

THE EFFECT OF PROBLEM BASED LEARNING MODEL TOWARD STUDENT LEARNING OUTCOME IN DYNAMIC ELECTRICITY TOPIC AT CLASS X IN SMA NEGERI 1 PERBAUNGAN ACADEMIC YEAR 2014/2015

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ABSTRACT

The objective of this research to know the significant difference of student learning outcome using Problem Based Learning Model in dynamic electricity topic at class X SMA Negeri 1 Perbaungan Academic Year 2014/2015. The type of research was quasi-experiment with the population is all of students at class X in odd semester consist of six classes. Sample of this research was obtained by cluster random sampling technique. The research instrument has seven questions in essay form, the instrument tested validated. Research result obtained the average value of posttest in experiment class was 80.63 and 75.53 for control class was higher than control class. It can be concluded that there was significant difference towards student learning outcomes using Problem based Learning Model.

Keywords : Problem Based Learning Model, Dynamic Electricity

INTRODUCTION

Physics is one of the sciences that important in education. Physics is a natural science is concerned with how to find out about natural phenomenon systematically, so that the natural science is not just a collection of knowledge mastery of facts, concepts, or only principle but also is a process of discovery. In natural science education expected become facilities for learners to learn about human and environment, as well as the prospect of further development in applying them in daily life.

The process of learning gives emphasis on providing the experience to develop competence in order for learners exploring and understanding the natural science.

Physics till now is one of subjects that are less attractive to students. It is evident from the low percentage of students mastery the learning matter. This is because in addition to the material in these subjects

is difficult to understand, sometimes the delivery of content by teachers lacking attract students.

In general, physics teacher at school often discussing the theory of the handbook, providing formulas and solving problems. The system of teaching learning process focus on teacher centered and use conventional learning.

Based on the preliminary observation with questionnaire found about 50 % students in SMAN 1 Perbaungan which like the physics as an obligation. And 33 % students stated physics interested in learning physics. If only the method of teaching the teacher are good and interactive, it will make them more interested in learning physics. In their daily life, they will be respond well to the subjects of physics, this can be seen when teachers teach, they observe and record things that are important.

Observation data show 60 % of students prefer to learn physics in groups. In reality teachers rarely engage student in the the process to get knowledge and in group discussion and only emphasize the students to memorize formula and doesn't emphasize on the concept and its application.

In fact, many students are still difficult in using the formula to solve problem and some of them is misunderstanding on the concept. During the learning process, the teacher rarely conduct students in experiments for the material significantly.

Learning process show students as the listeners and teacher is dominated the class or teacher-centered. Dominance of teacher in this study will cause the student less motivated and less curiosity in this subject in acquiring knowledge.

Generally, learning physics in this school is still using conventional learning method because this method is easy to implement and quickly seen. In the learning process that is likely to be teacher centered domination master teacher in the classroom. Teacher writes on the blackboard, and then,

RESEARCH METHOD

The research conducted at year X of SMA Negeri 1 Perbaungan on April until May in second semester of research Academic year 2014/2015. The population in this research is all students at year X of SMA N 1 Perbaungan and consist of eight classes. Sampling technique in this research use cluster random sampling. this technique provide the same chance for every part of population to be selected into sample. Randomly selected sample and obtained two classes that used as experiment and control class. The variables in this research are independent variable and dependent variable. Independent variable in this research is learning model of problem based learning (PBL). Dependent variables in this research is students learning outcome. method use in this research is quasi experiment. this experiment method use to see the figure of achievement level.

goes on solving problems related to it. The students prepare for the exam by memorizing these concepts and formulas, and by solving the related problems. Meanwhile, some of the students cannot comprehend the concept, others are not interested in the subject as they think that it is not useful to them, and the others are like spectators while few students come to the blackboard and solve the problems. Problems above must developed by fixing learning model that can improve students learning outcome and students become active in learning process. Student not only receive the teacher explanation but also student can understand the real physics concept and the important understanding the concept for resolving the problem. An effort to improve students learning outcome implementing the Problem Based Learning (PBL) Model.

Solving this problem the researcher must be able to manage required for each step and can really adjust the time allocation there with the lesson plans are made. And involve teachers in the learning process so that students become active so student can increase their learning outcome. Experiment research method is the most productive experiment research because if the research applied well, so it can answer the main hypothesis that link to causal relationship. Preliminary test conducted before learning activity process to determine the level of students' skills in dynamic electricity material in the control and experimental classes. Dynamic electricity taught for students, and then conducted posttest to get the value of students learning outcomes in the control and experimental classes. This research will conducted two classes who give the different treatment. to know the student's achievement used test for both of classes before and after give the treatment. The design of research showed in Table 1.

Table 1. Research Design

Sample	Pre-Test	Treatment	P o
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			s t - T e s t
Experiment	T ₁	X ₁	T ₂
Control	T ₁	X ₂	T ₂

While, the instrument is achievement test of students as much ten questions. Test is compiled based on analyze of curriculum unit education level, handbook of teacher and students and questions has been tested in class or group. Before use the test, it will be validated based on content validity by using fundamental construction test. Preparation of this test is used to customize the content validity test questions based on KTSP with dynamic electricity topic.

The test tested by content validity. Content validity is the standard of a test to measure the coverage of a substance to be measured. A test is stated to have content validity when it measures specific objectives that align with the subject matter or content provided. The instrument has been developed subsequently validated to expert (lecturer or teacher).

Selection of data analysis techniques specified interval data dissemination. The spread of data is how the data is spread between the highest value with the lowest value, and the variability in it because the normality test sample should be done.

Firstly determining mean and standard deviation. The mean is the sum of the whole numbers /no numbers, divided by the number of digits/numbers. Secondly, determining normality test. it aims to determine whether a sample comes from a normally distributed population or not. Lilliefors test was used to examine.

Knowing the data homogenous or not, used homogeneity to test variance similarity, which one of the requirements to

use the test statistic t in hypothesis testing as follows :

- : There is no difference of student learning outcome between using problem based learning with conventional learning in Dynamic Electricity Topic class X SMA Negeri 1 Perbaungan.
- : There is difference of student learning outcome using problem based learning model with conventional learning in Dynamic Electricity topic class X SMA Negeri 1 Perbaungan.

RESULT AND DISCUSSION

This research is quasi- experimental research involving two classes that were given different treatments, namely experiment class were treated by using Problem Based Learning Model and control class was treated by using Conventional Learning Model. The population of this research is all students at Class X of SMA Negeri 1 Perbaungan and consist of six classes. The sample of this research were two classes that consist of thirty six students namely the class X-2 and X-4 SMA Negeri 1 Perbaungan.

In the beginning of research, both of classes given pre-test which aims to determine whether the initial ability of students in both classes are same or not. But firstly the problem of pre-test must be validated. In this research, using the content validation.

In the beginning of this research, experiment and control class were given pretest which aim to see initial learning ability of students in both of classes. Based of the result of test before treatment ,the value detailed of experiment class showed in the Table 2 and, value detailed of control class can be seen in the Table 3.

Table 2. Pretest Result Data in Experiment Class

Parameter	Value
Avarage	49.80
Highest Value	70
Lowest Value	37

Standard Deviation	8.63
Variance	70.50

Based on pretest data, with amount of responden : 36 got the highest value : 70 and lowest value : 37, with average value : 49.80 and the standard deviation : 8.63 .Then standard deviation : 8.63. Based on the result of test before treatment the picture of frequency distribution in experiment class showed in Picture 1.

Picture 1. Frequency Distribution of Pretest Result Data in Experiment Class before treatment using PBL.

Table 1.3 Pretest Result Data in Control Class

Parameter	Value
Average	47.86
Highest Value	73
Lowest Value	33
Standard Deviation	8.24
Variance	68.05

Based on pretest data, with amount of responden : 36 got the highest value : 73 and lowest value: 33,with average value : 47.86.Then standard deviation : 8.24.Based on the result of test before treatment the picture of frequency distribution in control class showed in Picture 2.

Picture 2. Pretest Data Result in Control Class before treatment using Conventional Learning Model.

Both of class are given different treatment, then both class are given post-test that problems which same with pre-test with essay test with seven problems. After giving treatment, the post-test results of experiment class showed in the Table 4.

Table 4. Posttest Result Data of Experiment Class

Parameter	Value
Average	80.63
Highest Value	93
Lowest Value	60
Standard Deviation	7.19
Variance	51.78

Based on posttest data,with amount of responden : 36 got the highest value : 93 and lowest value : 60,with average value : 80.63 and the standard deviation. The picture of frequency distribution in experiment showed in Picture 3.

Picture 3. Posttest Result Data in Experiment Class using PBL Model.

Both of class are given different treatment, then both class are given post-test that problems which same with pre-test with essay test with seven problems. After giving treatment, the post-test results data of control class showed in Table 5.

Table 5 Posttest Result Data of Control Class

Parameter	Value
Average	75.53
Highest Value	90
Lowest Value	53
Standard Deviation	8.17
Variance	66.86

Based on posttest data,with amount of responden : 36 got the highest value : 90

and lowest value : 53,with average value : 75.53 and the standard deviation : 8.17.The picture of frequency distribution in experiment showed in Picture 4.

Picture 4. Posttest Result Data in Control Class using Conventional Learning.

CONCLUSION & SUGGESTION

During the implementation of the research showed that Problem Based Learning Model has beneficial because the model is designed to bring students directly into scientific process into small periods of time and the training has resulted in an increased understanding of science, more creative thinking, and skills for obtaining and analyzing information as students establish facts, build concepts, and then generate and test explanations or theories. Thus, the students able to reflect their own thinking process in real life problems, retain students the knowledge in longer time and also raise the motivation of student of interest in subject matter.

The results in cognitive aspect showed that there was significant difference of students' learning outcomes.

Result of Cognitive domain showed acquisition value of the average pretest students in the experimental class was 49.80 with a standard deviation of 8.63 and an average posttest score of 80.63 with a standard deviation of 7.19. While the values obtained in the control class average pretest students of 47.86 with a standard deviation of 8.24 and an average posttest score of 75.75 with a standard deviation of 8.43. From the data, average posttest value of experiment class is bigger than control class. The increasing of posttest value is caused by after pretest done we give treatment to the students. In experiment class we give the treatment using problem based learning model and control class given the treatment using conventional learning model.

The increasing of learning outcome by using Problem Based Learning is better because it has several overplus, students learn to get knowledge and practice their skill thinking,stimulates the curiosity and motivates the student's ability, students are encouraged to be autonomous, learn actively in mastering concepts and principles, teaches the students to understand the content and process in same time, students learn to solve the problem, evaluate the solution, and think logically, it can be seen when the students work in group and convey their hypothesis and when they asked the teacher or share what they had have in learning process, students are also demanded learn and acting so they more remember what they had learn.

Problem Based Learning directs the students to be more active, creative and critical thinking so they are motivated to understand the subject. For example in solving the problem, students are divided in group whom has five or six member. Then share their result discussion to others.

For the next researcher so that use the time effectively thus the syntax in problem based learning model can achieved and occurs well. Also that prepare one observer for each of group to get accurate data and to observe the students' affective will be better if researcher take daily notes of students from class teacher. Then give more attention and guidance of students who are less active in learning process.

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