Developing a Problem-Based Learning Model through E-Learning for Historical Subjects to Enhance Students Learning Outcomes at SMA Negeri 1 Rogojampi

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Abstract. The aim of this study was to create a problem-based learning model through e-Learning and to determine the effectiveness of the implementation of Problem Based Learning model through E-Learning for historical subjects to increase student learning outcomes at SMA Negeri 1 Rogojampi. ADDIE (Analysis, Design, Development, Implementation and Evaluation) learning model was used to develop E-learning. The results showed that the average learning outcomes of the experimental class was 74.2 and the control class was 66.3, because \( p \)-value = 0.000 < \( \alpha = 0.05 \), \( H_0: \mu_1 = \mu_2 \) is rejected and \( Ha: \mu_1 > \mu_2 \) is accepted. Based on the results of these studies it can be concluded that the Learning Model of Problem Based Learning through E-Learning is effective in improving student learning outcomes. The advantages of Problem Based Learning Models through E-Learning can be implemented by teachers to provide electronic information and educational content for students that assist them to achieve knowledge through ubiquitous learning.

1. Introduction

The classic problem faced by history lesson is an impression which very strong among students that history subjects are memorizing, less interesting, and boring subjects (Garvey and Krug, 2015: 18). The lack of teacher skills in creating an innovative and pleasant learning atmosphere which causes history lessons to often be classified as "soft subjects" compared to certain subjects that are considered "hard subjects". Even though history lessons occupy a very important position in the formation of national character and civilization that dignified and in the formation of Indonesian people who have a sense of pride and love for the country (Habsari, 2015: 06).

In principle, each generation has style and characteristics in learning. Today’s generation is often referred to as "Generation Z or net generation" is a generation that was born when technology and information have developed very sophisticated and enters all aspects of human life. Learning about Generation Z will be very difficult if teachers (especially history teachers) still apply traditional teaching styles, such as using the method of " Sit, Listen, Record and Memorize " (Purnomo, et al., 2016: 71). Therefore, for teachers to be able to keep abreast of the development of their students in learning, innovation in teaching and learning activities is needed, especially in the use of technology.

The development and use of technology in all aspects of human life can be a challenge as well as an opportunity for history teachers. The use of technology in learning is known as E-Learning. E-Learning (electronic learning) is a learning model by utilizing information technology in the form of cyberspace/internet (Hanum, 2013: 92).

The previous research by Tambunan (2018) about Problem Based Learning based on E-Learning generates that this model can improve students learning outcomes. It also can increase students’ motivation in learning.
The use of E-Learning in the process of learning can be an alternative solution to various kinds of educational problems, especially problems in learning history and teaching of Generation Z. Moreover, the Generation Z learning environment "is not only the real world but also cyberspace" (Purnomo et al., 2016: 71).

2. Methods

The type of this research is Research and Development which continued with research Quasi-experiments using the Nonequivalent Control Group Design model.

Research and Development are used to produce E-Learning based learning models. The Development of E-Learning based learning models using ADDIE (Analysis, Design, Development, Implementation and Evaluation).

Research Quasi-experiments were carried out by using the Nonequivalent Control Group Design model. In Non equivalent Control Group Design, there are two groups, namely the experimental group and the control group that are not randomly selected. The two groups were then given a pretest to find out the initial situation. Next, the experimental group was given treatment and finally, the two groups were given post test. (Sugiyono, 2014: 113-116).

This experiment aims to see the effectiveness of the E-Learning based learning model to improve student learning outcomes in Indonesian history subjects. Experiments begin by determining the population and selecting samples. The population of this research is all X class students of 1 Rogojampi State High School.

The sample selection is done by simple random sampling technique. Samples were taken as many as two classes namely the experimental class and the control class that was given different treatments. The experimental class applied E-Learning based learning models, while in the control group conventional methods were applied.

The population in this study were X class students of 1 Rogojampi State High School consisting of 5 classes. The sampling technique used in this study was a simple random sampling technique.

Simple Random Sampling, which is random or random sampling according to existing classes (Arikunto, 2010: 134). In the selection it will be selected, one class as an experimental group, namely class X1 and one control class, class X2. In the experimental class, students learn with an E-Learning based learning model, while conventional control methods apply. The design of this study refers to (Sugiyono, 2014: 116) can be seen in chart 1 as follows:

Chart 1. Nonequivalent Control Group Design

|     | O1 | X  | O2 |     |
|-----|----|----|----|-----|
|     | O3 |    | O4 |     |

Explanation:
O1 = Pretest of the experimental class
O3 = Pretest control class
X = treatment by applying an E-Learning based learning model
O2 = Posttest experimental class
O4 = Posttest control class

Data analysis techniques were performed by using t-test statistical techniques. Before doing the t-test, a prerequisite test was carried out by conducting a normality test and a homogeneity test at the posttest value. This aims to regulate data that is homogeneous and normally distributed.

T-tests were conducted at the learning level of the effectiveness of the use of E-Learning based learning models in improving student learning outcomes in Indonesian History lessons. This test is
done by comparing data from the experimental class and the control class. The formula used for the t-test was published from Winarsunu (2009: 82) as follows:

\[ t = \frac{X_1 - X_2}{\sqrt{\left(\frac{\sum X_1^2 + \sum X_2^2}{n_1 + n_2 - 2}\right) \left(\frac{1}{n_1} + \frac{1}{n_2}\right)}} \]

Explanation:
- \( x_1 \) = average value in the experimental class
- \( x_2 \) = average value in the control class
- \( n_1 \) = number of students in the experimental class
- \( n_2 \) = number of control class students

3. Results and Discussion

Based on the results of student scores obtained from posttest, homogeneity and normality testing must be done first to find out that the data is homogeneous and distributed in a normal distribution.

The normality test results of the control class and the experimental class posttests were conducted to determine whether the data obtained were normally distributed or not. The normality test for two classes was carried out by the Shapiro-Wilk test using the SPSS 22.0 program for Windows with a significance level of 0.05. After processing the data, the output display can be seen in Table 1.

| Class     | Shapiro-Wik Statistic | df | Sig. |
|-----------|-----------------------|----|------|
| Posttest  | Eksperimen            | .971| 30   | .536 |
| Control   |                       | .969| 30   | .450 |

Based on the result of the normality test output using the Shapiro-Wilk test in Table 1, the significance value in the data column of the final test (posttest) value for the experiment class was 0.536 and control class was 0.450 as the significance value of two classes is more than 0.05 it can be said that the control and experimental class are normally distributed.

Based on the posttest data distribution normality test, the posttest scores for both classes were normally distributed and the analysis continued by testing the homogeneity of two variances between the experimental and control classes posttest data using the Levene test using the SPSS 22.0 program for Windows with a significance level of 0.05. After processing the data, the output display can be seen in Table 2.

| Tests of Homogenety of Variance |
|---------------------------------|
| Levene Statistic | df1 | df2 | Sig. |
| .449              | 1   | 58  | .505 |

Based on the result of the homogeneity variance test output using the Levene test in Table 2, the significance value is 0.505 as the significance value is greater than 0.05, it can be concluded that the control and experimental class students come from populations that have the same variance, or both classes are homogeneous.

Both classes are normally distributed and have a homogeneous variance, than a similarity of two means is conducted with the t-test through the SPSS 22.0 program for Windows using the Independent Sample T-Test with the assumption that both variances are homogeneous (equal variance
assumed) with a significance level of 0.05. After processing data, the t-test results of the final test (posttest) can be seen in Table 3.

**Table 3. T-test Posttest Experiment and Control Class.**

| Levene’s Test for Equality of Variances | T-test for Equality of Means | 95% Confidence Interval of the Difference |
|----------------------------------------|-------------------------------|----------------------------------------|
| Equal variances assumed                | F: 0.449 Sig.: 0.505 t: 6.219 df: 58 Sig. (2-tailed): 0.000 Mean Difference: 12.839 Std. Error Difference: 2.065 | Lower: 8.706 Upper: 19.968 |
| Equal variances not assumed            |                              |                                        |

In the Table 3, the p-valued value for 2-tailed = 0.000, as p-value = 0.000 < α = 0.05, so H0: μ1=μ2 is rejected and Ha: μ1>μ2 is accepted, it can be concluded that the learning outcomes of students who get the Problem Based Learning model based on E-Learning is better than students who get conventional learning. The conclusion is the average value of the experimental class is better than average control class with class average value of 74.2, while in the control class the average value of 66.3.

**Discussion**

Based on the analysis of student learning outcomes data (posttest), it can be observed that there are differences in the average value of the experimental class compared to the control class. It can be seen from the result of the T-test. T-test was conducted in the experimental class with an average value of 74.2, while in the control class the average value was 66.3 as p-value = 0.000 < α = 0.05, so H0: μ1=μ2 is rejected and Ha: μ1>μ2 is accepted. It can be concluded that the average experimental class learning outcomes are higher than the average control class learning outcomes. It shows that the learning outcomes of students whose learning processes use the E-Learning model are better than students who get learning with conventional method.

**4. Conclusions**

The E-Learning model is effectively used in the learning process and it can improve students learning outcomes as p-value = 0.000 < α = 0.05, so H0: μ1=μ2 is rejected and Ha: μ1>μ2 is accepted. It can be concluded that the average experimental class learning outcomes are higher than the average control class learning outcomes. In the experimental class with an average value of 74.2, while in the control class the average value was 66.3. Based on the results, it can be concluded that there are differences in the effectiveness of learning between classes using the E-Learning model and conventional classes.

**Suggestion**

1. For school, the development of the E-Learning model in Indonesian History subjects with materials can be developed in other subjects.
2. For other researchers, this research can be continued in a wider population with a longer period so that the results obtained are more optimal.
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