

Effect of Problem Based Learning Model Learning on Critical Thinking Ability and Student Motivation Class X SMAN 2 Kerinci

Afifi Reni Humaira¹, Ratna Wulan², Dwi Putri Hilda²

¹ Student of Master Degree Program of Biology Education, Universitas Negeri Padang

² Lecturer of Biology Department, Universitas Negeri Padang

Abstract, The learning process is still focused on the knowledge and understanding of the material, the active role of learners is still very poor and critical thinking skills as well as the motivation of learners is still low. One effort that can be done to solve the problem is to do research by applying the learning model Problem Based Learning. The purpose of this study was to determine the effect of the learning model Problem Based Learning on critical thinking skills and motivation of learners. This study is a quasi-experimental research, the study population is class X SMA Negeri 2 Kerinci in the academic year 2018/2019. Sampling was conducted using random sampling techniques and obtained experimental class as a class X3 and X4 class as the control class. Instruments used in the form of critical thinking skills tests and questionnaires. Analysis of the data in this study using t-test for critical thinking skills, and motivation to learn the Mann-Whitney U test. The results showed that the critical thinking skills and motivation of learners class of biological experiments is better than the control class learners.

1. Preliminary

Education is a human effort to humanize, As creatures Tuhan, humans have the ability to speak and rational mind, so as to develop itself into a civilized beings. Various efforts have been made by the government to improve the quality of education, including the renewal of the Education Unit Level Curriculum (SBC) which is refined into Curriculum 2013. Through 2013-based curriculum development and competency-based characters will produce learners who are productive, creative, innovative, active through knowledge attitudes, skills and knowledge are integrated (Hosnan, 2014).

Implementation of the scientific approach in the classroom can be done in three models of learning that has been recommended that the project-based learning model, the model of discovery learning and problem-based learning model. Curriculum ideal demand in 2013 against the competence of learners listed in the competency standards that cover aspects of attitudes, knowledge, and skills (Permendikbud, 2016)

One of the subjects that are in high school (SMA) is biology. Interest in the biology subject content standards are learners able to cultivate the scientific attitude that is honest, objective, open, resilient, critical, and can cooperate with others. To achieve these objectives the need to develop an attitude of learning to think

critically, because the human resources professional and quality will result if science is explored in more depth by developing a culture of critical thinking (Yustyan et al, 2015).

Based on observations and interviews were conducted on August 8, 2018 against biology teacher in class X SMA 2 Kerinci, it is known that the learning process is still emphasis on the knowledge and understanding of the material. During this learning process that takes place is still a teacher center, more teachers delivering course material through lectures and provide exercises do the questions contained in the worksheet. As a result, students become less trained in developing thinking and problem solving skills and apply the concepts learned in school to the real world.

Through observations that have been made can be known that motivation of learners in the learning process is still lacking, only a few students who showed motivation in asking and answering questions. Questions and answers posed are still limited to questions and answers on the level of knowledge alone. At least learners who ask, argue, commented, explained, and consider the relevant sources indicate critical thinking skills are poorly trained (Afrizon, 2012).

Data critical thinking skills of learners gained from high school biology teacher Kerinci School 2 also shows the critical thinking skills of learners is still below the minimum completeness criteria that have been set at 75. The average value of critical thinking skills can be seen in Table 1.

Table 1. Percentage of Mastery Learning Outcomes of Students Class X SMAN 2 Kerinci in the academic year 2016/2017

| N o. | Class | The number of students | Average Value UH |
|-----------------|--------------|---------------------------------------|-----------------------------|
| 1 | X1 | 30 | 72.26 |
| 2 | X2 | 30 | 69.83 |
| 3 | X3 | 30 | 73.33 |
| 4 | X4 | 30 | 74.57 |

Source: Biology Teacher SMAN 2 Kerinci

One of the factors causing low critical thinking skills of learners that influence learning outcomes include learning and assessment model selection is not right. Based on the problems that have been described, how that can be done to improve critical thinking skills and motivation of learners is started lessons with a problem or question (Snyder and Snyder, 2008). Learning can be applied to a problem with the application of Problem Based Learning (PBL)

Model Problem Based Learning is a learning model that can be motivating, challenging, and fun for the learners as a result of the learning process to understand or solve a problem (Norman and Schmidt, 2000). Stages of learning by making learners PBL models as a learning center, so it will affect the learning outcomes of knowledge, attitudes and skills. PBL put learners at the center of the learning process that will improve the knowledge, skills and understanding (Matthew, 2011).

According Abanikanda (2016), using the model PBL make learners more experienced in collecting, organizing and providing information that could be used for the future and could also face and solve complex problems and real. PBL is designed to increase high-level thinking skills of learners, particularly reasoning skills (Savery, 2006). High-level thinking skills is the ability to connect, manipulate, and transform knowledge and experience that already has to think critically and creatively in order to determine decisions and solve problems in new situations. There are four high-level mindset, one of which is of critical thinking (critical thinking) (Rofiah, 2013).

Critical thinking is the ability to argue in an organized manner through a process focused and clear to that used in problem solving, decision making, analyzing assumptions, and conduct scientific research to achieve a deeper understanding, so that learners understand the meaning behind an event (Johnson , 2014). Critical thinking is also a logical thinking in making decisions about what to believe and what to do (Ennis, 2011).

The use of this model is expected to make the learners are actively involved in learning activities that can improve critical thinking skills and motivation to learn. In line with the research results Afrizon (2012) says that Problem Based Learning pembelajaran models can improve critical thinking skills and motivation of learners.

2. Research methods

The method used in this study is quasi-experimental. In the experimental group using Problem Based Learning model of science and grade control using the Direct Instruction learning model. The study design used design types randomized control-group posttest only design.

2.1 Normality Test

Normality test used is the Kolmogorov-Smirnov test. Normality test aimed to see if the population distribution is normal or not. Normal distribution of data if the value is greater than the level of significance $\alpha = 0.05$ with statistical hypothesis as follows:

H_0 = the data follows a normal distribution

H_1 = not follow a normal distribution

The test criteria is received H_0 if the Sig > significance level ($\alpha = 0.05$), meaning that normal distribution and otherwise.

2.2 Test of Homogeneity

Homogeneity of variance test performed with Levene's test. Homogeneity of variance test was conducted to determine whether the population has a homogeneous variance / no. variance homogeneity test carried out with the help of SPSS software 17. The test criteria is received H_0 if the Sig. > Significance level ($\alpha = 0.05$), and rejected otherwise.

2.3 Hypothesis Testing

Hypothesis test aims to determine whether there is influence of the Problem Based Learning model of critical thinking skills and motivation of learners. The test criteria is when the Sig. > 0.05 then H_0 and H_1 rejected, otherwise the Sig. < 0.05 then H_0 rejected and H_1 accepted.

2.3.1 First Hypothesis Testing

Statistical tests performed for the first hypothesis is t test for normal distribution of data and has a homogeneous variance. Using the t test if the data were normally distributed and have a variance is not homogeneous with the Mann-Whitney U test if the data are not normally distributed. In this research hypothesis testing is done with the help of SPSS software 17.

2.3.2 Second Hypothesis Testing

Statistical tests performed for the hypothesis The second is the Mann-Whitney U test hypotheses In this study conducted with SPSS 17 Criteria for testing this hypothesis that if the significance value that is greater than 0.05 then H_0 is accepted, and if the significance value obtained is less than 0.05 then H_1 is rejected.

3. Results and Discussion

3.1 Research result

3.1.1. Description Data Critical Thinking Skills

Data critical thinking skills in this study was obtained through the final test in the form of a written test in the form of essay given to learners experimental classes and control classes were held at the end of the meeting each basic competency. Results kritis thinking skills can be seen that the average critical thinking skills of students in the experimental class is higher than the control class, namely the class 77.99 72.99 experiment and control class. Maximum and minimum values of critical thinking skills experimental class is higher than the control class.

3.1.2 Data Description Motivation

The research data on aspects motivation to learn is obtained through filling a questionnaire carried out by students during the learning process has been completed. Results motivation to learn can be seen that the total value of the average motivation of learners who filled out by students in the experimental class earned an average higher than the control class.

3.2 Data Analysis Research

Test requirements analysis is done before proceeding to test the hypothesis, the first test conducted was a test for normality using the Kolmogorov-Smirnov test homegenitas variance using test Levene's with the help of software SPSS 17. If the data were normally distributed and homogeneous then test the hypothesis using the t test, if not distributed would not normally be followed by a test of homogeneity of variance and hypothesis testing using Mann Whitney U.

3.2.1 Normality test

Normality test is done on the value of critical thinking skills and the experimental class control class. Normality test is done using Klomogorov-Smirnov test with SPSS. The test criteria is received H_0 if the Sig. > Significance level ($\alpha = 0.05$).

From the calculation results show that the critical thinking skills to the experimental class have the Sig. 0.200 while the control class has the Sig. 0.141 so that it can be concluded that the data were normally distributed.

3.2.2 Homogeneity test

Test of homogeneity of variance values of critical thinking skills of learners experimental class and control class using Levene test with SPSS 17. The test criteria are received H_0 If the Sig> extent of paragraph ($\alpha = 0.05$) and reject H_0 otherwise.

From the calculation results show that the critical thinking skills of the experimental class and control class has a homogeneous variance with significant value 0.431.

3.2.3 Hypothesis testing

3.2.3.1 Hypothesis Critical Thinking Skills

This hypothesis test is used to determine the effect of the Problem Based Learning model of critical thinking skills of learners. Testing this hypothesis using the t test. The calculations show that the critical thinking skills of learners have the Sig. 0,008 with significance level ($\alpha = 0,05$). This means that the value of Sig. <0.05 then H_0 is rejected. Results hypothetical calculation of critical thinking skills can be seen in Table 2.

Table 2. Calculation of Critical Thinking Ability Hypothesis

| Class | Sig | α | Conclusion |
|------------|-------|----------|-------------|
| Experiment | 0,008 | 0.05 | Ho rejected |
| Control | | | |

From the calculation results Table 2 it can be concluded that the learning model Problem Based Learning affect the critical thinking skills of learners.

3.2.3.2 Hypothesis Motivation to learn

This hypothesis test is used to determine whether there is influence of the model of Problem Based Learning to motivate learners. Hypothesis testing is performed using the Mann Whitney U test results show that the sphere of competence of learners attitudes have value Sig. 0,000 with significance level ($\alpha = 0,05$). This means that the value of Sig. < 0.05 then H_0 is rejected. Attitude hypothetical calculation results are shown in Table 3.

Table 3. Calculation Results Hypothesis Motivation

| Class | Sig | α | Conclusion |
|------------|-------|----------|-------------|
| Experiment | 0,000 | 0.05 | Ho rejected |
| Control | | | |

From the calculation Table 3 it can be concluded that there is significant influence learning model Problem Based Learning on the motivation of learners who follow the teaching model Problem Based Learning is better than the motivation of learners who follow the Direct Instruction learning model.

3.3 Discussion

3.3.1 Achievement of Critical Thinking Skills of Students

Application of PBL models have a positive impact on critical thinking skills of learners, where this model can enhance the critical thinking skills of learners, The result is in line with research that has been conducted by the Tosun and Teskesenligil (2011) indicated that PBL had a positive contribution to the critical thinking skills of learners. The positive impact of the PBL model of critical thinking skills of students can be seen from the average acquisition value of critical thinking skills of students in the experimental class is higher than the average value of students in the control class. Differences in study results is due to the model PBL learners are trained to develop their critical thinking skills to solve problems through activities that constitute the core of the model PBL.

Core activities of PBL models located on the second phase, third, and fourth gives the opportunity to students to actively construct knowledge through problem-solving activities that can develop the mindset so that learners are accustomed to think critically (Karim and Normaya, 2015). This is in line with the opinion of the Goddess and Jatningsih (2015) which stated that the use of PBL models makes learners are able to identify and solve the problems given that this model is able to enhance the critical thinking skills of learners.

In the control class that uses the learning Direct intruction, Critical thinking skills of students is lower than the experimental class using PBL models. The fundamental difference between the models Direct intruction PBL model is a model of PBL presents problems in the beginning of learning to find the ideas and concepts of learning. In the model of PBL, the problem presented in early learning and serves as a stimulus learning activities (Chin and Chia, 2005).

3.3.2 Achievement of Students' Learning Motivation

Statistical analysis showed that the motivation of learners increased after using the model PBL, This is evident from the acquisition of the average value of the experimental class learning outcomes are higher than students in the control class given intruction Direct learning. Differences in study results is due to the experimental class that uses the model of PBL, the learners are given the opportunity to build his own knowledge. The same thing was stated by Orhan and Ruhan (2007), that the model PBL had a positive effect on the motivation of learners.

The motivation of learners in a class lower than the control experiment class. The process of learning the control class that uses the model Direct instruction make less active learners in the learning activities, so it becomes less meaningful learning activities.

Apparent differences in the learning process experimental class and control class, so also there is a difference in motivation of learners. Class experiments using model of PBL has an average value of learning motivation is higher than the average value of learning motivation in control classes using instruction Direct learning model. Anderson (2007) states that learners who use PBL models in the learning process has a higher level of motivation. Model PBL provides learning experiences for learners to give birth to a good understanding so the motivation to learn is also getting better. This is supported by research results Muspita (2013) that the application of problem-based learning model has positive influence on the motivation of learners.

4. Conclusion

Based on the results of research and data analysis, it can be concluded that there are significant model of problem based learning to critical thinking ability and motivation to learn biology students.

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Acknowledgment

A big thank you to Mrs. Dr. Ratna Wulan, M.Sc., and Dr. Dwi Putri Hilda, M. Biomed., As a supervisor and provide motivation to the author in writing this journal.