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The Application of Problem-Based Learning Methods to Improve Economic Learning Outcomes and Motivation

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Abstract

The aim of this study is to determine the effectiveness of the application of Problem-Based Learning methods in improving students' learning outcomes at the eleventh grade of SMA Negeri 20 Tangerang Regency batch 2018/2019. This study used a quasi-experimental design and the techniques of collecting data were test, questionnaire, observation sheet, and document. The population in this study were 308 students consisted of students of eleventh grade in science 1 - 4 and eleventh grade in social science 1 – 4. This study used eleventh grade in science 2 and eleventh grade in science 4 as the sample that was taken non-randomly by using purposive sampling. The students' learning motivation for economic subjects with the material about national income is considered good based on the t-test result. The value of t-test was 5,288 where tcount > ttable (5,288 > 1,977). It could be concluded that there was a significant differences between students' learning outcomes that used Problem-Based Learning method and those that used conventional method in economic subject of student national income material at the eleventh grade of SMA Negeri 20 Tangerang Regency. This research also found that Problem-Based Learning methods improved student's motivation.

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INTRODUCTION

Education is one of the things that influence and guarantee the success of a nation. The school, as one of the educational institutions, is a supporter institution for the creation of learning activities. Learning is an activity in developing students' abilities, in terms of their potency, proficiency and personality, so that the learning objective was materialized. Learning objectives can be seen from the aspects of students' learning outcomes. Learning outcomes is one of the success in the learning process. According to Nur et al. (2016), one of the benchmarks namely students' behaviour transformation is the result of the learning activities process. Learning outcomes is the result from the learning process which consists of cognitive, affective and psychomotor aspects (Lizzio, Wilson, & Simons, 2002).

Learning process can be seen from the students learning result, one of them is on the cognitive aspects. From that aspect, we can find out whether the students' learning outcomes are good or not. Good learning outcomes can be seen from satisfying students' learning outcomes, while bad learning outcomes can be caused from students' learning outcomes that still low. According to Rerung, Sinon, & Widyaningsih (2017) the low of students' learning outcomes can be caused by the students that have not been maximal actively in the learning process, eventually the students' learning outcomes become less optimal. It could be shown by the students' learning outcomes of economic subjects of eleventh grade in science 3 at SMAN 20 Tangerang Regency in Academic Year 2017/2018 on the Figure 1.

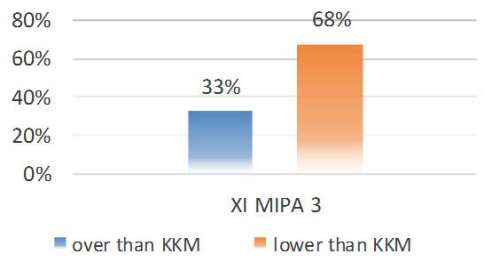

Figure 1. Score of Economic Subject's daily Examination of eleventh grade in science 3 of SMAN 20 Tangerang Regency in academic year 2017/2018

The minimum score criteria in the eleventh grade of SMAN 20 Tangerang Regency is 70. There are 8 classes of eleventh grade in SMAN 20 Tangerang Regency and the researcher had examined 40 students of XI MIPA 3. Graphic 1.1 shows that the achievement of student learning outcomes from daily examination, 33% of students could achieve the minimum score criteria and 68% of students could not achieve it. Hence, the economic subjects at the eleventh grade of SMAN 20 Tangerang Regency has not been able to achieve the standard of success learning.

Based on the data result above, it can be seen there are some students who are still low in the learning process. The researcher identified some of them were: when attending the teaching and learning process in the class, the students like to interfere with other students, busy with their own interests such as playing cell phone or talk to their seatmate. As stated by Sosyal & Dergisi (2013) the lack of interest in the learning process is suspected because the learning method applied by the teacher during the learning process are too monotonous, students feel bored in teaching and learning activities, so the atmosphere of learning in the classroom becomes less effective. Witte & Rogge (2014) argued that the classroom atmosphere is students' perceptions of the satisfaction in the process of teaching and learning in the classroom after the application of learning methods. As also stated by Suranto (2015) the classroom atmosphere is students' freedom to express themselves in the process of teaching and learning, such as interacting with teachers, the solidarity in collaboration, students' satisfaction, and students' personal development of students on improving their abilities.

The teacher is very helpful in developing students' abilities in the learning process, as expressed by Lin, Huang, Lai, Yen, & Tsai (2009) teachers who have teaching competen-

ce, they will be able to improve students' learning activeness, and otherwise if the teachers have less teaching competence, thus the students will be passive in learning activities, so that the learning process will be disturbed. Lim & Morris (2009) states that, teachers who use varied learning methods will significantly improve learning outcomes and improve student satisfaction. Therefore, in the learning system one of the demands of the teacher is being able to determine the right learning method to teach. If the learning method used is right, the learning atmosphere will be fun and make students feel satisfied in learning activities, so that a process of interaction between teachers with students.

Problem-Based Learning method is an active learning method, which starts from a certain problem, through group discussion, individual study, and group collaboration in small groups. As stated by Mergendoller, Maxwell, & Bellisimo (2006), Problem-Based Learning method is an alternative method based on problems which is more complicated in the learning process. Witte & Rogge (2014) revealed that Problem-Based Learning method can significantly increase student motivation and classroom atmosphere. According to Mioduser & Betzer (2007), Problem-Based Learning methods can give the contribution to the learning, students can expand and increase their learning abilities and can encourage students to active learning, foster the independent student learning behaviour, and students are given full responsibility for their own learning process.

Not all of the previous studies revealed that Problem-Based Learning method was able to improve student learning outcomes, there are also the previous studies that revealed that there was a negative impact on PBL learning methods. Teacher's basic competence in teaching helps the students to create a good and pleasant learning atmosphere. Learning outcomes are one of the benchmarks that play an important role in the world of education, and is a success or level of learning processes, from the results of learning we can know that learning and teaching activities are good or not. According to Anderson, Moore, Anaya, & Bird (2005) stated learning outcomes is a change in student behaviour from the learning process.

While, Lizzio, Wilson, & Simons (2002) argue that learning outcomes are a result obtained from the learning process consisting of cognitive, affective and psychomotor aspects. Mundia (2012) says that, learning outcomes are a skill or ability obtained by students in the learning process. Associated with the influence of Problem-Based Learning on learning outcomes, motivation, and atmosphere, Suwardi (2012) revealed that there are several factors that influence the students' learning success. The most contribution factor was the students' psychology factor with the frequency 27.54% and the smallest contribution factor is the school hour time with the frequency 6.23. Besides, there were the society, family, learning support (motivation), environmental, and school hour factors. The interaction between teacher and student is very important in the learning process in order to create the pleasant learning atmosphere, especially in the Problem-Based Learning (PBL) method. As Azer (2009) stated that the problem-based learning method is a good method to improve the discussion atmosphere and more effective the learning system. As also stated by Ates & Eryilmaz (2010), teacher is one of the factors that can influence the learning process especially in the problem-based learning method.

According to Mergendoller, Maxwell, & Bellisimo (2000), there are no significant differences on students' knowledge, abilities, and learning outcomes that use Problem-Based Learning with traditional learning. Suryanti (2016) said that there is no difference between student learning outcomes using Problem-Based Learning and Drilling method. Burris & Garton (2007) also revealed that there is no significant difference on students' ability using PBL and conventional learning methods and also it does not contribute to learning outcomes. However, Suranto (2015) saw that higher motivation was an important factors in

a student's success. As also expressed by Witte & Rogge (2014), motivation is an encouragement in learning that must be possessed by the students, among them are autonomous motivation (intrinsic) and controlled motivation (extrinsic).

Therefore, it needs to have the innovation in learning activities especially in economic subjects. The innovation can be in the form of effective learning methods that applied by the teacher during the learning process, so that the students can be actively involved in learning activities and the result is optimal. Therefore, the Problem-Based Learning method was applied in accordance with the principles: basic conceptshave to be clear, clear and current problem definitions, independent learning, and exchange of knowledge among students. According to Rusman (2014) while the learning flow in PBL can be seen on the Figure 2.

Based on Figure 2, the process of student learning activities of Problem-Based Learning method starts from: (1) students find the real problems that have been presented by the teacher, (2) after finding the problems, students discuss and analyse problems to determine issues from the real problems that already exist, (3) students report a collection of facts from the results of the discussion, (4) after reporting the problem, students present the results of the discussion about the solution of the problem and reflection, (5) students conclude the problem from the results of their discussion.

Based on the analysis above, there is a research gap about the application of Problem-Based Learning method in improving the learning outcomes. Therefore, the researcher conducted the re-study about the application of PBL method for economic subjects with the type of quasi-experimental. This study was conducted to determine whether there is an enhancement on students' learning outcomes using PBL learning methods. This study was done at the eleventh grade of SMAN 20 Tangerang Regency. With the application of the PBL method, it is expected that the learning outcomes of economic subjects can be increased. The researcher intends to take up the problem through this paper with the focus of the study on the application of PBL method to improve students' learning outcomes in economics subject.

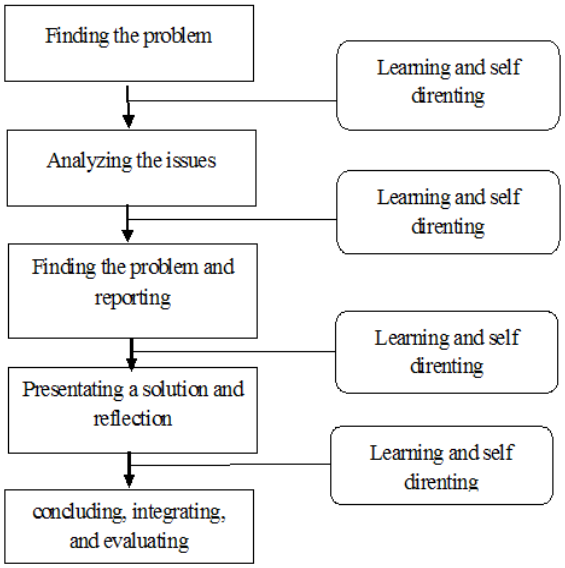

Figure 2. Flowchart of Problem-Based Learning Method
Source: Rusman (2014:5)

METHODS

This study was conducted at SMAN 20 Tangerang Regency. The method used based on the level of naturalness is the type of experimental design. This study was conducted by the researcher who taught in two different classes, namely experimental class and control class. Where the experimental class was the class that applied by the researcher by PBL method, and the control class was the class that applied by using conventional methods. The design of this study was a quasi-experimental design. The researcher chose this design because there are two different classes' treatments, namely experimental class and control class that would be tested by the researcher. The research design is pre-test and post-test control group design. The main objective of this study was to determine the level of achievement of student learning outcomes by applying PBL method. The research design on the Table 1.

Table 1. Research Design

Class	Test	Treatment	Test
EC	Pre-test O1a	X_1	Post-test O1b
CC	Pre-test O2a	X_2	Post-test O2b

Source: Processed Primary Data (2018)

Information:
EC = experiment class
CC = control class
O1a = pre-test at experiment class
O2a = pre-test at experiment class
X1 = PBL method application
X2 = conventional method application
O1b = learning outcomes of experiment class after treatment
O1b = learning outcomes of control class

The population used in this study was a target population and an accessible population. Target population of this study was all of students in SMAN 20 Tangerang Regency and the population that can be accessed was eleventh grade in Social Science at SMAN 20 Tangerang Regency batch 2018/2019, including 302 students from 8 classes. There were 148 students of eleventh grades in Science 1 - 4 and 154 students of eleventh grade in Social Science 1 - 4. Sampling was carried out by purposive sampling because the researcher chose the sample based on the previous information, their ability, and their relevancy with the study purpose. The researcher chose students of eleventh grade in Social Science, consists of eleventh grade in Science 2 and eleventh grade in Science 4 as the samples in this study.

The technique of collecting data in this study were in the form of test scores, while the added value that wanted to be known in the achievement of students' learning outcomes was to use the students' learning motivation questionnaire and class atmosphere. The instrument was tested for its validity and obtained valid question items as many as 23 of 30 question items which were in the form of multiple choice questions. The reliability of the test instrument was 0.732, so it can be concluded that the instrument is feasible.

RESULTS AND DISCUSSION

There were 68 students in this study. Students of eleventh grade in Science 2 consist of 18 male and 16 female and students in Science 4 consists of 15 male and 19 female. The statistical data description of experimental class were mean, standard deviation, minimum, and maximum which could be seen at Table 2.

Table 2 The Result of Normality Test

Class/aspect	N	Min	Max	Mean	Std. Dev.
Experiment:					
Pre-test_EC	34	17	48	29,65	10,421
Post-test_EC	34	65	83	73,32	5,814
Diff. values	34	17	61	43,68	9,701
Controll:					
Pre-test_CC	34	17	48	31,09	9,693
Post-test_CC	34	48	78	59,50	9,768
Diff. values	34	9	30	28,41	13,756

Source: Processed Primary Data (2018)

Mean is the average score representing a set of data from the experimental class and the control class. The mean of pre-test was 29.65, while the mean of post-test was 73.32 in the experimental class. Meanwhile, the mean of the difference score was 43.68. From the score of post-test in experimental class, the results showed that the minimum score was 65 and the maximum score was 83 with the score range was 18 and the standard deviation was 5.814.

The statistical data description of experimental class were mean, standard deviation, minimum, and maximum. Mean is the average score that can represent a set of data from the experimental class and the control class. The mean of pre-test was 31.09, while the mean of post-test was 59.50 in the control

class. The mean of the difference score was 28.41. From the score of post-test in control class, the results showed that the minimum score was 48 and the maximum score was 78 with the score range was 30 and the standard deviation was 9.768.

The results of the observation analysis of teacher's activities were the skills of teachers in conducting learning activities by applying the PBL method. Observation was carried out by an observer, namely a teacher in the field of study of economics using the teacher's observation sheet. Criteria for evaluating teacher activities were 1 = very poor category, 2 = inadequate category, 3 = adequate category, 4 = good category, and 5 = very good category. Whereas, the result of teacher's teaching behaviour of experimental class was 83, with the following calculations:

Teacher's observation score = 54/65 x 100 = 83

The teaching process was done by the researcher in the experimental class with the application of PBL method was obtained the score of 83, so it was said as "good". The students of experimental class had an average score in learning behaviour 4.28 with good criteria, it can be stated that the students' learning behaviour of the experimental class was "good". Meanwhile, the students of control class had an average score in learning behaviour 3.25 with sufficient criteria, it can be stated that the students' learning behaviour of the control class was "not good" yet.

This study also measured the level of motivation of students after learning using PBL method. Questionnaire of learning motivation that has been given to the students in the experimental class during the learning process and also has been analysed by obtaining an average score of learning motivation was 4.08 which means that the learning motivation of the experimental class was good. Besides measuring of the learning motivation, researchers also measured the level of the class atmosphere. The score of class atmosphere was obtained from the questionnaire that had given to the students in the experimental class and there are 8 statements in the questionnaires including: 1) the class the assessment criteria are 1 - 5 which means 5 = very good, 4: good, 3 = sufficient, 2 = bad, 1 = very bad. The class atmosphere in the experimental class during the learning process got an average score was 4.15 which means the learning atmosphere in the experimental class was "good".

Next, students who do not understand the material during the learning process would: 1) Raise their hand and asked for more explanation was 47%; 2) Went to the teacher after class to ask for more explanation was 38%, and 3) Did nothing was 15%. The third, during the learning process, time passed most quickly for students. The answers from the statement contained of 3 answers were: 1) The teacher was teaching him/herself was 3%; 2) We solved problems in groups was 71%; and 3) We did the exercises individually before discussing the results in class was 26%. The fourth, students cooperate best in class. The answers from the statement contained of 3 answers were: 1) The teacher was teaching him/herself was 0,0%; 2) We solved the problem in groups was 79%; and 3) We did the exercises individually before discussing the results in class was 21%.

The fifth, the students disagree with the teacher/group or they have a comment. The answers from the statement contained of 3 answers were: 1) I said that immediately was 68%; 2) I waited until after class and told it to the teacher or person in the group was 17%; and 3) I remained silent was 15%.

The sixth, working together in groups to solve problems, have an impact for the students. The answers from the statement contained of 3 answers were: 1) I got to know my friends better and less in class was 88%; 2) I have more trouble to understand the content of the course was 3%; and 3) incongruence arose between the group members was 9%.

The seventh, teachers who teach with the conventional learning methods. The answers from the statement contained of 3 answers were: 1) I can easily follow without having friend disturbing me was 32%; 2) I talked

to fellow students about how they experienced the course after class was 59%; and 3) there was at least no turmoil as we don't have to work together in group was 9%.

The eighth, the process during learning in class, which is obtained from learning. The assessment criteria were 1 - 5 which means 5 = very lot, 4 = lot, 3 = sufficient, 2 = little, 1 = none. During the learning process in the experimental class that students obtained from learning got an average score was 4.26 which means that during the learning process in the experimental class that students obtained from learning was a lot.

After obtaining data from the experimental class using the PBL and the control class using conventional methods, researchers conducted a test of data analysis prerequisites first, namely the test for normality and homogeneity. The first test were normality test using Kolmogorov-Smirnov. The result could be shown on the Table 3.

The significance value of control data > 0.05 (0.092 > 0.05), so Ho is accepted, it can be concluded that the control data is normally distributed. The result of homogenity test can be shown the Table 4.

Table 4. The Result of Homogeneity Test of Variances

Levene Statistic	df1	df2	Sig.
,142	1	66	,708

Source: Processed Primary Data (2018)

From the output above, it can be seen the significance value> 0.05 (0.708> 0.05). It showed that the data variance in the experimental class and the control class were same. So, it can be concluded that the data was homogeneous. Prerequisite tests had been carried out and it was known that both classes were normally distributed and homogeneous.

This study aimed to compare the two test scores (pre-test and post-test) between the experimental class using the PBL method and the control class using conventional methods, whether or not there were differences between the two test scores. Testing this difference in value should only be done on the average of the two values only and for that purpose the t-test was used. The result of the hypothesis test with independent sample test can be seen at Table 5.

Based on the obtained data from the t-test results, it can be seen t-count is 5.288. While to get the t-table, it can be seen in the t-test table on the two-sided test with df 66 that was 1.997 t-count > t-table (5.288> 1.997) so that Ho was rejected. It can be concluded that there is a significant effect on students' learning outcomes using PBL method.

In applying the PBL method, the teacher presented a problem about national income to be discussed by students and helped students to understand it. The teacher guided students in the division of discussion groups and guided students to gather information through various ways to solve problems in material about national income. After that,

Table 3. The Result of Normality Test

	Class	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
		Statistic	Df	Sig.	Statistic	Df	Sig.
Students' Learning outcomes	Experiment	,119	34	,200*	,963	34	,299
	Control	,140	34	,092	,907	34	,007

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

Source: Processed Primary Data (2018)

Table 5. The Result of Independent Sample T-test

Assume	Levene's Test for Equality of Variances		t-test for Equality of Means						
	F	Sig.	T	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
								Lower	Upper
Equal variances assumed	3,869	,053	5,288	66	,000	15,265	2,887	9,501	21,028
Equal variances not assumed			5,288	59,315	,000	15,265	2,887	9,489	21,040

Source: Processed Primary Data (2018)

the teacher guided students to determine the most appropriate problem solving from various alternative problem solving that students found in the material about national income and guided students to compile reports on the results of problem solving on material about national income, for example, in the form of power points. Overall the application of this method had been good.

The application of this method had proven to have a good effect in increasing learning motivation. In addition, this method also could create a good and conducive classroom atmosphere, students active to ask, students able to work with other students to solve problems, and students respect the differences among them. This condition was different, if the teacher applied conventional methods. This result corresponds to the study conducted by Witte & Rogge (2014) who argue that independent and active learning is derived from student learning motivation, such as autonomic motivation (intrinsic motivation) that is a motivation in students who tend to understanding material and controlled motivation (extrinsic motivation) that is a motivation in students who tend to memorize material only.

Meanwhile, the results of this study can prove significantly the hypotheses that have been formulated before, namely significant between the learning outcomes of experimental class students with the application of PBL method and control class students with the application of conventional learning methods. In the experimental class, the average value of students was 34.96% higher than control class. The result of this study corresponds to the research conducted by Witte & Rogge (2014) which revealed that application the PBL method can significantly improve student's learning outcomes.

This research also is similar with Azer (2009) has conclude that the PBL method is significant to create a good interaction between teachers and students and it will make the discussion atmosphere in the learning system more effective. The similar result was revealed by Rerung, Sinon, & Widyaningsih (2017) which concluded that the PBL method can significantly influence student's learning outcomes. The other identical findings were carried out by Mioduser & Betzer (2007), as they stated PBL method can give the contribution to the learning, students can expand and increase their learning abilities and PBL metod can encourage students to learn actively, foster the independent student learning behaviour, and students are given full responsibility for their own learning process.

CONCLUSION

Based on the findings and discussion, the following conclusions can be drawn; (1) The application of the PBL method at the eleventh grade of SMAN 20 Tangerang Regency, during the learning process can be done well, it can be seen from the teacher assessment of economic subjects (tutor's teacher) is 83; (2) The students' learning motivation at the eleventh grade of SMAN 20 Tangerang Regency for economics subject with the material about national income is good, it can be seen from the assessment of the student questionnaire analysis result is 4.08; and (3) The result based on the analysis from the questionnaires of class atmosphere at the eleventh grade of SMAN 20 Tangerang Regency is good. The difference between the learning outcomes at the eleventh grade of SMAN 20 Tangerang Regency in the experimental class with the application of PBL method and control class with the application of conventional learning methods proved to have differences, it can be seen from the results of tcount> ttable (5,288 > 1,977), which means there is a difference between the learning outcomes of experimental class and control class.

Theoretically, for further studies, it is expected to add other variables because there are many other variables that can influence students' learning outcomes. Then the researcher expects that further studies could use different analytical techniques. It is also recommended to the next researchers when conducting the study must be planned in detail and systematically and carried out as well as possible so that the results obtained will be better and more optimal than what the researcher have done before.

Practically, the students more enhance their motivation in learning, being active and participating in the learning process, so that the students' learning outcomes will be better. For economic teachers, they are expected to use several variations of learning methods in teaching and learning activities based on the 2013 curriculum using scientific approach as a reference in conducting learning activities to always involve the students in each learning process. This is expected to improve students' learning outcomes, such as by using PBL method.

Schools are expected to improve the teachers' quality, especially the teachers of economics subject by giving seminars of learning methods that make students more active and involved in it, and also supported by good infrastructure in the classroom. Considering the results of this study are still very simple, what is obtained from the results of this study is not the last result, all of the limitations in this study can be used as reference material for further studies by paying attention to the possibilities of other variables that influence the application of the scientific approach of PBL method and students' learning outcomes.

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