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THE EFFECT OF PROBLEM BASED LEARNING MODEL AND LEARNING MOTIVATION ON THE STUDENTS' LEARNING OUTCOMES OF SMP NEGERI 1 BABALAN

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Abstract

This research aims to:(1) Knowing the effect of the PBL learning model on the science learning outcomes of heat and its transfer materials; (2) Knowing the effect of learning motivation on science learning outcomes for the subject matter of Heat and Its Transfer; and (3) Knowing the effect of the interaction of the PBL learning model and learning motivation on the science learning outcomes of the subject matter of Heat and Its Transference. The sample in this study is student Class VII SMP Negeri 1 Babalan Academic year 2021/2022 as many as 54 students. Data collection through learning outcomes test and critical thinking ability test. Hypothesis testing is done by using the Two Way Anova test. The results showed that: (1) Model problem based learning provides a positive difference to the science learning outcomes of seventh grade students of SMP Negeri 1 Babalan in the 2021/2022 academic year (F_{count} = 9.062 and sig. 0.004 <0.05); (2) Learning motivation gives a positive difference to the science learning outcomes of seventh grade students of SMP Negeri 1 Babalan in the 2021/2022 academic year (F_{count} = 4.283 and sig. 0.044 <0.05); and (3) There is an interaction of problem based learning model and learning motivation on science learning outcomes for seventh grade students of SMP Negeri 1 Babalan in the 2021/2022 academic year (F_{count} = 6249 and sig. 0.016 < 0.05).

Keywords: *Problem Based Learning, Learning Motivation, Science Learning Outcomes*

A. Introduction

In learning science in class, the teacher is used as a source of information for students, where students only take notes and do the exercises given by the teacher. The learning model does not contribute much to student learning outcomes. This fact can be seen from the results of observations made in class VII when science material is taught in class. When the teacher provides information about heat and its transfer, most students feel bored, which can be seen from the attitude of the students who are noisy, talk to their classmates, and seem passive. The class atmosphere is uncomfortable and filled with noises so that the teaching and learning process is not in an orderly manner (Fatmawati & Yusrizal, 2021).

Based on the existing facts, it is necessary to apply a learning model that is able to make students active, independent, and able to develop knowledge from learning outcomes in the classroom, namely the Problem Based Learning (PBL) learning model (Ariani, 2020). PBL is a learning model that focuses more on students as learners and on authentic and relevant problems to be solved by using all their knowledge or from other sources (Mariani et al., 2016). In PBL, students are required to be able to work in groups to achieve common results. Starting from the definition of the problem, then students conduct discussions to equalize perceptions about the problem and set goals and targets to be achieved. In this case the PBL learning model offers students the freedom to be active in the learning process. Harvest said that in PBL learning, students are expected to be involved in a research process that requires them to identify

problems, collect data, and use the data for problem solving (Qomariyah, 2016).

The PBL learning process involves students to solve problems, allows students to actively build and organize their learning, and can make students realistic and have critical thinking skills. Tjahjana & Arief define that PBL is not designed to help teachers provide as much information as possible to students, but problem-based learning is developed to help students develop thinking skills, problem solving, and intellectual skills, learning various adult roles through their visions in real experiences. or simulation and become an independent learner (Tjahjana & Arief, 2016).

Bungel (2014: 45) found that the PBL learning model can improve student learning outcomes with 5 stages, namely (1) basic concepts, (2) problem definition, (3) independent learning, (4) group learning; and (5) Assessment. At the basic concept stage, the teacher conveys the prerequisite material. At the problem definition stage, the teacher displays the material questions. At the independent learning stage, students independently seek solutions to the problems given. At the group learning stage, students work on questions with their group friends. At the assessment stage, the teacher and students evaluate the results of group discussions. In other words, it can be concluded that the PBL model is a solution for students to improve learning outcomes in class.

Through PBL students learn through practical problems related to real life such as in the study of heat and its displacement. In conveying the material of heat and its transfer, students are faced with practical problems such as what objects can conduct heat well and what objects do not conduct heat well. The process of conducting heat can be felt in real life. Every problem solving on heat material and its transfer will be

discussed through a series of systematic learning, namely finding solutions from various sources can solve the problems being discussed critically and be able to draw conclusions based on their understanding.

The success of learning is also based on students' learning motivation (Yusrizal, 2020; Yusrizal et al., 2019, 2020). Learning motivation is the overall driving force that exists within students that causes learning activities and ensures the continuity of learning activities so that the goals desired by the learning subjects can be achieved (Dwita et al., 2018). In another opinion, it is said that learning motivation is an internal and external encouragement for students who are learning to make changes in behavior, in general with several indicators or elements that support (Nurdin, 2016). These two opinions explain that learning motivation is an encouragement or stimulus that exists in students to carry out learning activities in order to achieve the expected learning competencies or realize learning goals that have been formulated previously by creating a conducive learning environment.

In reality, what can be seen in schools proves that there are still many students who in learning feel bored, don't want to ask, some are sleepy, even many students ask for permission to go back (Hasibuan et al., 2021). Students' learning motivation is still low in SMP Negeri 1 Babalan, it is known from the observations made in the teaching and learning process that takes place in the classroom. Therefore, the teaching and learning process that has been implemented has not been efficient, so the learning pattern needs to be improved. This fact was also found by Husnawan (2014: 55) stating that the low motivation of students is one of the factors causing the less successful learning process in students. This ultimately has an impact on the low student learning outcomes. Learning motivation is a very important component in determining student

learning success. The low motivation of students is caused by several factors, including the lack of students' understanding of a concept, the lack of active students' attitudes towards the subject being studied.

B. Method

This type of research is a quasi-experimental research with a 2x2 factorial design. This research was conducted inSMP Negeri 1 Babalan Academic year 2021/2022. The sample in this study was class VII students consisting of 2 classes with each class totaling 27 students. Collecting data through learning outcomes tests and tests of critical thinking skills. The data analysis technique used is descriptive and inferential statistical techniques. Hypothesis testing was carried out with the Two Way Anova test with a significant level of 0.05. Before the Two Way Anova test was carried out, the analysis requirements were first tested, namely the normality test and the data homogeneity test. The normality test was carried out by the Kolmogorov-Smirnov test while the homogeneity test of the data was carried out by the Levene test with a significant level of 0.05.

C. Finding and Discussion

1. Result

a. Science Learning Outcomes of Students Taught with Problem Based Learning Models

Based on the data obtained and the results of statistical calculations, it is known that the science learning outcomes of students who are taught with the problem based learning model get the lowest score of 68, and the highest score of 100, with an average of 86; mode of 88; the median is 88; variance of 65.69 and standard deviation of 8.10.

The frequency distribution of students' science learning outcomes scores is shown in the following histogram:

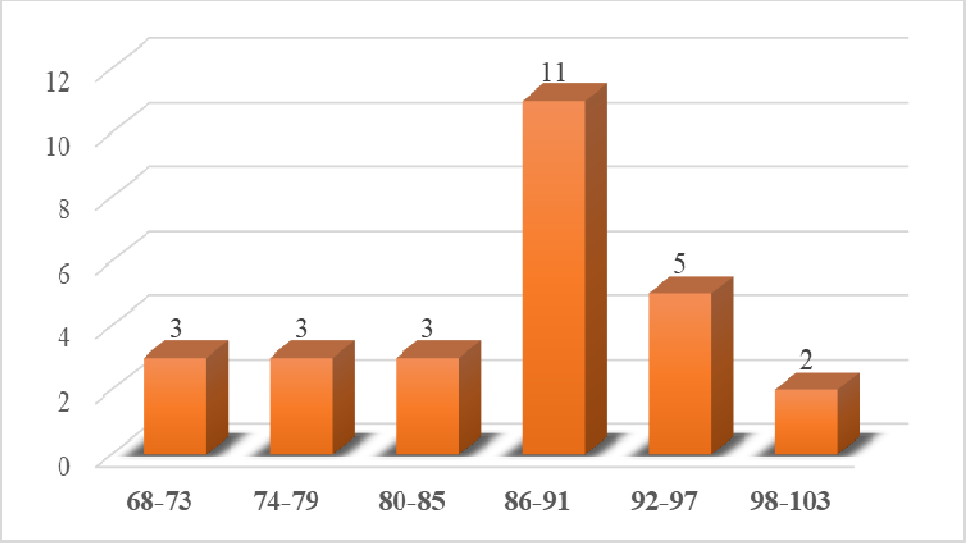

Figure 1. Histogram of Science Learning Outcomes of Students Taught with Problem Based Learning Model

b. Science Learning Outcomes of Students Taught with Conventional Learning Models

From the data obtained and the results of statistical calculations, it is known that the science learning outcomes of students who are taught using conventional learning models get the lowest score of 68, and the highest score of 96, with an average of 81; mode of 76; the median is 84; variance of 51.74 and standard deviation of 7.19. The frequency distribution of students' science learning outcomes scores is shown in the following histogram:

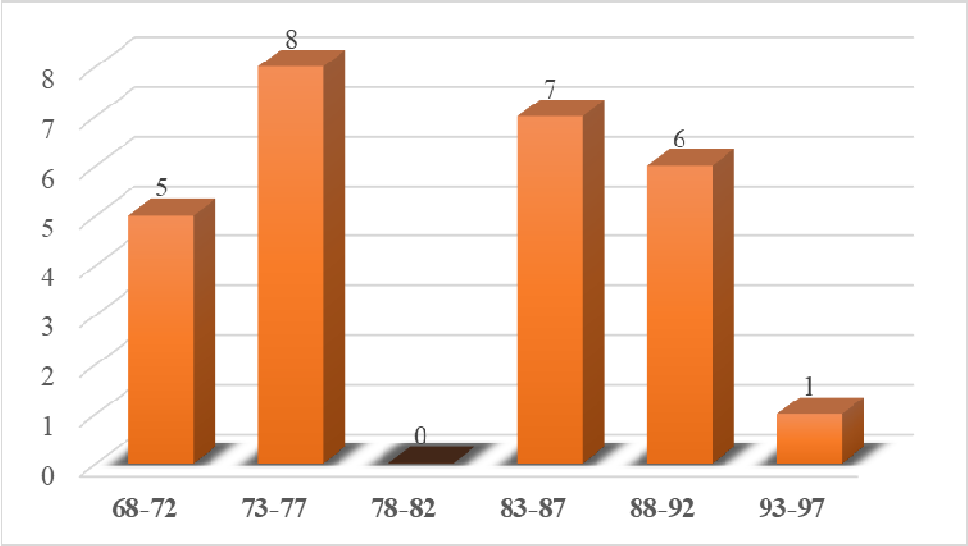

Figure 2. Histogram of Students' Science Learning Outcomes Taught with Conventional Learning Models

c. Science Learning Outcomes of Students Who Have High Learning Motivation

From the data obtained from statistical calculations, it is known that the science learning outcomes of students who have high learning motivation get the lowest score, namely 68, and the highest score is 100, with an average of 85.44; variance of 77.17 and standard deviation of 8.78. The frequency distribution of students' science learning outcomes scores is shown in the following histogram:

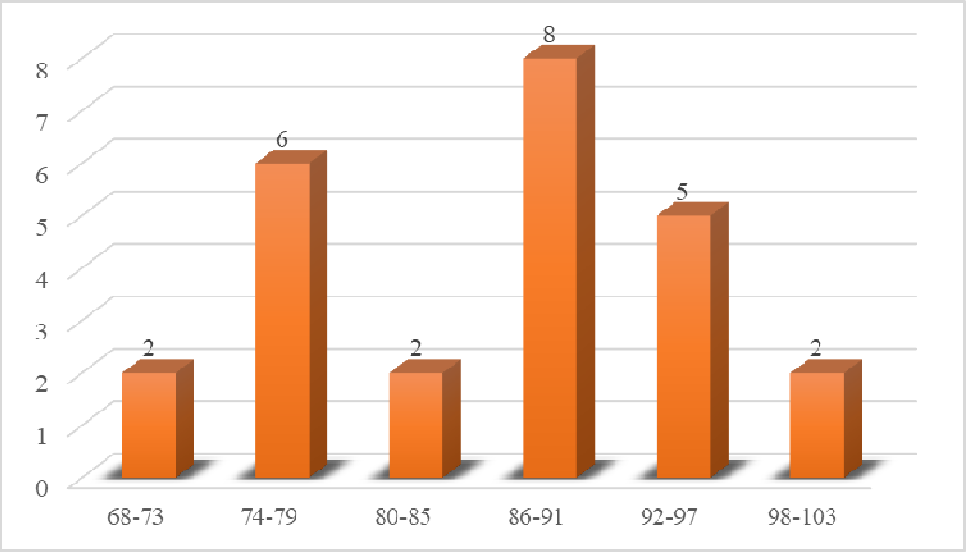

Figure 3. Histogram of Student Learning Outcomes who Have High Motivation

d. Science Learning Outcomes of Students Who Have Low Learning Motivation

From the data obtained and the results of statistical calculations, it is known that the science learning outcomes of students who have low learning motivation get the lowest score of 68, and the highest score of 92, with an average of 81.66; variance of 49.73 and standard deviation of 7.05. The frequency distribution of students' science learning outcomes scores is shown in the following histogram:

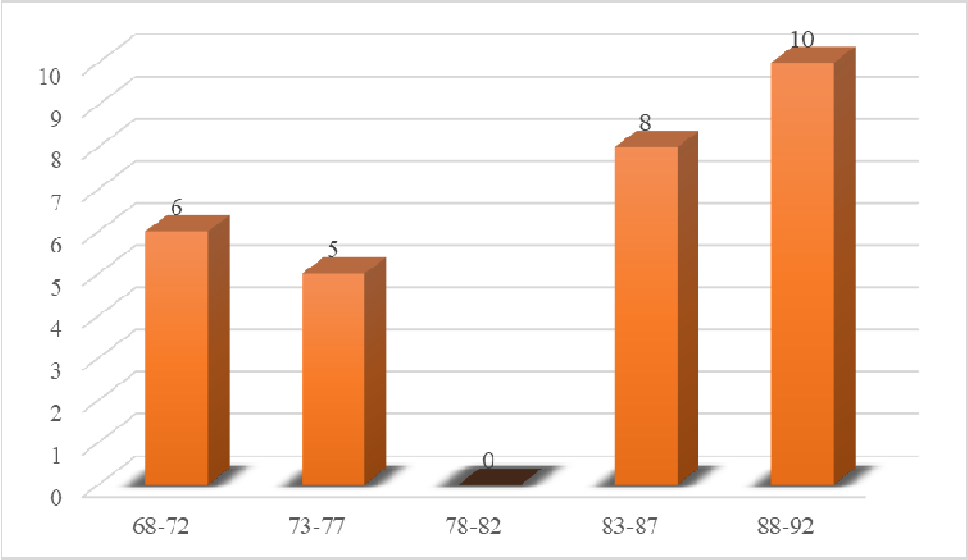

Figure 4 Histogram of Science Learning Outcomes of Students with Low Learning Motivation

e. Normality test

The normality test of the data was carried out by the Kolmogorov-Smirnov statistical test. Normality test can be seen in the following table:

Table 1. Normality Test Results

Tests of Normality						
	Kolmogorov-Smirnova			Shapiro-Wilk		
	Statistics	df	Sig.	Statistics	df	Sig.
Standardized Residual for Hasil_Belajar	,970	54	,185	.971	54	.204
a. Lilliefors Significance Correction						

Based on the table, it can be seen that the significant value is 0.185 > 0.05, thus it can be concluded that the data is normally distributed.

f. Homogeneity Test

A summary of the homogeneity test calculation can be seen in the following table:

Table 2. Homogeneity TestPost-test data

Levene's Test of Equality of Error Variancesa			
Dependent Variable: Learning Outcomes			
F	df1	df2	Sig.
2,621	3	50	.061
Tests the null hypothesis that the error variance of the dependent variable is equal across groups..			
a. Design: Intercept + Class + Motivation_Learn + Class * Motivation_Learn			

Based on the table shows that the homogeneity test obtained a significant value of 0.061 > 0.05, thus it can be concluded that the data is homogeneous.

g. Hypothesis test

Hypothesis testing in this study uses two-way ANOVA with 2x2 factorial, hypothesis testing is calculated with the help of SPSS version 23. Hypothesis testing data can be seen in the following table:

Table 3. SPSS Output ANOVA Calculation Results

Tests of Between-Subjects Effects					
Dependent Variable: Learning Outcomes					
Source	Type III Sum of Squares	df	Mean Square	F	Sig.

Corrected Model	912,820a	3	304,273	6.027	.001
Intercept	375216.210	1	375216.210	7432,329	.000
Class	457,472	1	457,472	9.062	.004
Motivation to learn	216,205	1	216,205	4.283	.044
Class * Motivation_Learning	315,485	1	315,485	6,249	.016
Error	2524,217	50	50,484		
Total	379104,000	54			
Corrected Total	3437,037	53			
a. R Squared = .266 (Adjusted R Squared = .222)					

Table 4. Comparison of Science Learning Outcomes Based on Learning Model

1. Class				
Dependent Variable: Learning Outcomes				
Class	mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
Learning Model Problem Based Learning	86.567	1.376	83,803	89.330
Conventional Learning Model	80,725	1.368	77,977	83.474

Table 5. Comparison of Science Learning Outcomes Based on Learning Motivation

2. Learning Motivation				
Dependent Variable: Learning Outcomes				
Motivation to learn	mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
High Learning	85,65	1.422	82,797	88,510

Motivation	4			
Low Learning Motivation	81,638	1,320	78.986	84,290

- **First Hypothesis**

  The statistical hypotheses tested were:

  H_0: A1 A2

  H_a: A1 > A2

Based on the SPSS output in Table 3, it is obtained that the value of F_{count} =9.062 and the significant value of the class variable is 0.004 < 0.05.WithThus it can be said that there is a significant difference between the average science learning outcomes of students who are taught with problem based learning models compared to conventional learning models. Furthermore, based on Table 4, it is found that the average science learning outcomes of students who are taught using the problem based learning model are 86,567, while the science learning outcomes of students who are taught using the conventional learning model are 80,725. So that the hypothesis testing rejects Ho and accepts Ha. With the conclusion that the problem based learning model provides a positive difference to students' science learning outcomes.

- **Second Hypothesis**

  The statistical hypotheses tested were:

  H_0: b1 b2

  H_a: b1 > b2

Based on the SPSS output in Table 3, it is obtained that the F_{count} = 4.283 and the probability value or significant value is 0.044 <0.05. Thus there is a significant difference between the average learning outcomes of students who

have high learning motivation compared to the learning outcomes of students who have low learning motivation. Furthermore, based on table 5, it is found that the average science learning outcomes of students who have high learning motivation are 85.654, while students who have low learning motivation are 81.638. So that the hypothesis testing rejects Ho and accepts Ha. With the conclusion that learning motivation provides a positive difference to students' science learning outcomes.

- **Third Hypothesis**

  The statistical hypotheses tested were:

  H_0: A x B = 0

  H_a: A x B 0

Based on the SPSS output in Table 4.27, it is obtained that F_{count} = 6249 and a significant value of 0.016 with = 0.05. Then it can be seen that the value of sig. 0.016 <0.05 so that the hypothesis testing rejects Ho and accepts Ha. With the conclusion that there is an interaction between the learning model and learning motivation in influencing student learning outcomes.

2. Discussion

Natural Sciences (IPA)asa learning has the main goal of helping students gain ideas, understanding, and skills (life skills). Thus the science learning process emphasizes more on observation and communication in observing natural phenomena that occur then solving problems that occur and ultimately finding solutions. The science learning process like this has received less attention from science teachers in junior high schools including SMP Negeri 1 Babalan which shows that there are still many students who cannot solve learning problems and find learning solutions

so that science learning outcomes do not give satisfactory results and are still below the KKM score. So it is very necessary to make a new breakthrough in a learning that is able to improve students' science learning outcomes. One of the steps that can be used by teachers is to change the learning model. The appropriate learning model used in this case is a problem based learning model. This is in line with the opinion Mariani et al., (2016) which mentions the use of problem based learning models can improve students' science learning outcomes.

Model *problem based learning* can make confrontations with students with practical problems or learning that begins with giving problems and has context with the real world. In other words*problem based learning* will train students to solve problems with the knowledge they have so that they will build new knowledge that is more meaningful for students with the following steps: (1) Directing students to problems; (2) Prepare students for learning; (3) Assisting independent and group research; (4) Develop and present tools or materials as a result of work; and (5) Analyze and evaluate the problem solving process (Tjahjana & Arief, 2016). This is in line with research Ariani (2020) which states that the use of problem based learning models can improve the critical thinking skills of science subjects.

D. Conclusion

Based on the discussion that has been described previously, several conclusions can be drawn including the following:

1. The problem based learning model provides a positive difference to the science learning outcomes of seventh grade students of SMP Negeri 1 Babalan in the 2021/2022 academic year (F_{count} = 9.062 and sig. 0.004 <0.05).

2. Learning motivation gave a positive difference to the science learning outcomes of seventh grade students of SMP Negeri 1 Babalan in the 2021/2022 academic year (F_{count} = 4.283 and sig. 0.044 <0.05).
3. There is an interaction between problem-based learning models and learning motivation on the science learning outcomes of seventh grade students of SMP Negeri 1 Babalan in the 2021/2022 academic year (F_{count} = 6.249 and sig. 0.016 < 0.05).

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