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The effect of problem based learning (PBL) on students' critical thinking

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Abstract: This study aims to determine the effect of Problem Based Learning (PBL) Learning Model on Students' Critical Thinking Ability in Mathematics Class V SDN Banjarejo, Madiun City. This research is a quantitative research with experimental method. The population of this research was all students of VA class at SDN [S]anjarejo, Madiun city, with sampling technique using saturated sampling with 27 students while the research design used One Group Pretest-Posttest Design. Based on the results of hypothesis testing with the t-test (t-test) shows that $t\text{-count} = 50 > t\text{-table} = 1.705$ then H_1 is accepted meaning by using the Problem Based Learning (PBL) learning model the students' critical thinking skills become better. From the calculation of students' critical thinking skills showed that 3 students with low critical ability, 12 students are moderate, and 12 students with high critical ability. It means that the Problem Based Learning (PBL) learning model influences students' critical thinking abilities.

Keywords: Project Based Learning, critical thinking

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INTRODUCTION

Mathematics is a science or subject which is very important in daily life and becomes a main subject in elementary schools. Mathematics in Elementary School level is one of the subjects that is considered difficult by some students because mathematics presents various problems that are difficult to be solved by elementary school age children.

In the learning process the teacher only delivers the material then students are asked to answer questions or work on the Student Worksheet (LKS), and if there is enough time the teacher will discuss together but if the time is not enough then the child is asked to complete it at home as homework. And sometimes the teacher does not give problems in the real world of students in the learning process even though that way makes students more easily understand. Teachers should innovate to create fun learning and make students enthusiastic to learn so that it can affect students' critical thinking skills in learning, especially mathematics. One innovation that can be applied by teachers, namely the selection of learning models that can improve students' critical thinking skills in mathematics.

Problem Based Learning (PBL) is a learning model that is oriented to mathematical problem-based learning. Context can be obtained from the real world or the world of formal mathematics as long as it is real in the minds of students. It is in line with the opinion of Mulisa (2015: 144) that the learning model Problem Based Learning (PBL) can be defined as a learning model that aims to stimulate students to learn through various real problems in daily life, related to the knowledge they learn. With the implementation of the PBL model, it is expected to have a positive effect on students' critical thinking skills in mathematics, especially in the matter of building cubes and beams.

Based on the background of the problem above, the researcher wants to know the effectiveness of the use of the Problem Based Learning (PBL) learning model on the critical thinking skills of fifth grade students in one class, namely the VA class at SDN Banjarejo, Madiun City. Thus, to answer the above problem the researcher took the title "The Effect of Problem Based Learning (PBL) Learning Model on Students' Critical Thinking Ability in Mathematics Subject Class V SDN Banjarejo, Madiun City".

Based on the above background, the researcher limits the problem under investigation as follows: 1. This research is limited to the use of Problem Based Learning (PBL) Learning Models. 2. This research is limited to students' critical thinking skills in the material of cubes and rectangular prism in the VA class at SDN Banjarejo, Madiun City.

Based on the background and problem constraints above, it can be stated the formulation of the problem as follows: "Is there any influence of the Problem Based Learning (PBL) learning model on students' Critical Thinking Ability in Mathematics Class V SDN Banjarejo, Madiun City?".

METHODS

This research used a quantitative approach with an experimental method. The design used in this study is Pre Experimental Design with the type of One-Group Pretest-Posttest Design research. The population in this study was all students of VA class at SDN Banjarejo, Madiun City as total 27 students.

The independent variable in this study was the Problem Based Learning (PBL) learning model, the dependent variable in this study was the students' critical thinking abilities in mathematics. Data collection techniques used the test. Before conducting the research, the test question instrument was tested to determine the validity and reliability of the items. Hypothesis test analysis techniques in this study used the t test (t-test) while for the normality test used the Liliefors method and homogeneity test used the F-test with a significance level of 5%.

RESULT AND DISCUSSION

The research data were taken from the VA class at SDN Banjarejo, Madiun City, which numbered 27 students. Normality test used the Liliefors method to determine whether the sample is from a normal distribution population or not.

Tabel 1 The result of Normality Test

	L_{table}	L_{count}	Criteria
Treatment			
Pre-Test	0,166	0,114	Normal
Post-Test	0,166	0,095	Normal

Table 1 shows the results of the normality test from populations that were normally distributed because of $L_{count} > L_{table}$. Homogeneity testing using the F-test was used to determine whether the population originated from the same variance or not. Following are the results of homogeneity test analysis of student test results.

Tabel 2 The result test of Homogeneity

F_{count}	F_{table}	Criteria	Test
1,48	1,93	$F_{hitung} < F_{table}$	H_0 is accepted

The table above shows that the population has a homogeneous variance. Hypothesis testing in this study uses t-test (t-test). The t test was used to determine the effect of the Problem Based Learning (PBL) learning model. Hypothesis test results show $t_{count} = 50 > t_{table} = 1.705$.

Tabel 3 The result test of Hypotheses

T_{count}	t_{table}	Criteria	Test
50	1,705	$t_{hitung} > t_{table}$	H_1 is accepted

Hypothesis test results show $t_{count} = 50 > t_{table} = 1.705$, so that the hypothesis stating "There is an Effect of Problem Based Learning (PBL) Learning Model influences the Critical Thinking Ability of Students in Mathematics Subject Class V SDN Banjarejo, Madiun City" is accepted.

Based on the results of data analysis shows that there is an influence of the Problem Based Learning (PBL) learning model on the Critical Thinking Ability of Students. Problem Based Learning (PBL) Learning model is a learning model that is easily applied to the Mathematics learning process. In the Problem Based Learning (PBL) learning model it is also very challenging for students to "learn how to learn", discuss individuals and groups to find solutions to problems in daily life in the real world. Students are also expected to be able to think critically in solving existing problems that are analyzed and linked in everyday life, therefore critical thinking is very important in Problem Based Learning learning models.

Ngalimun (2015: 117) states that the Problem Based Learning (PBL) learning model is an innovative learning model based on many problems and requires resolution or analysis related to daily life to answer from these problems. On the data of students' critical thinking skills show 3 students with low critical ability, 12 students with moderate critical

ability and 12 students with high critical ability. While the results of the calculation of critical thinking skills indicator shows that giving a simple explanation has the highest percentage, which is 40%, while the indicator builds basic skills by 20%, concludes by 25%, arranges strategy as well as tactics by 10% with medium percentage categories, and low percentages the indicator provides further explanation has a percentage of 5%. This is also in line with the opinion of Noprianda (2016: 183) argues that the Problem Based Learning (PBL) learning model is useful to facilitate students' critical thinking and this Problem Based Learning model provides a challenge for students to solve existing problems but must also be linked to life daily. Likewise, supported by the opinion of Susanto (2013: 121) argues that critical thinking is an activity that starts from ideas or ideas that are continually aligned with the problems faced, by analyzing those ideas or ideas to be more specific which must be identified first, then review it and develop it towards a more perfect and optimal direction.

CONCLUSION

Based on the discussion above and from the analysis of the hypothesis test using the t-test, the results of the study prove that there is an influence of the Problem Based Learning (PBL) learning model on students' critical thinking skills in mathematics class V SDN Banjarejo, Madiun City. Based on the hypothesis test it can be seen that $t\text{-count} (50) > t\text{table} (1.705)$, so that H_0 is rejected and H_1 is accepted, and the PBL learning model is one of effective learning for critical thinking skills. So, it can be concluded that there is an effect of the Problem Based Learning (PBL) learning model on students' critical thinking skills in mathematics class V SDN Banjarejo, Madiun City.

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