

Effect of Project Based Learning (PjBL) Model on Biology Psychomotor Competence of X Grade Natural Science Class Students in SMAN 1 Kapur IX

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Abstract. Purpose of the research was to know effect of Project based learning model on students' Biology psychomotor competence. It was a quasi-experimental research and used Randomized Control Posted Only Design. The population is X grade Natural Science students in SMAN 1 Kapur IX, who are registered in academic year 2018/2019. Samples were taken by using Purposive Sampling technique. As a result, X MIPA 1 was as experimental class and X MIPA 2 was as control class. Instrument used was psychomotor observation sheets. Data were analyzed by using normality test, homogeneous test, and hypothesis testing by assistance of SPSS application. Finding shows that there is a significant difference between students' Biology psychomotor competence in experimental and control classes, in which students' psychomotor competence score in experimental class is higher than students' psychomotor competence score in control class. Average score of students' psychomotor competence in experimental class is 87.63 and in control class is 85.17. So, it can be concluded that Project based learning model can improve students' Biology psychomotor competence.

Keywords -*Project Based Learning (PjBL), Psychomotor, Biology Learning.*

I. INTRODUCTION

Education is a way to make someone use his mind/ thought as a tool to face problems in the future. Currently, education is expected to be able to keep up with development of science and technology in 21st century.

Education in 21st century aims at building and developing students' intelligence competence in learning to be able to overcome problems around them. Intelligence in real world do not only students know something, but also able to solve problems around them meaningfully, relevantly, and contextually. Contextual learning can make students think critically, master technologies, and be

cooperative and collaborative. These abilities are necessary to solve problems (Zhou, 2005: 7).

Reorientation in learning demands some changes in learning process. First, it changes teacher-centered learning paradigm to student- centered learning paradigm, self-directed learning, and metacognition because it will make students more developed in all aspects. Second, it changes concept memorizing to concept discovering and developing so that it can improve students' ability in critical thinking, creative and skillful in solving problems. Third, it changes classical individual learning to cooperative learning, which do not only teach thinking skill but also

teach students other skills (Milla et al., 2014: 2). By the changes of learning orientation, governments try to improve education quality. One of governments' efforts is by improving curriculum, started from the 1994 Curriculum to the 2013 Curriculum which covers all subjects, including Biology.

The biology learning demands students to be able to master the established competences. Mastery of competences by students cannot be separated from teachers' roles as advisor and facilitator in learning process. As instructor, teachers have to be able to find the best way to make students interested and enjoy in learning activity to make them more qualified. According Munandar (2009: 40), good quality students in academic, skill, emotional and spiritual would be generated by qualified teacher. Therefore, teachers need to master learning materials and strategy so that students' learning competence can improve.

Based on the result of observation and interview with Biology teacher in SMAN 1 Kapur IX, it is known that learning is still use teacher centered. Besides that, students are afraid of giving their opinion and tend to be shy to ask or answer questions during learning process. Lack of students' willingness to search references about Biology causes lack of their interest to learn Biology. In addition, they have ever done a project in the classroom, but it is not appropriate with Project based learning syntax. Biology teacher only gave a project without being initiated by ideal problem for Project based learning. The project is based on teacher's willingness, not from the planning proposed by students based on problem analysis which is done. It causes students' psychomotor average score becomes low.

The problem needs an appropriate solution to create learning atmosphere which makes students active and participate in learning process. Therefore, it needs to implement an interesting learning model to improve learning situation in the classroom. One of learning model which can be implemented is Project based learning. The Project based learning model is a learning which gives freedom to students to plan learning activity, do a project collaboratively, and produce a product which are going to present to other people. Final result of Project based learning model is a product made by students in teamwork.

According to Hosnan (2014: 321), Project based learning model is a model which uses projects or activities as learning facility to achieve affective, cognitive and psychomotor competences.

In addition, Abidin (2014: 169) states that Project based

learning model is learning which is oriented on developing students' competences and skills through activities of planning, conducting a research, and producing a product in form of learning project. It is similar to Warsono and Hariyanto (2012: 53), who assert that Project based learning is a learning model which demands students to design, do problem-solving, make decision and do observation by themselves. Students would feel a problem, formulate a problem and overcome a problem in real life by making a project.

Study about Project based learning done by Chanlin (2008: 63) shows that students who implement Project based learning can learn about responsibility in group, sharing ideas, and obtaining scientific knowledge through various group activities in doing observation and discovery. Furthermore, Karaman and Celik (2008: 211) also say that students in Project based learning can build network to real life outside classroom, solve real problems, and develop skills in real world.

Table 1. Accumulation Data of Students' Psychomotor Competence in Sample Class

Parameter	Class		Description
	Experimen t al	Control	
Average	87,63	85,17	$\bar{x}_1 > \bar{x}_2$
Normality Test	Sig = 0,20 $\alpha = 0,05$	Sig = 0,06 $\alpha = 0,05$	Normally Distributed
Homogeneity Test	Sig = 0,37 $\alpha = 0,05$		Homogeneous Variance
Hypothesis Testing	Sig. = 0,00 $\alpha = 0,05$		Sig < α

The Project based learning gives positive effect to students. It can facilitate them to have high achievement in learning and design and implement appropriate solution to the problems (Mioduser dan Betzer, 2008: 59). Based on the explanation of background above, it is interesting to do a research, entitled "Effect of Project Based Learning Model (PjBL) on Biology Psychomotor competence of X Grade MIPA Students in SMAN 1 Kapur IX".

II. METHOD

It was a quasi-experimental research by using Randomized Control Group Posttest Only Design. The population is X grade Natural Science students in SMAN 1

Kapur IX, who are registered in academic year 2018/2019. Samples were taken by using

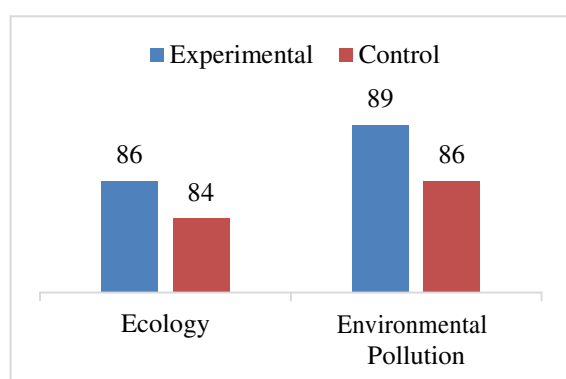
Purposive Sampling technique. As a result, X MIPA 1 was as experimental class and X MIPA 2 was as control class. Instrument used was psychomotor observation sheets. Data were analyzed by using normality test, homogeneous test, and hypothesis testing by assistance of SPSS application.

III. FINDING AND DISCUSSION

Based on the research done in SMAN 1 Kapur IX on Februari to April 2019, in which X MIPA 1 and X MIPA 2 as sample classes. X MIPA 1 was as experimental class and X MIPA 2 was as control class. The findings of students' psychomotor competence in learning materials of Ecology and Environmental Pollution in X grade Natural Science class can be seen in Table 1 below.

Based on Table 1 above, it is obvious that accumulation of students' psychomotor competence average score in experimental class is 87.63 and in control class is 85.17. The result of normality test in both classes has Sig. value $> \alpha$, which means that the data are normally distributed. Besides that, the result of homogeneity test has Sig. value $> \alpha$, which means that the data have homogeneous variance. So, based on the result of normality and homogeneity tests, it is proven that the data are normally distributed and have homogeneous variance. Therefore, T-test was done to test the hypothesis. As a result, Sig. value $< \alpha$, so that the hypothesis is accepted.

Statistically, the difference of students' psychomotor competence average score in learning materials of Ecology and Environmental Pollution can be seen in Graphic 1 below.



Graphic 1. Students' Psychomotor Competence Average Score in Learning Materials of Ecology and Environmental Pollution in Sample Class

Based on the Graphic 1 above, it is obvious that students' psychomotor competence score from accumulation of performance, project and product in learning materials of Ecology and Environmental Pollution in both experimental and control classes. The average score of psychomotor competence in learning material of Ecology in experimental class is 86 and in control class is

84. Meanwhile, in learning material of Environmental Pollution in experimental class is 89 and in control class is 86.

From explanation above, accumulation of students' psychomotor competence score in experimental class which implemented Project based learning model is higher than in control class which did not implement the model. It is in line with Mahanal, et al. (2009), who state that Project based learning model is effective to improve students' affective and cognitive competences in Biology learning.

Hosnan (2014) proposes that Project based learning is a learning strategy which uses project or activity as learning facility to achieve students' affective, cognitive, and psychomotor competences. Focus of learning is on students' activities to solve a problem by implementing skills of researching, analyzing, producing, and presenting a learning product based on real experience. It can be done independently or in group to construct an authentic product from real phenomena in daily life.

The Project based learning is student- and-experience centered learning (Dole, et al., 2017: 2). It is in line with Annetta, et al. (2019: 172), who assert that in Project based learning, students are going to produce many projects during learning process which enables the existence of feedback and opportunity for them to learn from experience.

Sani (2014: 172-173) also states that Project based learning enables students to develop their creativity to design and do a project, which can be used to solve a problem. It is based on constructivism theory and student-centered learning. Learning Process through Project based learning enables teachers to "learn from their students" and "learn together with their students".

IV. CONCLUSION

Based on the findings, it can be concluded that implementation of Project based learning model has significant effect on students' Biology psychomotor competence because it can improve their psychomotor competence.

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