

The Influence of Problem Based Learning (PBL) Model on Student Learning Outcomes in Mathematics Learning Materials Building Cube Space and Beam in Class V SDN 060907 Medan Maimun District

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Article history: received June 28, 2023; revised July 10, 2023; accepted July 29, 2023

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Abstract. This study aims to determine the effect of the problem-based learning (PBL) model on student learning outcomes in learning mathematics on the material of cubes and blocks in class V SDN 060907 Medan Maimun District. This study used a quasi-experimental design (quasi experimental design). The participants involved in this study were students in class VA and VB SD Negeri 060907 Medan Maimun District, with a total of 20 VA students and 19 VB students. The total number of participants was 39 students. Specifically, VA and VB students have the same learning ability characteristics and there is also no superior class at SD Negeri 060907 Medan Maimun District. The population in this study were all VA and VB class students at SD Negeri 060907 Medan Maimun District. The determination of the class to be used as the sample in this study was taken from the population, namely VA class students as the experimental class and VB class as the control class. The data collection techniques used in this study are: Tests, Documentation. Based on the results of the research that has been done, the results of the research based on hypothesis testing can be obtained $t_{count} > t_{table}$ (5,643 > 1,668) meaning that H_1 is accepted and H_0 is rejected. So, it can be concluded that there is an influence of the problem-based learning model on the learning outcomes of fifth grade students at SDN 060907 Medan Maimun District. This research was conducted on fifth grade students at SDN 060907 Medan Maimun District with a population of 39 students in the experimental class and control class with 20 VA students in the experimental class and 19 VB students in the control class.

Keywords: PBL, Learning Outcomes, Mathematics

I. INTRODUCTION

Education has an important role in the life of an aspect and cannot be separated from human daily life. In addition, education is the single most important factor in determining a person's readiness to participate in community life. Education is divided into three categories: formal, informal, and non-formal. Basic education includes formal education, namely elementary school. A person's quality of life is highly dependent on the education they receive, given the current state of education, the process of learning is still weak.

During the learning process, students are rarely encouraged to develop their thinking skills. Classroom learning activities are only aimed at students' ability to memorize the information they get in learning. Sanjaya (2013: 1) explains that the learning process in class is only aimed at students' ability to memorize and collect various information without understanding the purpose of the information obtained. This resulted in students only understanding the theory and weak in its application. Many subjects are taught in elementary schools to develop students' academic potential, one of which is mathematics.

Based on the results of observations at SDN 060907 Medan Maimun subdistrict, the research obtained information about the learning outcomes of fifth grade students in mathematics tended to be low. This is because some students still have difficulty with numeracy skills, lack of student knowledge to study mathematics, and students think that mathematics is a very difficult and very boring subject. The reason for the difficulties faced by students is suggestions from students who think that mathematics is difficult so that they they are lazy to try and learn. In addition, there is a lack of teacher innovation in delivering lessons. Thus, students are less enthusiastic about learning. Paying attention to the teacher's

explanation in class, students sometimes lack the confidence to express opinions. So, because of these factors students do not understand the material presented and often students only memorize formulas and do not even understand the concepts given.

In addition, the learning model is still teacher-centered, teachers still often use the *Teacher-Centered approach model*. The students just sat quietly and listened to the explanation given by the teacher. students are active when asking or doing questions. this model does not create meaningful and enjoyable learning experiences for students. Teachers also often use learning methods that make them less active and often passive, causing many students to think that mathematics is nothing more than calculating and memorizing. Then there are students who think that mathematics is just like that. So complaining that math is a very difficult and boring subject.

Problem Based Learning (PBL) is an innovative learning model, students can provide conditions for more active learning. The problem-based learning model is a learning model that involves problem solving in students through the stages of the scientific method, so that students can learn about problems, as well as have problem-solving skills in a question.

In addition, the problem-based learning model has learning characteristics such as learning begins by asking questions, usually questions considering the real world context, learning in an authentic way, active groups asking questions and offering solutions. In this lesson students not only know theory and formulas or solve problems with numbers, but also understand mathematics more closely with real-world backgrounds. Based on the description above, the researcher is interested in making a research title regarding "The Influence of the *Problem Based Learning* (PBL) Model on Student Learning Outcomes in Mathematics Learning Materials Building Cubes and Blocks in Class V SDN 060907 Medan Maimun District". 1. To find out whether there is an effect of the Problem Based Learning (PBL) Model on the learning outcomes of Class V students in learning Mathematics on Building Materials of Cubes and Blocks at SDN 060907 Medan Maimun District.

II. METHODS

This research uses quasi experimental research (quasi experimental design). Sugiyono (2010: 114) argues, that quasi-experimental research is research that has a control class but cannot fully function to control variables that will affect research implementation. There are two forms of quasi-experimental design, namely, series design and nonequivalent control group design

The participants involved in this study were students in class VA and VB SD Negeri 060907 Medan Maimun, with a total of 20 VA students and 19 VB students. The total number of participants was 39 students. Specifically, VA and VB students have the same learning ability characteristics and there is also no superior class at SD Negeri 060907 Medan Maimun. Determination of the class that will be used as the sample in this study was taken from the population, namely students in class VA as the experimental class and VB as the control class. The data collection techniques used in this study are: Test. Documentation Research instruments are tools or facilities used by researchers in collecting data so that their work is easier and the results are better, in the sense that they are more accurate, complete and systematic so that they are easier to process. The instrument to be used in this study is a test instrument.

III. RESULTS AND DISCUSSION

Research Analysis Results

The research results were analyzed to interpret the results that have been collected and answer the research hypotheses. The following is an explanation of the results of the test instrument analysis test, the initial data, and the final data studied. To find out the validity of the items, an assessment of the validity of the instrument was carried out so that it could be used as a measuring tool in research. An instrument is said to be valid if it is able to measure what is desired and disclose data from the variables studied correctly. From the calculation of the 20 item items, it was found that there were no invalid questions, while the other 20 questions were considered valid.

Test Reliability

If $r_{\text{count}} > r_{\text{table}}$, so instruments or item items declared reliable. If $r_{\text{count}} < r_{\text{table}}$, then the instrument or item item is declared not reliable. After details question done test validity, test level difficulty, then the item is tested for reliability. The purpose of testing reliability is For know consistency from instrument can be trusted to be used as a collection tool data.

Table 1 Test Data Reability Test Test Try
reliability Statistics

Cronbach's Alpha	N of Items
.985	20

The *problem-based learning model* variables or variables on mathematics learning outcomes can be seen in table 4.2. The results generated from this variable are 0.985 indicating that Cronbach's alpha is 0.985 > 0.70. From these results it can be concluded that all statements on the variable is stated to be reliable or can be trusted.

Test Normality

The normality test is used to ensure that all data the variables analyzed are normally distributed or not. The normality test is calculated with *Kolmogorov-Smirnov (KS)*. If the significance is less than 0.05, then the data not normally distributed. Meanwhile, if the significance is more than 0.05, then the data distributed normal. After testing using SPSS for windows 16, then obtained data as follows:

Table 2 Results Test Normality
One-Sample Kolmogorov-Smirnov Test

	<i>Problem Based Learning</i>	Hasil Belajar
N	39	39
Normal Parameters ^a	Mean	72.7124
	Std. Deviation	8.37331
Most Extreme Differences	Absolute	.321
	Positive	.351
	Negative	.354
Kolmogorov-Smirnov Z		.956
asymp. Sig. (2-tailed)		.889
		.678
a. test distribution is Normal.		

Source: Data is processed year 2023

Kolmogorov-Smirnov test results in table 4.3 it can be read on the Asymp value. Sig. (2-tailed) on *problem based learning variables* the significance value is 0.889 > 0.05 and for the learning outcomes variable in mathematics the significance value is 0.678 > 0.05. So, it can be said that the data is in study it is normally distributed.

Test hypothesis

Criteria the hypothesis will be accepted if the price of tcount is greater than ttable at a significance level of 5%, and the significance is less than 0.05 so hypothesis in research this can accepted.

- 1) $H_0 : \mu_1 = \mu_2$
No there is influence *problem based learning* to mathematics learning outcomes class V SDN 060907 Kec. Medan Maimun
- 2) $H_1 : \mu_1 \neq \mu_2$
There is influence *problem based learning* to mathematics learning outcomes class V SDN 060907 Kec. Medan Maimun.

Table 3 Recapitulation Results Test hypothesis (*t-test*) Class Experiment
And Class Control

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	8.846	1.567		5.643	.000
	Problem Based Learning	.165	.117	.257	1.405	.017

a. Dependent Variable: Pre Test Hasil Pembelajaran Matematika

Based on the calculation of the t-test that has been carried out the posttest value then can be obtained $t_{\text{arithmetic}} 5.643$ and $t_{\text{table}} 1.668$ so that the result is $t_{\text{count}} > t_{\text{table}} (5.643 > 1.668)$ means that H_1 is accepted and H_0 is rejected. So got concluded there is influence *problem based learning* on the learning outcomes of fifth grade students at SDN 060907 Kec. Medan Maimun.

Discussion

This shows that from the research results obtained, this is further strengthened by several theories which are in line with the results of the data obtained through the learning syntax of the *Problem Based Learning model* that students are given the opportunity to explain to their friends according to constructivism theory. Constructivism theory is stated by Suprijono (2015: 30) that knowledge is not just a picture of the real world, but the construction of reality through subject activities that form cognitive schemes, categories, concepts, and structures necessary for knowledge. This theory is in line with the theory of Jerome Burner which is written in Susanto's book (2015: 11) that in the learning process, the active participation of each student and knowing well that there are differences in abilities is very important and this theory trains students to conduct experiments and find appropriate principles. with the syntax of the *Problem Based Learning model*. The two theories support the success of the research with the influence of the *problem-based learning model* on student learning outcomes in mathematics.

The research results obtained strengthen the results of previous research conducted by Intan Purnama Sari (2021) concerning the Effect of the *Problem Based Learning Learning Model* on Student Learning Outcomes in Indonesian Language Subjects in Class V of SD Negeri 24 Bengkulu City. This study used the Quasy Experiment method with the *Non-Equivalent Control Group approach*. The results showed that the average pretest score for the experimental class was 44.25 and the posttest average score for the experimental class taught using *Problem Based Learning* was 70.00. While the average value of the control class pretest was 43.5 and the posttest average value of the control class without using the *Problem Based Learning model* was 58.00. The results of the hypothesis test obtained by t_{count} of 3.835 with t_{table} of 2.024. Thus $t_{\text{count}} \geq t_{\text{table}} (3.835 \geq 2.024)$, indicating that the *Problem Based Learning learning model* has a significant influence on student learning outcomes than without using the *Problem Based Learning learning model* in improving student learning outcomes in Indonesian language subjects at SD Negeri 24 Kota Bengkulu. The results of this study are in line with research conducted by researchers with variable equations, namely the *Problem Based Learning model*.

It can be concluded that there is an influence of the *Problem Based Learning model* on students' cognitive learning outcomes in mathematics class V elementary school.

IV. CONCLUSIONS

With *the problem based learning* (PBL) model, students not only memorize formulas and concepts, but also apply this knowledge in real situations. They are given the opportunity to work in teams, collaborate, think critically, and take initiative in solving mathematical problems related to cubic and cuboid shapes. The PBL model also increases students' learning motivation, because they feel involved in the learning process that is relevant to everyday life.

Thus, the application of *the problem based learning* (PBL) model provides a more interesting learning experience, allows students to understand mathematical concepts in depth, and helps they develop skills relevant to everyday life.

Based on the hypothesis test can be obtained $t_{\text{count}} 5.643$ and $t_{\text{table}} 1.668$ so that the result is $t_{\text{count}} > t_{\text{table}}$ ($5.643 > 1.668$) means that h_1 is accepted and h_0 is rejected. So got concluded there is model influence *problem based learning* on the learning outcomes of class V sdn 060907 kec. Maimun field.

ACKNOWLEDGEMENTS

Thanks to my supervisor Arrini Shabrina Anshor, M.Pd who has guided me in working on this article so that it can be published.

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