

THE EFFECTIVENESS OF PROJECT BASED LEARNING ON STUDENTS' SOCIAL ATTITUDE AND LEARNING OUTCOMES

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ABSTRACT

This study aims at determining the effectiveness of the learning model of Project-Based Learning (PjBL) on students' social behavior and learning outcomes. This study can be categorized as the quasi experimental method with pretest-posttest control group design. Data collection technique to measure students' social behavior was using questionnaires and to measure student learning outcomes was using post-test. Data analysis for student learning result was using U Mann Whitney test while the analysis on the social behavior of students was using descriptive analysis. The results of this study indicated that: (1) the student who stated that the learning model PjBL can increase the social behavior of students was 40.3%, the student who agreed was 39%, and the student who were hesitant with this learning model was 20.7% (2) the result of student learning outcomes with PjBL model increased with the mean score of 7.67 while the class with the conventional method was 4.67. The implications of the application of this model were the improvement of students' cognitive, affective, and psychomotor aspects.

Keywords: effectiveness, learning outcomes, project-based learning, social behavior

INTRODUCTION

The aim of education is to create a qualified academic outcome as the expectations of various parties. Learning itself is an attempt to create an atmosphere and capability service, potential, interests, talents, and various students' needs in order to occur optimal interaction between teachers and students, as well as between students and students. In case of learning process, there is a learning model which is close to the learning strategy understanding but the meaning of this learning model is distinguished from the understanding of strategies, approaches and learning methods. The term of learning model has a broader meaning than a strategy, method, and technique.

The learning model is a conceptual framework illustrates a systematic procedure for organizing learning experiences and serving as a guide in planning and executing learning activities. The selection of learning models is based on the characteristics of the subject and its basic competencies. Not all models are suitable for every basic competency. So, teachers need to

select and determine the model of learning that matches the ability, potential, interests, talents, and learners needs in order to optimize the interaction between teachers and students as well as students and students.

One of the learning models that can accommodate the teacher's role like what mentioned above is Project-Based Learning (PjBL). The PjBL learning model is supported by constructivist learning theory, a learning theory that widely support the idea that students can build their own knowledge within the context of their own experience (Murphy, 1997). PjBL is a project-based method that produces a work at the end of the lesson. The project contains the tasks derived from basic statements then proceed with the process of searching or investigating and finding, so that the students gain complete knowledge. The role of teachers in PjBL is just as facilitator, trainer, advisor, and intermediary in order to achieve optimal results for the students' imagination, creations, and innovations. So, the students can be more active and pay more attention to the learning process.

PjBL uses project or activity as the media. Teachers assign students to explore, assess, interpret, and synthesize information to produce different forms of learning outcomes. This learning model employs the problem for a first step in collecting and integrating a new knowledge based on the students' experience to real activity.

This learning activity is designed for a complex problem so students need to investigate and to understand it. Through this learning model, the inquiry process begins by raising guiding questions and guiding learners in a collaborative project that integrates various materials. When the question is answered, students can directly see the various main elements and the various principles in a discipline that is being studied. This learning model is an in-depth investigation of a real-world topic, it will be valuable to the attention and effort of students.

The assessment system is based on its project. It is a task assessment that must be completed in a certain time. These tasks include assessment of the planning, data collection, organizing, processing and presentation of data. Project assessment can be used to determine understanding, applicability, investigation ability and the students' ability to make clear information on specific subjects. As defined by Buck Institute of Education (1999) that project-based learning has the following characteristics: (a) the learner makes decisions and frameworks, (b) the solutions of the problems are not predetermined, (c) the learner designs the process to achieve the outcome, and (d) the learner is responsible for obtaining and managing the collected information, (e) continuous evaluating, (f) regularly review on what the students have done, and (g) the final product has been evaluated.

Oakey (1998) reinforces the concept and characteristics of project-based learning by distinguishing it from problem-based learning

that often use interchangeably. The terms project based learning and problem based learning are used to express learning strategies. The similarity of this two concepts of learning and the same abbreviations create confusion in the literature and research.

Project-based learning has great potential to provide more engaging and meaningful learning experience for students. Davcev (2008) states that PjBL can improve students' interdisciplinary in solving daily problems. The implementation of project based learning model was proven to increase the learning process, the students' performance and the learning outcomes of students (Nayono and Nuryadin, 2013; Mulyadi (2015). In addition, Ana et al. (201) claimed that project based learning model was effective to improve the students' generic green skills for project management, collaborative skills, and communicative competence.

Branch & Jensen (2016) state that precommitment was significantly effective in optimizing students' goals and improving their academic performance, but the attitude survey result indicated that students could not fully recognize the value of precommitment-related activities. Meanwhile, social behavior is interdependence atmosphere to ensure human existence (Rusli Ibrahim, 2001). According to Krech, Crutchfield and Ballachey (1982) in Rusli Ibrahim (2001), person's social behavior can be seen from the patterns of interpersonal response in their interpersonal relationships. Social behavior is also identical with one's reaction to others (Baron & Byrne, 1991 in Rusli Ibrahim, 2001). The behavior is demonstrated by feelings, actions, beliefs, memories, or respect for others. A person's social behavior is a relative trait to respond to others in different ways.

Baron and Byrne state that there are four main categories that can create a person's social behavior, i.e. (1) the behavior and characteristics of others, (2) cognitive processes, (3)

environmental factors, and (4) culture. A person's social form and behavior can also be demonstrated by social attitudes. The attitude according to Azhari (2004) is "a way of reacting to a certain incentive while social attitudes expressed by the similar and repeat activities toward the social objects that cause the occurrence of repeatedly behavior to one social object. Krech et. al. (1962) reveals that in order to understand the social behavior of individuals, it can be seen from the tendencies of the characteristics of interpersonal response, which consist of: (1) Role Disposition; namely tendencies that refer to the duties, obligations and positions from an individual, (2) Sociometric disposition (sociometric disposition); namely the tendency that is linked with preference, beliefs to other individuals, and (3) expression of disposition, the tendency that is linked with self-expression by displaying particular habits (particular fashion).

METHOD

The method used in this study is a quasi-experimental research. The first group is the research group while the second group is the control group. The quasi experimental method aims to know the a certain treatment. Treatment in this research is PjBL learning model. In this study, the subjects divided into 2 groups of treatment groups and control groups. For students in the learning control class were treated with conventional process of lecture method while the treatment group applied PjBL model. In the

experimental quasi-experimental research, the treatment groups and control groups are both regulated intensively to have same or near-same characteristics, the different is just the given treatment.

The design of this study used pre-test and post-test. The control group was given pre test (Y1) and the learning process with conventional learning model (speech) then the post test (Y2) was given. In the experimental group, pre-test (Y1) was given and then learning was done with PjBL model and the post-test (Y2) was given. The result was shown by the score gap obtained from the score result of pre-test (Y1) and post-test (Y2) of the student. The research design can be described as follows:

Table 1. Research Plan

Pretest	Treatment	Posttest
O ₁	X	O ₂
O ₃	-	O ₄

Explanation :

- O₁: The measurement of initial ability of treatment group
- O₂: The measurement of final ability of treatment group
- X : treatment
- O₃: The measurement of initial ability of control group
- O₄: The measurement of final ability of control group

Sugiyono (2009) states that quasi experiment has some considerations, i.e (1) Pre experiment measurement, (2) Treatment, and (3) Post experiment measurement (measurement after the experiment). The stages in the study are described in the following Figure 1.

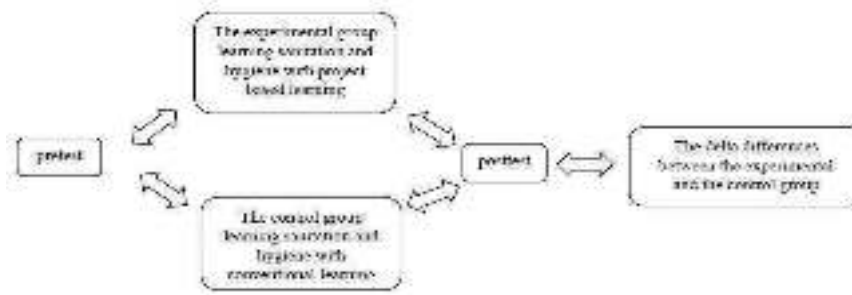


Figure 1. Research Stages

To measure student learning outcomes on the subject of food poisoning, the instrument guidelines are presented in Table 2. Meanwhile,

to measure the students' social attitude, the instrument guideline are presented in Table 3.

Table 2. The Instrument Guideline of the Student Learning Outcomes in the Subject of Food Poisoning

Variabel	Sub Variabel	Indicators	Question Item
The students' knowledge on the subject of Higyne Sanitation	Knowledge (C1)	Explain the definition of sanitation and hygiene	1-2
		Identify the implementation of sanitation and hygiene	3
		Identify chef's uniform	4
	Understanding (C2)	Identify the personal hygiene	5
		Identify a good kitchen sanitation system	6-7
		Understand personal hygiene	8
		Understand personal hygiene of a chef	9-10
		Understand the kitchen sanitation environment	11-13
	Implementation (C3)	Implement personal hygiene of a chef	14-15
		Identify Occupational Safety and Health	16
		Describe the characteristics of a good kitchen	17
		Identify the principles of sanitation and hygiene	18
		Identify the types of food poisoning	19
	Prevent food damage	20	

Source: Lesson Plan Food Sanitation of SMK 24 Jakarta

Table 3. The Instrument Guideline of Students' Social Attitude

Variable	Sub Variable	Indicators
Social Attitudes	The tendency of attitudes	brave and socially cowardly nature
		the nature of power and obedience
		sfat initiative socially and passively independent and dependent properties
	The tendency attitudes in social relationship	acceptable or rejected by others
		sociable and sociable
		friendly and unfriendly nature sympathetic or unsympathetic
	The tendency of expressive attitudes	like to compete (not cooperative) and do not like to compete (like to work together)
		aggressive and not aggressive
		calm or socially calm likes to show off or stand out

Source: Krech et. al. (1962)

The Hypothesis of reseach statistic is as follow :

$$H0: \mu A = \mu B$$

$$H1: \mu A > \mu B$$

Explanation :

H0: there is no increase in students learning outcomes of SMK Negeri 24 Jakarta on the subject of food poisoning with the application of PjBL.

H1: there is an increase in students learning outcomes of SMK Negeri 24 Jakarta on the subject of food poisoning with the application of PjBL.

μA : the mean score of students learning outcomes of learners who are treated with of Project Based Learning (PBL).

μB : the mean score of students learning outcomes with lecturing methods.

The hypothesis test result was analyzed by U Mann Whitney test with significant level α 0,05. From the test results, it can be known the score gap. After getting the test statistics of U1 and U2, the next step was taking the smallest score from both values. The smallest score was then compared with the Mann Whitney table. If U count (U the smallest value) <U table, then H0 was rejected (H1 was accepted) (Sugiyono: 2010).

RESULT AND DISCUSSION

The validity test of the instrument was using content validity. The validity of content in this research was obtained from the expert judgment, i.e. an educational expert and a material expert of Jakarta State University. Also, a judgment from the teachers of Hygiene Sanitation Subject at SMKN 24 Jakarta.

Table 4 shows there were 10 invalid items in this research instrument, i.e. 3, 6, 8, 9, 10, 12, 15, 16, 21, 30. Therefore, 10 items of the instrument were not considered for final score

calculation (omitted). Reliability test in this research was using Alpha Cronbach formula. Based on the analysis results, the obtained reliability coefficient (α) was 0.96. These results indicated that the thest items in the research instrument can be catagorized as very high reliability.

Table 4. Instrument Item Status

Item	r_{hitung}	r_{tabel}	Status
1	0.745	0.632	Valid
2	0.779	0.632	Valid
3	0.497	0.632	Drop
4	0.745	0.632	Valid
5	0.779	0.632	Valid
6	0.452	0.632	Drop
7	0.779	0.632	Valid
8	0.452	0.632	Drop
9	0.452	0.632	Drop
10	0.096	0.632	Drop
11	0.711	0.632	Valid
12	0.376	0.632	Drop
13	0.711	0.632	Valid
14	0.745	0.632	Valid
15	0.541	0.632	Drop
16	0.208	0.632	Drop
17	0.711	0.632	Valid
18	0.779	0.632	Valid
19	0.765	0.632	Valid
20	0.779	0.632	Valid
21	0.093	0.632	Drop
22	0.711	0.632	Valid
23	0.745	0.632	Valid
24	0.765	0.632	Valid
25	0.779	0.632	Valid
26	0.779	0.632	Valid
27	0.711	0.632	Valid
28	0.711	0.632	Valid
29	0.779	0.632	Valid
30	0.367	0.632	Drop

The experimental class in this research was a class that employed the project based learning method, while control class in this research was having conventional method (ordinary learning method, without any treatment) on the material of food poisoning in sanitasi hygiene subject. Below was the mean score of pre-test and post-test results of the students in the experimental class and control class.

Table 5. Mean score of Pretest and Posttest on Experimental and Control Class

Class	Mean Score		
	Pretest	Posttest	Delta
Experimental Group (Project Based Learning)	73.5	81.67	7.67
Control Group (Conventional Learning)	70.67	75.50	4.67

Based on Table 5 it can be described that the mean score of pre-test in the experimental class was 73.50. The mean score of post-test was 81.67. The mean of delta pre-test and post-test score was 7.67. Meanwhile, the mean score of pre-test in control class was 70.67. The mean score of post-test was 75.50. The mean of delta pre-test and post-test score was 4.67.

The requirements test analysis was through two stages of testing, namely normality test and homogeneity test. Normality test was to know whether the distributed data normal or not. If the data was normal or homogeneous, then the homogeneity test was done by T test. Meanwhile, if the resulting data was not normally distributed or not homogeneous, then the homogeneity test of T test can not be performed. The following table was the result of normality test performed by using Chi-Square test (χ^2).

Table 6. Chi-Square Test Table

No	Interval	Fi	Pj	100Pj	Pj-100Pj	$(Pj-100Pj)^2$	100Pj
1	0-2	5	16.67	10.02	6.65	4.41	
2	3-5	9	30	17.97	12.02	8.05	
3	6-8	0	0	22.60	-22.60	22.60	
4	9-11	11	36.67	21.08	15.59	11.52	
5	12-14	0	0	13.78	-13.78	13.78	
6	15-17	5	16.67	6.44	10.23	16.25	
Sum		30	100			76.61	

Column Pj was obtained from $(f_j / 25) \times 100$ while the 100 Pj column was from the 100P1 example (interval 0 - 2), the limits were -0.5 and 2.5, so it was obtained $Z_{1-1} = (-0.5 - 7.7) / 5.08 = -1.61$. Based on cumulative normal distribution table z, it was obtained area of $Z_{1-1} = 0.0537$; and $Z_{1-2} = (2.5 - 7.7) / 5.08 = -1.02$ the area of Z_{1-2} was 0,1539 so the area of Z_{1-2} - area of $Z_{1-1} = 0.1539 - 0.0537 = 0.1002$; then $100P_j = 10.02$. Chi-Square formula:

$$\chi^2 = \frac{n}{100} \sum \frac{(P_j - 100P_j)^2}{100P_j} \tag{1}$$

$$\chi^2 = \frac{30}{100} \cdot 76.61 = 22.98 \text{ (Chi square calculation result)}$$

Determining χ^2_{tab} with degrees of freedom $db = k - 3$, where k was the number of groups, so $db = 6 - 3 = 3$, so $\chi^2_{tab} = \chi^2 (\alpha = 0.05) (3) = 7.82$. The result of normality test in experiment class was χ^2 count equal to 22.98 with mean table (mean) = 7.7 and standard deviation = 5.08.

The criterion in Chi-Square test (χ^2) was if χ^2 counts $\leq \chi^2$ table then H_0 was accepted (samples were from normally distributed populations).

Given χ^2 table = 7.82. Thus, χ^2 count = 22.98 > χ^2 table = 7.82. It meant that H_1 was accepted. Thus, the sample came from an abnormally distributed population. Therefore, statistical analysis could not use t-test. The next statistical test used was Mann - Whitney to test the statistical hypothesis:

$$H_0: \mu_A = \mu_B$$

$$H_1: \mu_A > \mu_B$$

Calculating the score of U with formula of:

$$\bar{u}_2 = n_1 \cdot n_2 + \frac{n_1(n_1 + 1)}{2} - \sum R_1 \tag{2}$$

$$\bar{u}_1 = n_1 \cdot n_2 + \frac{n_2(n_2 + 1)}{2} - \sum R_2 \tag{3}$$

$$U_A = n_A \cdot n_B + \frac{n_A(n_A + 1)}{2} - R_A$$

$$U_B = n_A \cdot n_B + \frac{n_B(n_B + 1)}{2} - R_B$$

$$R_B = 30 \cdot 30 + \frac{30(30+1)}{2} - 1058.5$$

$$= 30 \cdot 30 + \frac{30(30+1)}{2} - 771,5$$

$$= 900 + 465 - 1058.5$$

$$= 900 + 465 - 771.5$$

$$= 306.5$$

$$= 593.5$$

U_A was U for the experimental group, while U_B was for the control group. The U here was the smallest of $U = U_A = 183.5$.

Mann Whitney test in this study used the large sample of U formula because the sample size was greater than 20, then the sampling distribution U may close to the normal distribution with the mean and the error standard:

$$\mu U = \frac{n_A \cdot n_B}{2}$$

$$\text{and } \sigma U = \sqrt{n_A \cdot n_B \cdot \frac{(n_A + n_B + 1)}{12}}$$

Therefore, the normal standard can be formulated as follow:

$$z = \frac{U - \mu U}{\sigma U} = \frac{U - \frac{n_A \cdot n_B}{2}}{\sqrt{n_A \cdot n_B \cdot \frac{(n_A + n_B + 1)}{12}}}$$

The used U was the smallest U = $U_A = 306,5$. So,

$$z = \frac{U - \frac{n_A \cdot n_B}{2}}{\sqrt{n_A \cdot n_B \cdot \frac{(n_A + n_B + 1)}{12}}} = \frac{306,5 - 450}{\sqrt{900 \cdot \frac{61}{12}}}$$

$$= -\frac{143,5}{\sqrt{4575}} = -\frac{143,5}{67,63} = -2,12$$

since the value of Z was the total area (absolute value) then -2.12 equals its meaning to 2.12. Thus the price of $z = 2.12$.

Mann-Whitney test criterion if $z > z_{\text{tabel}}$ then H_1 was accepted. $z = 2.12 > z_{\text{tabel}} = Z (\alpha = 0,05 = 5\%) = 1.96$. It meant that H_1 was accepted. In other words the application of PjBL can significantly increase students' learning outcomes in SMK Negeri 24 Jakarta on the subject of food poisoning compare to the conventional methods.

Based on Table 5, the mean score of the experimental group delta was 7.67. Meanwhile, the mean of delta control group score was 4.67. Based on the explanation, the average score of learners who were given the model PjBL was higher than the students who were treated with the conventional model.

Based on the statistical test, it can be concluded that the score of students' learning outcomes on the subject of food poisoning with PjBL model is higher than the score of learners who were given a conventional model.

The student attitude with the application of PjBL learning model, analyzed by quantitative description, can be concluded by 40.3% stated "strongly agree" that learning with model of PjBL influence to social behavior of student, 39% expressed "agree" and 20.7% expressed "doubt"

if applying of learning model PjBL can affect students' social behavior.

In other words the application of PjBL can significantly improve learners' learning outcomes than the conventional method at SMK Negeri 24 Jakarta.

The results of this study was supported by the theories where PjBL model was an innovative model, and more emphasized on contextual learning through complex activities to increase the students' enthusiasm and outcomes. This was because PjBL required students to develop skills such as collaboration and reflection. In addition the PjBL model can help students to improve their social skills, as well as students became more confident to speak with groups of people, including the adults. The benefit of PjBL was that it can improve the students' learning motivation. Learning environment with PjBL model can improve students' ability to solve problems, make students more active to solve complex problems. PjBL made learners to be able to obtain information quickly through information sources, so their skills to seek and obtain information could increase. Cooperative group work in the PjBL-based model can develop and practice communication skills among learners (Moursund in Wena, 2011).

CONCLUSION

The results showed that the model of Project Based Learning (PjBL) can significantly improve the students' learning outcomes compared to conventional methods. Based on the results of the research, the application of PjBL on the subject of food poisoning had the mean increase of 7.67 while the class given the conventional application had the increase of 4.67. The statistical test results with Mann-Whitney test proved that there was a significant difference in (α) 5% on the improvement of learning outcomes between groups applied by PjBL model

compared to conventional model. These results indicated that the application of PjBL on Hygiene Sanitation subjects in particular the subject of food poisoning obtained higher learning outcomes than the application of conventional methods. It is also supported by the assessment of attitude observation during the learning process that includes the aspects of accurate, honest, responsible, and better mannered. From the social attitude data obtained 40.3% of students who stated strongly agree that the application of PjBL can improve social behavior, 39% stated agree, and 20.7% student expressed doubt. The analysis of learning result value from both groups of research sample was tested by using Mann Whitey hypothesis test. From the calculation results, it was obtained Zcount of 2.12 and Ztable at $\alpha = 0.05$ of 1.96. From the results of this study, it can be concluded that H_0 was rejected if $Z_{count} > Z_{table}$ which meant H_a was accepted. From the data above, it can be concluded that the application of PjBL can positively improve the social behavior and learning outcomes of Basic Culinary students of SMK on the subject of food poisoning.

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