Jurnal Ikatan Alumni Fisika Universitas Negeri Medan
Vol.2 No.4 Oktober 2016
ISSN : 2461-1247

THE EFFECT OF PROBLEM BASED LEARNING MODEL STUDENTS ACHIEVEMENT ON STATIC FLUID TOPIC AT YEAR XI OF SMA NEGERI2 LINTQNGNIHUTA ACADEMIC YEAR 2015/2016

Novianti Hutasoit and Motlan Sirait
Bilingual Physics Education Program, Medan State University
hutasoitnovianti@gmai 1 .com

Abstract

This research is aimed to know and describe the student's Achievement using problem based learning and conventional learning about static fluid topic . This research employed a quasi experimental pretest and posttest with control design. The populations were 60 students grade Xl-science in SMAN 2 Lintongnihuta academic year 2015/2016. The samples consist of two classes, one class with 30 students as experiment class and one class as control class with 30 students, while the sampling technique used purposif sampling. Research instrument used essay test. The data obtained in the study were analyzed by the computer program Ms.Excel. From the research the pre-test average value of outcomes experiment class 26.66 and control class 27.83, after giving the treatment the post-test with the average value of outcomes experiment class 59.66 and control class 49.50. The result of t test Uunt = 3.158 while $ttabi_e^=$ 1.661. Because $t_{c<>unl}$>$t_t$abie(3.158> 1.661) so Ho rejected. The result showed that student's achievement in experiment class had been treated with problem based learning model have significantly different from control class which had been treated with conventional learning. In addition, the improvement of PBL in experiment class was greater than in control class. This meant implementation problem based learning has a significant effect toward student achievement.

Keyword: Student's Achiement, problem based learning, quasi experimental.

INTRODUCTION

Education is the process of facilitating lear ning, or the acquisition of knowledge,skills values, beliefs, andhabits. Education holds the important role to produce Indonesian human resources, like as individu or as society because education can improve and develop the quality of human resources. The learning process is both a mirror of one's life in relation to others and to the wider environment, as well as a compass to help us to map our way in our life's journey (Ramphele, 2015).). Education is expected to produce human resources highly skilled, including critical thinking, logical, creative, and willingness to work together effective that can be developed through education of physics.

Physics as a science is one of the subjects related to nature so demanding in learning the necessary investigations in the form of an experiment on such knowledge. The science and its applications are part of daily life to make our life better and therefore the development of an individual's understanding of science and its applications is one of the objectives of science instruction. Learning physics in schools is still dominated by the activities of teachers. In the sense of active teachers to teach and learners passive in learning (Prayoga, 2013). Therefore, not all types of Learning strategis necessarily improve the acquisition of conceptual understandin g. Research also suggests that higher level strategies are expected to promote conceptual understanding. Various studies exist in the physics education literature investigating the effectiveness of Learning strategi on student learning.Until now most schools will have to clean that purpose. However, the learning outcomes of students in studying physics has not shown success and satisfaction.

Learning outcomes are also associated with student life perspective (Ronfeldt, 2015). A fact that when the children were young, their world is full of questions. In various facets of life, they get the idea that being an adult means left the world questioning to enter the world know the answer. Schools tend to encourage the movement of question to answer because success by simply placing the correct answer blank or mark the correct response. Problem in school tend to have one correct answer and questions that no response is rare. Therefore, if we want to know how to learn is more important than knowing all the answers, then we must realize that a good question is more important than the right answer. Teaching students to ask questions of quality more important than the truth of the answers they could provide. The lesson will be interesting

and successful, when linked with experiences in which they can see, feel, give, do, try, think, and so forth. In this case the learning approach used in schools are less precise.

Observations has been conducted by researchers on students of SMAN 2 Lintong Nihuta, there are some problems that are found in physics learning. Perspective physics students will be unfavorable. Learning physics is often a frightening specter for them, filled with formulas, interesting but difficult to understand the study, there are even some opinion reveals that physics is only for scientists. Furthermore, the way of teaching physics teacher in the classroom tends to take notes and work on the problems. In addition, about 60% of students in each class XI science still has a value below KKM standards.

Monotonous teaching methods is the reason why the study of physics be learning less interesting for students. Moreover, when given a problem most students do not get to read about and determine what formula is used. Teachers do not always adopt new instructional strategies seamlessly. According Ravitz (2003) in (Tamim, 2013) posited that, even when teachers show enthusiasm about the constructivist teaching approach after participating in professional development workshops, they might not find it easy to implement it in their classrooms. Hence develop assumptions on students that physics is suitable only be learned by those who want to be a scientist or a physicist more details. At the time of teaching and learning activities take place, the activity of students in working on the problems of physics given by the teacher is still lacking, although still capitalized, see the notes and only some students were active. Another case when the teacher asked the students if the material presented is understandable, students only silence in other words no student is given a definite answer. Additionally, when a time the teacher gave a demonstration, students were also less active in its implementation. It shows students just received the knowledge of the teacher without the initiative to find their own. Furthermore, from the results of tests conducted by teachers of physics, it is known that the results of student learning about the material of static Fluid has not reached the expected target. Information about the physics student learning outcomes obtained from interviews, the average value for 3 years in a row has not reached the minimum completeness criteria. From this it appears that student learning outcomes are still low in physics.

Problem-based learning model is an instructional model that presents a contextual problem that stimulate learners to learn. In classes that implement problem-based learning, students work in teams to solve real-world problems . So, student able to solve the problem and get the knowledge and important concept by their selves (Etherington, 2014). Problem based learning aims improve students ability to work in a team, showing their coordinated abilities to access information and turn it into viable knowledge (Eldy, 2013). PBL will happen with meaningful learning. Because Learners who learn to

PBL can improve critical thinking skills, foster initiatives learners in work, internal motivation to learn, and can develop interpersonal relationships in the working group. One advantage of PBL is that discussion in a small group will empower students to be more independent in their study. Which means they will stimulate themselves to be more responsible and directly lead them to spend more time on their studies (Dolmans, 2016). In the fact shows students are less able to relate the information that has been obtained from the teacher with information that will be studied and related to everyday life. This relates to the lack of practice over theory learned and laboratoiy use are not effective in schools.

RESEARCH METHOD

The research conducted in SMAN 2 Lintong Nihuta grade XI semester II that were active in the Academic Year 2015/2016, on Jln.Dolok Sanggul Siborong borong. The research sample consisted of two classes that represent the population by having the same characteristics. As an experimental class Class XI is the number of students 30 students and were treated using the methods of learning Problem Based Learning (PBL) and as a control class is the class XI with the number of 30 students and were treated using conventional learning.

The study involved two classes, namely the experimental class and control class, where two classes are given different treatment. Given the experimental class teaching methods Problem Based Learning (PBL), while the the control class was given conventional learning models. To determine student learning outcomes obtained with the two treatments, the students were given the test twice a test that is given before treatment (Tl) is called pre-test and test after treatment (T2) called post-test. The design of this study as follows :

Tabel 3.1. The design of the research

Class	Pre-test	Treatment	Post- test
Experiment	T, T,	$\mathbf{X_1}$	T_2 T_2
Control		$\mathbf{X_2}$	

Explanation:
T, : Pre -Test
T_2 :Post - Test
Xi = Problem Based Learning Model
X2 = Conventioal Learning

T tests were used to determine the two parties similarity initial ability of students in both groups of samples. The hypothesis tested in the form:

H_o : $\mu_1 = \mu_2$ = Student's achievement of experiment class before giving treatement is equal to student's achievement of control class

Ha : $\mu_1 \neq \mu_2$ = Student's achievement of experiment class before giving treatment is different to student's achievement of control class

RESULT AND DISCUSSION

Result of this research was obtained from two samples classes, experiment class treated problem based learning model and control class by conventional learning. Result of this research were about the student's achievement in both of class

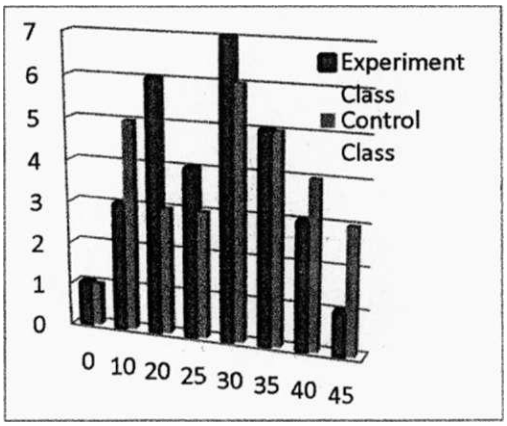

Figure 4.1 Distribution of pretest result

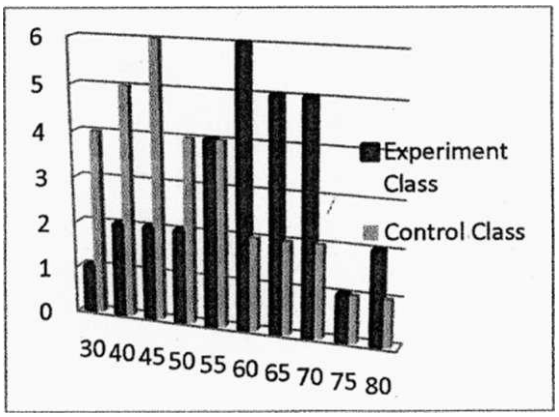

Figure 4.2. Distribution of posttest result

To calculate the data normality test pretest and posttest in the experimental class and control class is use Liliefors test. Normality test results is shown in

Table 4.3 The result of normality test

Class Data	L_{Count}	Conclusion
Pre-test Experiment	0,0780	Normal
Post-test Experiment	0, 0922	Normal
Pre-test Control	0, 1265	Normal
Post-test Control	0, 1210	Normal

Based on the table 4.2. it can be seen that $L_{count} < L_{table}$, so the pre-test and post-test data both of sample are normally distributed. Homogeneity testing done to know whether the samples used in this research homogeneous or not, it means whether the samples used in this research can represent all the population. Tests done by the homogeneity of data variance equality test. The results of calculations for data pre-test and post-test of both groups are shown in Table 4.3. Homogeneity testing of datadone with variance equality test. The result of the both pre-test and post-test calculation is shown in

Table 4.4 Homogenity Test Result of the both of Class

Class Data	F_{cunt}	Conclusion
Pre-test eksperiment Pre-test control	1.39	Homogeneous
Post-tes experiment Post-tes control	1,20	Homogeneous

From the data above $F_{count} < F_{table}$, so the data from the experimental class and control class homogeneous. Two tail test is used to know similarity initial ability of students in both groups of samples. The hypothesis tested in the form:

H_o : $\mu_1 = \mu_2$: experimental class and control class have the same initiability

H_a : $\mu_1 \neq \mu_2$: experimental class and control class have the different initiability

CONCLUSION

Based on the research result, data analysis, and discussion, the conclusions of this research are as followings as below:

1. Conventional Learning before being given treatment average pretest 27.83 and after giving the treatment the average post-test 49.50
2. Problem Based Learning model before being given treatment average pretest 26.66 and after giving the treatment the average post-test 59.66
3. From the result of hypothesis test $t_{count} > t_{table}$ is 3.158 > 1.661, so that H_o is rejected and H_a is accepted. It can be concluded that there is a difference of student learning achievement using problem based learning model with conventional, on the other word the learning achievement by using problem based learning better than conventional learning.

REFERENCES

Dolmans, D. Wolfhagen, I & Vleuten, C. (2006). Why aren't They Working?.In P. Schwartz, S. Mennin, & G. Webb. Problem- Based Learning:Case Studies, Experience and Practice. London & New York. Routledgc.

Eldy, E. F and Fauzian, S. (2013). The Role of PBL in Improving Physics Student's Creative Thinking and its Imprint of Gender, *International Journal of Education and Research* 1(6).

Etherington, M. B. (2014). Investigate Primary Science: Problem Based Learning Approach. *Australian Journal of Teacher Education* 36(9).

Prayoga, Z. N. 2013. Kemampuan berpikir kritis siswa pada pembelajaran materi pengelolaan lingkungan dengan pendekatan keterampilan proses sains. **Skripsi. Semarang: Universitas Negeri Semarang**

Ramphele, M. (2015). Meaning and Mission. *European Journal of Education* 50(1). Ronfeldt, M, Farmer, and Mc Queen. (201 5), Teacher Collaboration in Instru ctional Teams and Student Achieve ment, American Educational Research Journal 52(3): 475-514. Sudjana, (2005), *Metode Statistika,*Penerbit Tarsito, Bandung.

Tamim, R. S and Michael, M. G. (2013). Defenitions and Uses: Case Study of Teachers Implementing Project-*based Learning*, Interdisciplinary Journal of Problem-Based Learning *7(2)*.