning process and aims to help students to understand the meaning of the teaching material by linking it to the context of their daily lives (personal, social and cultural context), so that students have dynamic and flexible knowledge / skills to actively construct their own understanding (Ariestuti, Darsana, & Kristiantari, 2014; Permatasari & Muslim, 2014).

The Previous researchers have used the CTL approach in research. This is because the CTL approach can help in The student problem solving (Camilah, Suharto, & Indah, 2014), CTL assisted with performance appraisal influences the understanding of the science concept (Dewi & Rati, 2013), CTL based on local wisdom influences the learning outcomes of IPS (Hermawan , Jampel, & Widian, 2013), CTL with concrete material media can improve science learning (Nugraeni, Triyono, & Budi, 2016), CTL influences economic learning achievement (Suprihatin, Siswandari, & Sutarno, 2013), CTL with experimental methods can improve the student science learning outcomes (Kurniawati, Suripto, & Warsiti, 2016), CTL with teaching tools can improve understanding of physics concepts (Faikoh & Maftukhin, 2013), CTL can improve students' psychomotor abilities (Haloho, 2015), CTL can improve the student ability on writing (Oktarina, 2015), CTL can improve the student science learning outcomes (Daud & Riau, 2015; Mongan, A, & Alibasyah, 2015; Samriani, 2016).

The Low student learning outcomes are caused of inappropriate learning strategies.The student learning outcomes are the result of an interaction between learning and teaching. From the teacher's factor the teaching action ends with a learning evaluation process, while from the student learning outcomes is the culmination of the learning process (Rohmaniar, Jalmo, & Marpaung, 2015). In previous research, many research have used learning models to examine student learning outcomes such as research by (Febri, Achmad, & Marpaung, 2015) using the TGT model with snake ladder media, (A. Safitri, Achmad, & Marpaung, 2015) using a model Two Stay Two Stray (TSTS), (Rahmayanti, 2015), uses the CIRC and RME models, (Asmara,

Ngadino, & Lestari, 2015) using the Group Investigation (GI) and (Damayanti, 2015) models using the NHT and TPS models.

Based on the description above, the two approaches are equally capable of helping students in understanding learning related to daily life (contextual), especially in the set material that requires many examples related to daily life. As for the novelty of the researcher in this research, the researcher will try to see the differences in The student learning outcomes with the PMR approach and the CTL approach on the Material set.

## THE RESEARCH METHODS

The research method uses of quasi experimental with posttest only control design. Populasi design of this research is all class VII MTsN 33 East Jakarta. Sampling technique was used cluster random sample with class VII-1 as the experimental class 1, VII-2 as the experimental class 2. The data collection technique using the model documentation and test models. Model documentation used to obtain the primary capability experimental class 1 and experiment 2. While the test models used to obtain data on the study of students classroom experiment 1 and experiment 2. Model tests are used to collect data from the student studying mathematics with multiple choice tests form in 30 question items, each item consists of four multiple choices A, B, C, D. The test was given after fulfilling the validity of question and tested in class VIII-1 to see the level of difficulty and the distinguishing item, as well as reliability testing of each instrument test. Both classes are assumed in the given treatment. The design can be described as follows.

**Table 1. The Experiment Research Design**

Class	Treatment	Final Test (Post Test)
Experimental Class 1	$X_1$	$O_1$
Experimental Class 2	$X_2$	$O_2$

Description:

$X_1$  = The Treatment using PMR Approach

$X_2$  = The Treatment using CTL Approach

$O_1 = O_2$  = Final Test (posttest) Experimental 1 and Experimental class 2

Before testing the hypothesis, a prerequisite analysis test is performed on the student primary ability of each class is taken from the odd semester UAS grade for balance testing with a significance level of 0.05. Test prerequisite analysis is the normality test using Lillifors test, homogeneity test. If the test results are normally distributed and come from the similiar variance area, the Statistical Hypothesis is tested using the t-test. The Assumptions for normality testing are:

$H_0$  : The Data is normally distributed

$H_1$  : The Data is not normally distributed

The Criteria Test: If  $L_{count} < L_{table}$  then  $H_0$  Accepted, so that the both data are normally distributed.

The Assumptions for homogeneity testing are:

$H_0$  : The data is homogeneity

$H_1$ : The data is not homogeneity.

The Criteria Test : If  $F_{count} < F_{table}$  then  $H_0$  accepted, so that the both data are homogeneity.

The comparison of hypotheses is based on the formulation of the right-hand test hypothesis. If  $T_{count} \leq T_{table}$ , Then  $H_0$  Accepted. With the hypothesis is tested :

$H_0 : \mu_1 \leq \mu_2, \quad H_1 : \mu_1 > \mu_2$

$\mu_1$  : The learning outcomes with the realistic mathematics approach (PMR)

$\mu_2$  : The learning outcomes with the contextual approach (CTL)

## THE RESULTS OF THE RESEARCH AND THE DISCUSSION

After the student learning outcomes data are collected from the two experimental classes 1 (PMR approach treatment) and from Experiment 2 class (CTL approach treatment) were taken then obtained:

**Table 2. The data description of student learning outcome result**

Class	$X_{max}$	$X_{min}$	The size of central tendency		
			$\bar{x}$	Me	Mo
Exeriment 1	95	30	62,44	60	60
Experiment 2	77	30	50,19	47	40

After learning, the experimental class 1 (PMR method treatment) and Experiment 2 class (CTL method treatment) was carried out a final evaluation to find out the learning outcomes of students as data collection of the final evaluation obtained that in the experimental class 1 there were 30 students with essay questions on the ability to understand mathematical concepts obtained the largest grade 95 and the smallest grade 35, middle grade (Me) 60, the most grade obtained by students (Mo) is 60 and the average grade of students is 62.44. Whereas in Experiment 2 class which amounted to 30 students with learning outcomes of students obtained the largest grade of 77 and the smallest grade of 20, the average grade obtained by the student was 50.19, with Median 47 and the grade appeared was 40. Based on It can be concluded that the experimental class 1 student learning outcomes (PMR method treatment) are better than Experiment 2 class (CTL method treatment).

Furthermore, the assumption test analysis is performed by testing the normality of learning outcomes of students in the experimental class 1 with the experimental class score of 62.444 with  $L_{Count} = 0,1117$  and  $L_{table} = 0,1454$ . And experimental class 2 is 50.1935 with  $L_{Count} = 0,1016$  and  $L_{table} = 0,1556$  it shows that  $L_{Count} < L_{table}$  so that the data can be concluded that it is normally distributed. The following recapitulation results of the calculation of the student learning outcomes in experimental class 1 and experimental class 2.

**Table 3. The Calculation of Normal Tests Result**

Class	Sample Amount	$L_{count}(L_{(\alpha,n)})$	$L_{table}$	Description
Experiment 1	36	0,1117	0.1454	Normal
Experiment 2	31	0,1016	0,1556	Normal

Based on the calculation results of the normality test of the mathematics learning outcomes of students. Ability in experimental class 1 and experimental class 2 with a significance level of  $\alpha = 0.05$ , obtained that the value of  $L_{Count}$  of each group is less than  $L_{table}$  so that the null hypothesis of each group is accepted. It can be concluded that the data obtained from each group comes from a population that is normally distributed.

To find out the differences of the two scores have the same or different characters, the F test is needed. This variance test is comparing the largest variance and the smallest variance. If  $F_{count} \leq F_{table}(\sigma_1, \sigma_2)$  is obtained from the distribution with probability  $\frac{1}{2} \alpha$  while the degree of freedom is  $\sigma_1(n_1 - 1)$  and  $\sigma_2(n_2 - 2)$  each corresponds to the dk numerator and the dk denominator. The Variance testing results with a significant level of  $\alpha = 0,05$  can be seen in Table 4.

**Table 4 . The results of Test Calculations Similarities Two Varies**

Class	Sample Amount	Variants	$F_{count}$	$F_{table}$	Description
Experiment 1	30	63,454	1,204	1,810	Homogeny
Experiment 2	30	218,694	1,204	1,810	Homogeny

Based on Table 3. The score results of the calculation understanding mathematical concepts ability is obtained  $F_{Count} = 1.204$  and  $F_{table} = 1.810$ . Showing that  $F_{count} < F_{table}$ . It can be concluded that  $H_0$  is accepted or the sample comes from a population that has the similar variance. To test differences in mathematical learning outcomes students used the t-test formula, because the data is obtained were normally distributed and had the similar variance grade. The calculation results can be seen in Table 5. Below:

**Table 5 . The results of Test Calculations Similarities Two Varies**

Class	Sample Amount	Average ( $\bar{x}$ )	$t_{tabel}(t_{a,db})$	$t_{count}$	Description
<b>Experiment 1</b>	30	62,444	1,668	12,868	$H_0$ Accepted
<b>Experiment 2</b>	30	50,193			

Base on the Table 5. the calculation is obtained  $t_{count} = 12,868$  dan  $t_{table} = 1,668$  so that is  $t_{count} > t_{table}$ , then  $H_0$  is rejected. from the average learning outcomes of students can be seen in table 4 is obtained experimental class 1 (the class that received treatment PMR) is obtained a grade of 62.444 while the experimental class 2 (the class that received treatment CTL) is obtained a grade of 50.193, the results of this analysis can be concluded that there is a difference that students' mathematics learning outcomes between experimental class 1 (the class receiving PMR treatment) are better than the experimental class 2 (the treatment class with the CTL model). The results of this study are similar to the results of previous research with the results that the PMR approach is able to help students in the process of contextual learning or link learning in real life besides PMR learning model is able to help the students to understand the ability to the comprehend concepts and make students more creative in learning mathematics (Astuti et al., 2018; Suherman, 2015) and PMR can improve students' mathematics learning outcomes (Hanisah et al., 2016; Julita et al., 2016; Miftahurahmah et al., 2016).

## CONCLUSION AND SUGGESTION

Based on the theory and supported by the results of the analysis and processing of data and referring to the formulation of the problems that have been described, it can be concluded that: there are differences in learning outcomes of students with the application of PMR approach (realistic mathematics learning) with the application of CTL approaches (contextual teaching and learning). The further results of students' mathematics learning on the set material with the implementation of the PMR approach (learning of realistic mathematics) is better than the learning outcomes of students on the set material with the implementation of the CTL approach (context teaching and learning). Based on the conclusions the researcher suggest that the teacher uses the PMR approach (learning realistic mathematics) to improve student learning outcomes in the set material.

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