# THE EFFECT OF PROJECT BASED LEARNING MODEL ON STUDENT'S LEARNING ACHIEVEMENT OFFLUID TOPICINCLASS XI SMAN 1MATAULI PANDAN ACADEMIC YEAR 2013/2014

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ABSTRACT

The objectives of this research are: (1) To know if there isthe influence of Project based Learning model to students learning achievement in Fluid topicin SMA N 1 Matauli Pandan Class XI Academic Year 2013/2014. (2) To determine the differences of student's achievement in the subject matter Fluid using Project based Learning Model and Conventional Learning in Class XISMA N 1 Matauli Pandan, Academic Year 2013/2014. The type of research was quasi experiment with the population all of student in class XIof Science Program even semester in SMA N 1 Matauli Pandan which consits of 7 classes. Sample of this research was obtained by technique cluster random sampling. The sample is XI IPA 3 as the experiment class and XI IPA 4 as the control class. Experiment class taught by Project Based Learning model and control class taught by conventional learning. The research instrument has 10 questions in multiple choice forms with 5 options, the instrument tested validated. In this research obtained the mean of pre-test in experiment class is 28 and in control class is 26.4. The treatment in experiment class taught by Project Based Learning model and in control class taught by conventional learning, and then done the post-test. The mean of post-test in experiment class is 78.8 and in control class was 69.6. In hypothesis testing $t_{count} > t_{table}$ that was 3.07 > 1.67 at significant level α = 0.05 and dk =48. So, can be concluded that the student's learning outcomes in experiment class better than in control class. Ha was accepted or has effect of Project Based Learning Model on Student's Achievement of Fluid Topic in Class XISMA N 1 Matauli PandanAcademic Year 2013/2014.

Key word: Project Based Learning, Student's Achievement

## INTRODUCTION

Education is one of the factors to support the progress of a country. There fore, to improve the quality of education in Indonesia has issued Government Regulation no. 19 Year 2005 on National Education Standards, and perfected Curriculum of Education Unit Level Curriculum (KTSP) to Curriculum 2013. Based on this condition, perharps that the students have a good learning achievement. Butthe fact, it isn't same with the expectation. As the observation result at SMA N 1 Matauli Pandan, the learning achivement especially in Physics is not maximum yet.

Learning is a process of interaction between the learner and his environment so that there is a change to ward better behavior. According (Djahiri in Siregar, 2012) the main

principle in the learning processis the involvement of the whole olmost of the potential student (physical and nonphysical) and the meaning for them selves and their lives to day and in the future (life skills).

Learning Physics in generalis still oriented to wards the teacher. Studentst end to accept what is described by the teacher without having to know the meaning of the lesson. Students also end to memorize the definition and formula, the learning approachis less associated with natural phenomena, everyday life, and technological developments. This causes students passive and less motivated in learning, students assume that physics is difficult and boring, they learn physics because physicsis a compulsory subject, so students have difficulty learning and lead to a low learning achievement of Physics.

The emphasis should be relevant to physics daily life learning, so that the physics obtained will be useful, and will have an important role for students to apply in everyday life. Next will bean impactin creating quality human resources. Therefore, to awaken students 'enthusiasm for learning physics, required learning strategies, such as Project Based Learning models.

One of the problems facing our education is lack of learning problem, where the learning process, students are not encouraged to developcritical thinking skills. As stated Yus off bin Harunin the Project-based Learning Handbook:*"The old school models of passively learning facts and reciting them out of contextisno longer sufficient to prepar estudents to survive in today's world"*

The learning process in the classroom is directed to the child's ability to memorize information, the brain is forced to recall and hoard a variety of information without being required to understand the infor mation that is remembered to connect with every day life. As a result, student sare theoretically smart but poor application (Retno, 2008). Based on the observation result, teacher rarely to practice on the laboratory. The advice at the laboratory is not complete yet. In other side, students would refer to do experiment than hearing teacher's description as usual (54.3%).

Learning physics laden with concepts, from simple concepts to more complex concepts and abstract, so it requiresa correct understanding ofthe basic concepts in physics. One of the goals of learning physics in high school is "the students can understand the concepts of physics and its relevance and application to solve problems in every day life and technology" (Depdiknas, 2004).

Project Based Learning model is one of the innovations in learning that can be use das PBL aims to train students incritical thinking, creative, rational and improve understanding ofthe material being taught and givereal experience to students. According to Buck Institute for Education (BIE) (in Ngalimun, 2012) that PBL is a learning model that focuses on the concepts and principles of the main (central) of a discipline, involving students inproblem-solving activities and other meaning ful tasks, giving students the opportunity to work autonomously to construct their own learning and ultimately produc evaluable and realistic student work. In addition, through the model PBL, students are expected to develop know ledge through participation in the learning process. In this learning process with active student learning (student-centered) build know ledge while the

teacher acts as a facilitator and motivator (Ngalimun, 2012).

Fluid topic in accordance with the model of Project Based Learning (PBL) as it is one material that is much discussed theory of physics. With the PBL models, the term smart students theoretically but poor application can beavoided. This studywill beconductedin SMA N 1 Matauli Pandan. Based on observations made average value of physics students is 50-60 with a minimum standard 78.

And then, there is a problem that contextual to the citizen. Nowadays, almost 8 hours per day we have no electricity. As we know that our life activity is depend on electricity using such as for cooking, lighting, water pump, etc. Especially for water pump, it's an important things, because we need water for take a bath, watering plant, cooking, clothes washing, dishes washing, etc. So, when there is no electricity, there is no water. In this case, students have to find the solution of this problem using project based learning.

By solving the contextual problem above using the PBL model expected student able to understand the Fluid to the material well in order to improve student learning outcomes physics. Research with respect to the influence of PBL to increased learning outcomes in a variety offields of study has been carried out by Bellyna (2010), concluded the application of the PBL approach has significant impact on learning outcomes of students in junior high school chemistry Brigjend Katamso field on the subject of acid-base by 30, 69%. Further research conducted by Rahmadiah(2011), concluded that the model of learning through PBL effect on improving student learning outcomes by 51%. Recent research Anriani Devi(2012),

the results showed that PBL has an influence on improving student learning outcomes of 22.8%.

Based on the description above, researchers interested in conducting research in the physics department with the title, "the effect of project based learning model on student's learning achievement of fluid topic in class XI SMA N 1 Matauli Pandan Academic Year 2013/2014 ".

## RESEARCH METHOD

The research has been done at Senior High School (SMA Negeri) 1 Matauli Pandan. The populations of this research are all of students in class XI SMA Negeri 1 Matauli Pandan that consist of 7 classes of Science program with each class consist of 25 students.The sample is choosen by cluster random sampling. The sample is divided into two classes consisting of one class as experimental class and the other class as control class.

This research is involved two different treatments for the experimental class and the control class, where the two classes are treated differently. The experimental class treated with project based learning model and the control class treated with conventional learning.

To determine the student's understanding of the concept, researcher use test on both classes before and after treatment, which are called pretest and posttest.. The design of the research is as follows:

Table 1Design of Research

| Class | Pretest | Treatment | Posttest |
|---|---|---|---|
| Experiment | $X_1$ | P | $X_2$ |
| Control | $X_1$ | Q | $X_2$ |

Description :
X$_1$ = Pretest
X$_2$ = Posttest
P = Learning using project based learning model
Q = Learning using conventional leraning

The selection of data is carried out to observe whether the samples come from normal distribution population or not. The test used is Liliefors test and Homogeneity test, to know the homogenity of both samples used formula as follows (Sudjana, 2005) :

$$F_{count} = \frac{S_1^{\,2}}{S_2^{\,2}}$$

Description:
$S_1^{\,2}$ = Biggest Variance Data

$S_2^{\,2}$ = Smallest Variance Data

The test criteria are received Ho: the data come from a homogeneous populationif F $_{count}$<F $_{table,}$ where the F $_{table}$ obtained from the distribution list F with α = 0.05. Here α is a real level for testing. Hypothesis test use t-test with formula (Sudjana, 2005) :

$$t = \frac{\bar{x}_1 - \bar{x}_2}{S\sqrt{\dfrac{1}{n_1} + \dfrac{1}{n_2}}}$$

S is combination of standard deviation can be calculated with formula :

$$S^2 = \frac{(n_1 - 1)S_1^2 + (n_2 - 1)S_2^2}{n_1 + n_2 - 2}$$

Where:
$\bar{x}_1$ = Average value in experimental class.

$\bar{x}_2$ = Average value in control class.

$n_1$ = Total of sample in experimental class.

$n_2$ = Total of sample in control class

$S^2$ = Variance

$S_1^{\,2}$ = Variancein experimental class

$S_2^{\,2}$ = Variance incontrol class

t = t distribution

Testing Criteria : H$_o$ accept if t$_{calculate}$ < t $_{(1-\alpha)}$ where t $_{(1-\alpha)}$ get from distribution table t with independent degree (dk) = n$_1$ + n$_2$ − 2 and the probability (1-$\alpha$) with $\alpha$ = 0,05 for another value of t H$_o$ not accept, so Project based Learning Model has influence to the student's achievement in learning physics.

**RESULT OF RESEARCH**

The results of research is to know students learning achievement before the two of samples applied different treatments, namely the experimental class treated by using Project based Learning Model and control class treated by Direct Instructional Model.

Based from research data, the pre-test of student in experiment and control class in score range from 0 until 100, and got the mean of pre test score in experiment class is 28 with the deviation standard of 10.80 while mean pre-test score in control class is 26.4 with deviation standard of10.75.

The post test value of experiment class with treatment using Project based Learning Model has mean score is78.8 with deviation standard of 10.13. While in control class after given treatment with Conventional learning has mean post test score is69.6 with deviation standard of 10.98.

The results of hypothesis testing one tail on the post-test with α = 0.05 obtainedthe score t$_{count}$ = 3.07 and t$_{table}$ =1.67. By comparing t$_{count}$and t$_{table}$obtained t$_{count}$>t$_{table}$ it's 3.07> 1.67 so Ha accepted. It can be conclude that project based learning model has effect on student's learning achievement in

fluid topic at class XISMA N 1 Matauli Pandan academic year 2013/2014.

The achievement of cognitive test show saver agescore of pretest in the experimental classis 28 with deviation standard of 10.80 and the average post test value is 78.8 with deviation standard of 10.13. While the values obtained in the control class average pretest is 26.4 with deviation standard of 10.75 and the average post test value is 65.696 with deviation standard of 10.98. From the data, average post test value in experimental class is greater than control class. The increasing of posttest value is caused by the treatment given to the students. In experimental class given treatment using project based learning model and control class given the treatment using conventional learning.

The observation result in student's activity showed the activeness of students during the learning greatly affects the value of learning achievement. The activity of student can be seen more spesific from doing worksheet in the experimental class and in control class, the activity of students can be observed when the researcher doing the teaching activity and giving problems. When students active in the learning activities then the learning outcomes become higher. There is different activity of students' in experimental class and control class. The average value of students' activity in experimental class is higher than control class. It also the reason that the average value of posttest value in experimental class is greater than control class.

The results in cognitive and activity of students showed that there was effect of project based learning model on the student's achievement in fluid topic in class XI SMA N 1 Matauli Pandan academic year 2013/2014.

Observation result in student activity showed that students' attitude in experiment and control class is in good category, but average value of student activity in experiment class more active than control class.

Implementation of project based learning model in experiment class make the students become active, because project based learning model make student more creative and understand about physics phenomena. project based learning model developed good ethic of student, like creative, discipline, and responsibility so the affective of students is good. The student achievement in cognitive of experiment class is also high.

Good achievement of student in experiment class is due to better teaching and learning process using project based learning model that carried the students directly in the learning process to find a concept or principle.With these techniques, the students find them selves left or experiencing a mental process them selves, teacher only guide and provide instruction. Method of discovery learning as a theoryo f learning can be defined as learning that occurs when students are not presented with a lesson in its final form, but is expected to organize them selves. They found the concept of physics from experiment/observation by them selves and make students more interesting to learn physics, so they also remember it for long time and make students understand about the concepts.

In hypothesis test showed that there is different increasing of student's achievement in experiment and control class. The student's achievement is better in experiment class. So, can be concluded that project based learning

model have effect to student's achievement in fluid topic in class XISMA N 1 Matauli Pandan academic year 2013/2014.

The project based learning model has been researched by Anriani (2012), Rahmadiah (2011), Bellyna (2010), and the result of this research is suitable with their research result, where in their result the student's achievement taught by project based learning model is better than conventional learning.

Although the project based learning model could improve learning achievement, but during in teaching and learning process the project based learning model has the disadvantage, due to the weakness of researcher, the activity don't give the big contibution to the increasing of student's post test value, so for next researcher suggest to make a better descriptor to the implementation stages according to project based learning model.

**CONCLUSION**

Based on the result of research data, it can be concluded that: Student's achievement in experiment class is greater than student's achievement in control class. This reveal that project based learning model has effect on student's achievement in learning physics at SMA Negeri 1 Matauli Pandan.

**SUGGESTION**

According to the data of student's achievement and the experience of research when applying the project based learning model in class, so the researcher gives suggestion as follow: For the next researcher who wants to do research using project based learning model, pay more attention to implementation stages according to project based learning activities and develop a better descriptor.

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