The Influence of Application Problem Based Learning Model to Higher Thinking Skills Students of Senior High School Number 13 Palembang on Animal World

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WORD COUNT 2817 TIME SUBMITTED 28-AUG-2020 09:55PM

PAPER ID 62608788

The Influence Of Application *Problem Based Learning*Model To Higher Order Thinking Skills Students of Senior High School Number 13 Palembang on Animal World

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Abstract. This study aimed to obtain information on the effect of PBL models to higher order thinking skills of learners well in the realm of analysis, evaluation, as well as create. The study design used is *Pre Experimental Design* with shape design *One group*pretest-posttest.The shape of this design are the initial tests before being treated and final tests after being treated. The research was conducted in SMA Negeri 13 Palembang in the academic year 2016/2017. The research sample using a single class of 39 students. The sampling technique usedtechnique, *purposive sampling* which is taken into consideration in determining the sample is the average value of biology in the first semester. Data collection techniques in this study were 1) The written test, the test is given in the form of preliminary tests to determine the readiness of learners before studying and final tests to determine the extent to which learners have received learning subject matters as well as determine the ability to think critically learners in the subject matter of biology after being treated, ie learning PBL model application. 2) Sheet questionnaire, aimed to investigate the response of the students during the learning process by using a model of PBL. Analysis of the study results helped by the assistance program *Statiscal 22 Program for Social Science* (SPSS 22), t-test results using *one-sample t test* found that the significance value is 0.000, which means significant value <0.05 at 5% level (α = 0 , 05) it can be concluded that the model *Problem Based Learing* significant effect on the high-level thinking skills of learners.
Keywords: *Problem Based Learning, Higher Order Thinking Skills, World Animal*

1. Introduction

Indonesia is now implementing the curriculum 2013 from primary school and even middle. Curriculum 2013 has the characteristics of learning to use a scientific approach[(1).] In the curriculum 2013 has a change of the competencies, which the strengthening measures occur in the learning and assessment process that leads students to seek out not notified. One of the reasons why the curriculum 2013 continue to be developed for their future external challenges that require the ability to think[[2].] To reach the

characteristics of the curriculum 2013 and answer the challenges of the future, then the students are required to have good thinking skills.

One that includes the ability to think is a higher order thinking skills. Highr order thinking is a cognitive ability that not only requires the ability to remember, but also require a higher capacity by using comprehensive thinking to find something new or a new answer[3], [4];[5]. This higher order thinking skills refer to taknomi Bloom's revised by Anderson & Krathwohl in 2001 starting from remembering, understanding, applying, analyzing, evaluating and creating. Three levels starting from analyzing, evaluating, and creating is a higher order thinking skills[6];[7].

The fact of the case that higher order thinking skills of students in Indonesia is poor. This is caused by the lack of the ability of students to solve problems and assessment in Indonesia are still using low-level questions[8] and an assessment of students Indonesia in PISA at the category of Science which is almost at the last position. In 2009, Indonesia ranks 60 out of 65 participating countries[9]. In 2012, Indonesia ranks 64 out of 65 participating countries[10]. In 2015, Indonesia ranks 62 out of 70 participating countries[11]. To overcome these problems it would require an effort to improve the ability to think of students in this case is necessary to apply a model of learning. The learning model that has been suggested by the goverment[2] include a Project Based Learning, Discovery Learning and Problem Based Learning.

Problem Based Learning (PBL) is an instructional model that is the way of delivery is done by presenting the problem and engage learners to solve problems through group process or systematic team[12]; [13];[13]. Characteristics of PBL is learning to use a systemic approach to solving problems and issues presented are real-world problems. PBL syntax used is comprised of five phases[15]. PBL also has a syntax that can improve thinking skills that occur in the third phase is to do an independent investigative and groups. In this phase the students are trained to think at a higher level so that students can analyze, identify problems and find solutions when they meet a real problem in everyday life.

Problems in life are the main study in biology. One passage studied in biology is the Kingdom Animalia. The real problems in the kingdom animalia are often encountered in daily life include tapeworm infections, heart worm infection in cattle, elephantiasis, and hookworm.

Based on the above, then this paper tries to present how the effect of applying the model of Problem Based Learning to higher order thinking skills of students.

2. Methodology

The study design used is *Pre Experimental Design* with shape design *One group*pretest-posttest. The shape of this design are the initial tests before being treated and final tests after being treated[16]. Research conducted at SMAN 13 Palembang involving one class of 39 people.

Data collection techniques in this study in the form of a written test and student questionnaire responses sheet. Written test consisting of 20 multiple choice questions. This response questionnaire is both closed and direct using a Likert scale. This questionnaire consists of 20 statements, 15 are positive and 5 negative thinking skills is constituted by Bloom's taxonomy revised by Krathwohl and Anderson started at the level of C4 (Analyze), C5 (Evaluating) and C6 (Creating). The level of learning outcomes in this case is a higher order thinking skills at pretest and posttest 80-100 defined criteria (excellent), 60-79 (good), 40-59 (sufficient), 20-39 (less), and <20 (very less).

Analysis of the study results helped by the assistance program Statiscal 22 Program for Social Science (SPSS 22). Test for normality usingtest the Shapiro-W then continued using t-test using one-sample t test. The increase in high-level thinking skills using normalized gain value (n-gain) by using the following formula[17]:

$$\text{n gain} = \frac{final\ tests - initial\ tests}{ideal\ score - initial\ tests}$$

n-gain category index are grouped into three categories, namely high ($g \geq 0.7$), medium ($0.3 < g < 0.7$), and low ($g \leq 0.3$).

3. Results and discussion

Before learning begins students beforehand by preliminary tests to see the extent of the ability of students, then after the treatment then given a final test to see how far the ability of students after being treated. Percentage of pretest and posttest values can be seen in Figure 1.

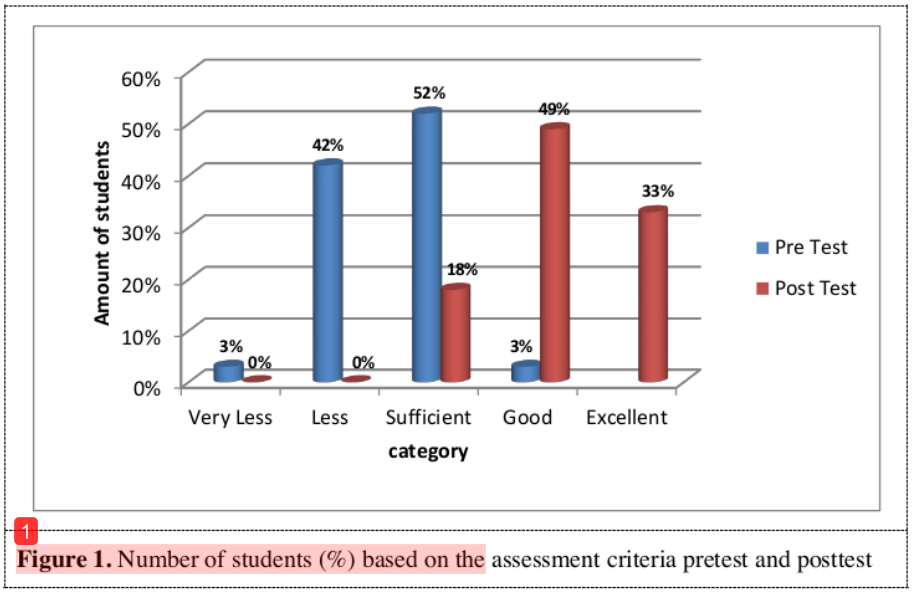

Figure 1. Number of students (%) based on the assessment criteria pretest and posttest

From the results presented in Figure 1, it can be seen that the percentage of students who have a higher order thinking skills criteria of "good" and "excellent" increased. In good criteria increased from 3% to 49%. In excellent criteria for an increase from 0% to 33%. While on the criteria of "very less" "less" and "sufficient" impaired. At the criteria of very less than 3% to 0%. In less criteria decreased from 42% to 0%. On the criteria sufficient from 52% to 18%. The increase in higher order thinking skills of students is calculated using the value of the n-gain. Amount of students, the average value of the pretest and value posttes, distribution, gain, n-gain, and significance are shown in Table 1.

Table 1 Test Normality test and difference between the mean value pretest and posttest

No	pretest		posttest		Gain	n-gain	*P*(sig.)
	the mean value of	Distribution	the average value	Distribution			
39	38.03	Normal	71.21	Normal	33.18	0.53	0.000 (significant)

Based on Table 1 above it can be concluded that the value obtained exceeds the significance of > 0.05 at 5% level (α = 0 , 05), it can be said that the data obtained have normally distributed. Then proceed t test and based on the criteria if the significance value > 0.05 at 5% level (α = 0.05), it can be said no significant effect and if the significance value < 0.05 at 5% level (α = 0, 05) such that any significant influence. The value obtained by the value of significance of 0.000 which means less than 0.05 then there is a significant influence. Given the significant influence it can be said that the application of the

model PBL can enhance higher order thinking skills of students. The increase in higher order thinking skills of students fall into the medium category with n-gain 0.53.

The increase in higher order thinking skills is also supported by the student questionnaire responses. The questionnaire was given at the last meeting of learning. Questionnaire This response is direct and closed using a Likert scale. This questionnaire consists of 20 statements. Results learner responses during learning using PBL models can be seen in Table 2.

Table 2 Percent response of learners per statement

No.	Statement	nature of the statement	SD	DA	A	SA
1.	The first time I learned to use the model *of Problem Based Learning*	Positive	0	7	19	13
2.	Learn to use model *Problem Based learning* improve my learning spirit	Positive	1	0	23	15
3.	learn to use the model *of Problem Based learning* makes me lazy to follow the lesson	Negative	9	28	0	2
4.	Learn to use the model of problem based learning enhances my cooperation	Positfive	0	1	21	17
5.	learn to use the model *of Problem Based learning* increase my confidence	Positive	0	4	29	6
6.	learn to use the model *of Problem Based learning* increase my curiosity	Positive	0	0	22	17
7.	How to learn to use the model of *Problem Based learning* makes me more active in learning	Positive	3	1	24	11
8.	learn to use the model *of Problem Based Learning* increase the sense of my responsibility	Positive	1	2	26	10
9.	Learn to use the model *of Problem Based Learning* improve my thinking skills	Positive	1	1	29	8
10.	Learn to use the model *of Problem Based Learning* improve my ability to solve problems	Positive	1	0	29	9

11 .	Learning through models *Problem Based Learning* increased my understanding	Positive	0	1	29	9
12.	Learning through model of *Problem Based Learning* makes me not understand the concept of lessons	Negative	10	23	5	1
13.	Learn to use the model *of Problem Based Learning* to improve my analysis	Positive	0	1	31	7
14.	Learn to use the model *of Problem Based Learning* to improve my creativity	Positive	1	3	26	9
15.	Learn to use the model *of Problem Based Learning* makes the subject matter easier to understand	Positive	1	1	19	18
16.	Learn to use the model of *Problem Based Learning* makes the subject matter is more difficult to understand	Negative	11	19	2	7
17.	Learning to use m the Model *Problem Based Learning* more fun	Positive	1	1	19	18
18.	Learn to use the model *of Problem Based Learning* more boring	Negative	11	25	2	1
19.	subject matter of Animalia very interesting to learn	Positive	1	4	26	8
20.	Subject matter of Animalia very not interesting to learn	Negative	6	26	7	0

Based on the responses of students listed in table 4, it can be said that for a positive statement there were 30% of students responded strongly agreed (SA), 64% of students responding agree (A), 4% of learners give response does not agree (DA), and 2% of students responded strongly disagree (SD). Response learners to negative statements there are as many as 24% responded strongly disagree (SD), 62% responded disagreed (DA), 8% responded agree (A), and 6% responded strongly agreed (SA).

Based on the results of the above, an increase in higher order thinking skills of students using PBL models. PBL itself is a learning model that is the way of delivery is done by presenting the problem and engage students to solve problems through a process of group or team work systematically. The problems are given a problem that is often encountered real life, the problems presented be a starting point and requires a dual perspective, the problems presented are expected to develop problem solving skills and challenge the knowledge possessed by students[14].

PBL models also have a syntax that can encourage students to collect appropriate information and find solutions. Once students gather information, students are required to be able to develop information that has been obtained in this case the analytical skills and thinking ability of students is required. PBL

model application aims to develop higher order thinking skills and students centered learning where students should be able to find what to study and where the information was obtained[2].

Learning to use the issue to prepare students for analytical thinking Learning to use the issue to prepare students for analytical thinking because the problems given encourage learning to occur. So that students can find their own lesson concept for the solving problems and learning becomes more meaningful[18]. This is in accordance with the utilization of excess PBL to develop thinking skills, problem-solving skills, integrating knowledge and specific to the skills simultaneously and apply it in a relevant context and can create meaningful learning[19].

4. Conclusion

Based on the above, it can be concluded that the learning activities using the PBL model can improve students 'ability in solving problems, improve the power of analysis, and improve students' creativity. Its means an increase in higher order thinking skills of students in the subject matter of Animalia. The increase in higher order thinking skills of students fall into the medium category. Learning by using PBL model can make students more enthusiasm in learning and make the subject matter becomes easier to understand.

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