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The Effect of Model Problem Based Learning on the Critical Thinking Ability of Students in Class X Man 1 Padang

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Abstract – Competition in the era of globalization has affected all aspects of life including in education. Critical thinking is an important and vital topic in the era of modern education. Based on the results of the trial of critical thinking questions at MAN 1 Padang the results of the critical thinking skills of Biology students learned less critical results. Efforts that can be made are conducting the learning process with the right model. One learning model that can improve students' critical thinking skills is problem based learning. The purpose of this study was to determine the effect of the model problem based learning on the critical thinking skills of class X MAN 1 Padang students. This type of research is a quasi-experiment. The samples in this study were class X IPA MAN 1 Padang enrolled in the school year 2019/2020 using technique. Purposive sampling the instruments used were essay question sheets. Data analysis with normality test, homogeneity test, and hypothesis testing with ANOVA test using SPSS application. The results showed that there was a significant influence of the model problem based learning on students' critical thinking skills between the experimental class and the control class. The conclusion of this study is the biological learning model of problem based learning influences students' critical thinking skills.

Keywords – Problem Based Learning, Critical Thinking

I. INTRODUCTION

One of the efforts made by the government in the world of education to face the era of globalization in the 21st century is through the application of the 2013 Curriculum (BSNP, 2010). The Australian Department of Education and Training (2006) states that the current curriculum in the world has considered critical thinking skills as a key component in achieving educational goals.

Critical thinking can be used as a motivating factor for increasing students' knowledge. In line with this, Zubaidah (2015) states that critical thinking in learning is used to assess and determine opinions towards scientific truth.

One of the lessons that must be planned to develop the ability to think critically scientifically is learning science. Science learning requires students to be scientific so that it can hone students' critical thinking skills. Biology is part of science that needs to be developed through the ability to think to be able to solve a problem related to events in the natural environment.

Based on the test results of critical thinking questions at MAN 1 Padang on October 24, 2019 on 67 students of class X, the results of critical thinking skills of Biology students were obtained with a mean value of 41.61. This figure according to Karim and Corresponding Author: Moralita Chatri Normaya (2015), shows that students' critical thinking

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skills are categorized as very low. These results are in line with research conducted by Fitri (2018), that the ability to think at a high level which is one of the components of critical thinking in Padang City High Schools obtained an average value of 44% in the low category.

Based on the results of an interview with one of MAN 1 Padang's teachers, Mrs. Armayanti, S.Pd, on October 15, 2019 it was stated that the school had implemented the 2013 Curriculum. However, the implementation of the 2013 Curriculum which expected student-centered learning had not been implemented at the school. Based on observations of learning in schools is still centered on the teacher (*teacher center*). Then, theinitial ability of students in class has not been considered by the teacher. The learning model that is applied does not accommodate all the characteristics of academic abilities of students, so the distance between high and low ability students is still far away. This is in line with the opinion of Anderson (2001), stating that if students have different levels of academic ability given the same learning, the learning outcomes are different according to their level of ability. According to Presseisen (2001), this is because learning outcomes are related to students' academic abilities in finding and understanding the material being studied. Students' academic abilities determine success in using critical thinking skills.

Learning in schools that are still *teacher-centered* makes students more passive and less enthusiastic in the learning process. The material presented is less directly related to the lives of students, so students cannot link biology learning with daily life. These conditions have an impact on the under development of students' thinking skills, especially critical thinking skills.

The ability to think critically does not come by itself but needs to be trained through learning (Friedrichsen, 2001). Based on these problems, it is necessary to have an effort to improve students' critical thinking skills. The solution that can be done to be done is to apply a model that is able to develop students' critical thinking skills. One learning model that involves all students in thinking activities is Problem Based Learning (BSNP, 2010). Problem based learning (PBL) is a learning model that is based on constructivism and accommodates students' involvement in learning and is involved in contextual problem solving (Warsono, 2012). Through thislearning model *PBL* students can be active, creative, and innovative, in accordance with the objectives of the implementation of the 2013 Curriculum.

Problem Based Learning will also improve thinking skills and learning abilities and other cognitive abilities of students (Smith, 1995). PBL Model designed to help students build a broad and flexible knowledge base, develop students' active involvement in carrying out tasks, and build intrinsic motivation in learning (Hmleo & Silver, 2004). Science learning by using the PBL model focuses on selected problems so that students not only learn concepts that are related to problems but also scientific methods to solve those problems. Therefore, students must not only understand the concepts that are relevant to the problem at the center of attention, but also gain learning experiences related to the ability to apply scientific methods in problem solving and foster critical thinking patterns.

PBL learning model has several weaknesses, one of which is without understanding why students must try to solve the problem being studied, students will not want to learn what they want to learn (Zubaidah, 2017). Therefore, there is a need for learning that can make students more active in the learning process, so students can be motivated to solve a problem.

Based on the above problems, researchers have conducted research on "The Effect of Models on the Problem Based Learning Critical Thinking Ability of Students in Class X IPA MAN 1 Padang".

II. METHODOLOGY

The type of research is a quasi- experimental research design with *Randomized Control Group Posttest Only Design*. In this study students are divided into two classes, namely the experimental class and the control class. The experimental class was treated by applying the learning model Problem Based Learning while the control class applied the learning model commonly used in the school ie scientific. After that, both the experimental class and the control class were given a *posttest*. The instrument used was a critical thinking ability test sheet in the form of essay questions. Data analysis with normality test, homogeneity test, and hypothesis testing using SPSS application.

III. RESULTS AND DISCUSSION

1. Results

Results of students' critical thinking skills can be seen in Table 1.

Table 1. Results of students' critical thinking skills

Class	Average of Critical Thinking Ability
Experiments	70.89
Control	61.83

Table 1. shows a summary of students' thinking abilities the experimental class gained an average value of 70.89 while the control class obtained an average value of 61.83. Based on table 1 it can be seen that the critical thinking skills of the experimental class students are better than the control class. Furthermore, an analysis prerequisite test will be carried out which includes a normality test, a homogeneity test, and a hypothesis test with ANOVA between the critical thinking skills of students who apply the PBL model and students who apply the scientific model and the results can be seen in Table 2.

Table 2. Prerequisite Test Results Knowledge Competence analysis

Parameter	Class		Description
	Experiment	Control	
Average	70.89	61.83	Experiment> Control
Normality Test	Sig = 0.08 α = 0.05	Sig = 0.20 α = 0.05	Distributed Normal
Homogeneity Test	Sig = 0.485 α = 0.05		Homogeneous Variance
Hypothesis Test (ANOVA)	Sig = 0.00 α = 0.05		Significant

Table 2. shows the average value of critical thinking skills of students in the experimental class and control class along with the value of normality test, homogeneity test and Hypothesis testing with ANOVA. With the average value of students' critical thinking skills the experimental class is higher than the control class. The data in this study are homogeneous and normally distributed, while the value of the hypothesis test using ANOVA is significant. <0.05, it can be concluded that the students' critical thinking skills in the experimental class learning using the model Problem Based Learning are better than the control class.

2. Discussion

Based on the results of the research described above, it shows that the critical thinking ability of experimental class students applying models Problem Based Learning (PBL) is higher than the critical thinking ability of control class students. Students who learn with the PBL model score critical thinking abilities of 70.89. These results indicate that students' critical thinking skills are at a critical level. While students in the control class who are learning with a scientific model score students' critical thinking skills at 61.83. These results indicate that students' critical thinking skills are still in a less critical level.

Critical thinking is a high-level thinking ability that is one component in the 21st century intelligence issue (Shanti, 2017). Critical thinking is different from thinking. Critical thinking is an intellectual thought process in which the thinker deliberately assesses the quality of his thought. Thinkers use reflective, independent, clear, and rational thinking (Murti, 2009). The success or failure of a person in his life is determined by the ability to think, especially in efforts to solve everyday problems (Zubaidah, 2010).

One learning model that can direct students to think critically in the learning process is thelearning model Problem Based Learning (PBL). This model helps students to develop thinking skills, problem solving skills, learn the roles of adults, and become independent students (Arends, 2008). Therefore, this model can provide opportunities for students to do thinking activities in solving problems, gathering information, processing and concluding so that students' critical thinking skills can be improved.

This PBL model uses seven steps to help students in analyzing problems namely, (1) clarifying concepts; (2) defining the problem; (3) analyze the problem; (4) find an explanation; (5) formulating learning objectives; (6) looking for further information; and (7) reporting and testing new information (Graaff, 2003). The first stage in the PBL model is to clarify the concept *(clarify)*, at this stage students read the problem, and identify some concepts that are not yet understood (Raine, 2005). Clarifying concepts is very important because it can provide feedback in the learning process as well as providing motivation to students (Krijgsman, 2019). So confronted with concepts that they do not yet know can arouse curiosity and can develop students' critical thinking skills.

The second stage is defining the problem (*define*), at this stage students are given the opportunity for participants to understand the material by exploring students' knowledge by connecting with their lives. Determining the problem will make someone a problem solver, so that they can think critically to achieve the learning objectives (Sarjono, 2017). The third stage is analyzing the problem (analysis*)*, at this stage students work in groups of five to six members to solve problems by way of discussion (Masek, 2010).

The fourth stage is finding an explanation *(review)*, at this stage students find temporary suspicions (hypotheses) on various possible solutions to problems in accordance with their knowledge through a causal analysis of the problem to

be solved (Heriawan, 2012). The fifth stage in this PBL model is formulating learning objectives (*Identify learning objectives*), at this stage students discuss in groups to determine the tasks of each group member by discussing the objectives and activities to be carried out to solve the problems that have been formulated.

The sixth stage is looking for further information (*Self study*), at this stage students look for information through the literature. Finding information that is relevant to the problem being studied can be used as an alternative to solving the problem. The last stage is reporting and testing new information (*Report and synthesis*). At this stage, students share information with each group member and conclude the information that has been found after that students present the results of solving the problem in front of the class.

Stages in the PBL model can train students' thinking skills on each indicator. Indicator analysis can be trained with the activities of students at the stage of identifying existing concepts in the problem and formulating the problem. Evaluation indicators can be trained with students' activities in making conclusions (Ismaimuza, 2010). PBL learning model is based on the principle that problems can be used as a starting point for gaining knowledge, so that with this problem students gain knowledge through PBL stages or syntax (Hidayat, 2016). So this PBL learning model can make students in the experimental class more active in the learning process than students in the control class.

This is in accordance with the strengths of this PBL model, which is to stimulate the development of students' thinking progress to solve the problem being faced appropriately (Sanjaya, 2008). The ability to think critically in the control class is lower than that of the experimental class due to the centralized learning of the teacher and the students who are more passive when learning. Students seem to only listen to the learning delivered by the teacher without being actively involved in the learning process. So that students' critical thinking skills in learning in the control class cannot be fully developed.

The stages in the PBL model can have a good influence on students' critical thinking skills. So that PBL learning models are better at improving students' critical thinking skills than control classes that use scientific models.

IV. Conclusion

Based on the results of research that has been done, it can be concluded that there is a significant effect between models problem based learning on students 'critical thinking skills, where students' critical thinking skills.

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