

# **Influence of Problem Based Learning on Critical Thinking Skills and Competence Class VIII SMPN 1 Gunuang Omeh, 2016/2017**

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**Abstract.** This research intends to determine the effect of Problem Based Learning models on students' critical thinking skills and competences. This study was a quasi-experimental research. The population of the study was the students of class VIII SMPN 1 Subdistrict Gunuang Omeh. Random sample selection is done by randomizing the class. Sample class that was chosen VIII3 as an experimental class given that treatment study based on problems and class VIII1 as control class that treatment usually given study. Instrument that used to consist of critical thinking test, cognitive tests, observation sheet of affective and psychomotor. Independent t-test and Mann Whitney U test was used for the analysis. Results showed that there was significant difference ( $\text{sig} < 0.05$ ) between control and experimental group. The conclusion of this study was Problem Based Learning models affected the students' critical thinking skills and competences.

## **1. Introduction**

The development of education today directing the process of learning, the students learn to build his own knowledge. This is done to achieve the goals of education contained in the curriculum in 2013, namely that the students have the necessary competence for lives. According [1], competence meant that competence of attitude (affective) in the form of a religious attitude and high social ethics in public life, the competence of knowledge (cognitive), and competence of skills (psychomotor) in the form of skills or the ability to apply knowledge.

One of the subjects contained in junior high school subjects were biology belonging to the subjects of Natural Sciences (IPA). Science education is one aspect of science education that is expected to deliver learners to meet the skills needed in the 21st century. Some of these capabilities by [1] is a learned skill and innovation that includes critical thinking and able to solve problems, creative and innovative, and able to communicate and collaborate.

Critical thinking skills is an ability that needs to face the global challenges of the 21st century. Critical thinking skills are needed so students are able to take decisions in everyday life. Learners must be taught to develop critical thinking skills in solving problems, so the ability to problem-solving will



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also be developed. This is supported by [2] which showed that critical thinking skills are important, because with automatic critical thinking someone would be able to resolve simple or complex in everyday life.

Through observation and interviews conducted to teachers teaching science in class VIII SMPN 1 Subdistrict Gunuang Omeh, it is known that the learning process is focused on knowledge and understanding of the topics. 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. The active role of learners in the learning process is still lacking, only a few learners are shown to be active in asking and answering questions. Questions and answers posed are still limited to questions and answers on the level of knowledge alone.

In addition to the value of critical thinking skills of students is still low, learners' cognitive competence of data obtained from a science teacher at SMPN 1 Subdistrict Gunuang Omeh also shows that the competence of learners cognitive aspect is still below the minimum completeness criteria that has been set is 75.

To improve critical thinking skills and competence of learners is started lessons with a problem or question [2]. Starting the learning with problems can be done through the application of PBL. In PBL, the problem presented in early learning and serves as a stimulus for learning activities [3]. PBL can also improve the competence of learners, both cognitive and affective competencies and psychomotor. The learning model is capable of making the students actively engaged in learning, so that learning becomes meaningful and can improve learning competencies possessed by learners [4].

## 2. Method

The research is a quasi-experimental. Research was conducted on two classes are experimental class and control class. The experimental class were treated in the form of a model *Problem Based Learning* (PBL) and untreated control class conventional model.

The population in this study were all students of class VIII SMPN 1 Subdistrict Gunuang Omeh academic year 2016/2017. Sampling was conducted through *random sampling* by drawing using a roll of paper which consists of 3 pieces containing the class name. Drawn first class is a class VIII<sub>3</sub> designated as experimental class and the second class is a class that is picked VIII<sub>1</sub> as the control class.

Instruments that used in this research is a matter of describing adjusted indicator to determine the value of critical thinking skills of students, the objective test to assess the cognitive competence, and observation sheets and evaluation sheets to determine the competence of learners' affective and psychomotor aspects. The data analysis technique used is the t-test for critical thinking skills and cognitive competencies and the u-test for affective and psychomotor.

## 3. Results

The data obtained in this study were: 1) the critical thinking skills of experimental class and control class, 2) cognitive competencies of experimental class and control class, 3) the affective competencies of experimental class and control class, and 4) psychomotor competence of experimental class and control class.

### 3.1 Data of Learners' Critical Thinking Skills

Data critical thinking skills of learners are presented in Table 1.

**Table 1.** Values Critical Thinking Skills of Students

Class	Average	$X_{\max}$	$X_{\min}$	S	$S^2$
Experiment	74.69	93.75	54.17	10.56	111.6
Control	66.56	85.42	47.92	9.94	98.90

Based on Table 1, it can be seen that the average of students' critical thinking skills in the experimental class is higher than the control class.

### 3.2 Data of learners' cognitive competence

Data of learners' cognitive competence are presented in Table 2.

**Table 2.** Data Competence Cognitive Students

Class	Average	$X_{\max}$	$X_{\min}$	S	$S^2$
Experiments	80.5	97.5	65	9.16	83.95
Control	70.38	92.5	50	11.45	131.10

Table 2, it can be seen that the average competence learn science students in the experimental class is higher than the control class, ie 80.5 experimental class and control class 70.38.

### 3.3 Data of learners' affective competence

Data affective competencies of learners are presented in Table 3.

**Table 3.** Data Affective Competence Students

Class	Average	Predicate
Experiment	78.82	B
Control	70.83	B

Based on Table 3, it can be seen the total value of the average affective learners in the experimental class earned an average higher than the control class.

### 3.4 Data of learners' psychomotor competence

Learners' psychomotor competency data are presented in Table 4.

**Table 4.** Data Competence Psychomotor Students

Class	Average	Predicate
Experiment	75.25	B
Control	65.25	C

Based on Table 4, it can be seen the average value of students' psychomotor competence in the experimental class is higher than the control class.

## 4. Discussion

The application of PBL give a positive impact on critical thinking skills of learners. PBL enhance the critical thinking skills of learners. This difference is due to the PBL, the learners are trained to develop their critical thinking skills to solve problems through activities that constitute the core of PBL. Core activities of PBL located on the second, third, and fourth phase provides an opportunity for learners to actively construct knowledge through problem-solving activities that can develop the mindset so that learners are accustomed to think critically [5].

Critical thinking skills should be developed through a process of direct experience of learners in solving problems. The critical thinking will grow if learners are accustomed to use critical thinking skills to solve problems. This is in accordance with the opinion of Masek and Yamin [6], which states that the measures contained in PBL is able to support the development of critical thinking skills of learners.

Differences in study results is due to the experimental class that uses PBL, learners are given the opportunity to build his own knowledge. The same thing was stated by Orhan and Ruhan in [7], that PBL give a positive impact on students' academic achievement. Implementation of PBL in medical school is also give a positive impact on cognitive competence. Problem-solving activities carried out on PBL is a good technique for learners to understand the content of the lessons. These activities will also make learners find his own knowledge, so that learning becomes more meaningful and can improve cognitive competence of learners. Masek and Yamin [6] states that PBL is believed to provide an environment that is conducive to learning more meaningful, so that it can affect the ability of learners to apply their knowledge. In line with Tan [7] that PBL contribute to cognitive competencies.

The observation of learners' affective competencies conducted by the observer, data showed affective competencies of students in the experimental group was significantly better than learners' affective competence control class. Concerns raised at the beginning of each study can provide a stimulus that stimulates the curiosity of learners. This curiosity arise as a result of learning that begins with the provision of the issues or issues of interest that exists around the learner. This is in line with Atikasari, et al. [8] suggest that the pattern of teaching that focuses the problem and explore science positive effect of increasing analysis capabilities and curiosity of students to provide relevant solutions to problems. PBL requires students to arrive on time and notify members if the group can not be present, so as to train the learner discipline.

Results competency assessment psychomotor learners performed, the data obtained psychomotor competence learners experimental class significantly better than the control class. The high acquisition psychomotor competence of students in the experimental class is a positive influence on learning to use PBL which in problem-solving activities, the students are required to develop and present work that requires creativity of learners. Not much different from the views expressed by [9] that PBL have special characteristics that produce products or work and show off the product. When learners have the creativity, competence psychomotor learning will increase as psychomotor competency assessment of learners is done through product ratings.

## 5. Conclusion

Based on the results of research and discussion that has been done it could be concluded as follows.

1. Problem Based Learning model has significant effect on the critical thinking skills of learners.
2. Problem Based Learning model has significant effect on the learners' cognitive competency.
3. Problem Based Learning model has significant effect on the lerners' affective competency.
4. Problem Based Learning model has a significant effect on the learners' psychomotor competency.

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