

The Effect of Problem Based Learning Model Multimedia Assisted on Cognitive and Affective Learning Outcomes in Class XI Students in Material Coordination Systems

Nurul Ilmi¹, Moralita Chatri²

¹Postgraduate Students at State University of Padang, Padang, Indonesia

²Postgraduate Lecturer of State University of Padang, Padang, Indonesia



Abstract - This research is motivated by the results of a preliminary study of SMAN 4 Padang which is known to have not maximized the improvement of students' cognitive and affective learning outcomes. In addition, students want a new atmosphere in the learning process with interesting learning models and media. This study aims to determine the effect of multimedia assisted PBL models on cognitive learning outcomes in students, knowing the effect of multimedia assisted PBL models on student affective learning outcomes and better than students who did not apply PBL models. This type of research is quasi-experimental with the population being class XI students of SMAN 4 Padang. The sample consisted of experimental class and control class, sampling technique with purposive sampling technique. This study used the design of randomized control group posttest only design. From the results of this study it was found that the average cognitive and affective learning outcomes of students using the PBL model were better than students who did not use the PBL model.

Keywords - Model Of Problem Based Learning, Cognitive, Affective, Learning Outcomes.

I. INTRODUCTION

Education serves to develop capabilities and form dignified character and civilization in order to educate the nation's life which aims to develop the potential of students to become human believers and fear God Almighty, noble, healthy, knowledgeable, capable, creative, independent, and become democratic and responsible citizens (RI Law No. 20 of 2003). Based on the education function, the teacher's role determines the success of the education and learning mission in school. The teacher is responsible for directing, regulating, and creating a conducive atmosphere in order to encourage students to carry out various activities in the school.

Based on the results of the interviews found problems that are the cause of the low student learning competencies in the learning process, not yet maximizing the cognitive and affective learning outcomes of students. The learning

process that has been going on so far shows that students are less active and have not been directly involved in learning, activities carried out by students tend to record and listen to the teacher's explanation and lack of application of models and learning media. Based on the questionnaire analysis that has been done to students, 20.14% of students want the teacher to change the style and method of learning in order to attract students' attention and use learning media at 11.11%.

Ngalimun (2014), choosing and determining the way of learning approaches, procedures, methods and techniques of teaching and learning is very important to motivate students to be able to apply their knowledge and experience to solve problems and can encourage students to be able to think and have the courage to express their own opinions. The quality improvement in the learning process is certainly a concern, especially for teachers who teach in the classroom. Teachers are required to be able to develop student learning

competencies not only in the cognitive but also affective domains. According to Burton in Lufri (2007), learning outcomes are an illustration of actions, values, attitudes, appreciation, abilities and skills. Knowledge competence is a competency that reflects scientific concepts that must be achieved by students through the teaching-learning process (Kunandar, 2013). Attitude competency is the domain related to attitudes and values. Attitude competencies include the nature of behavior such as feelings, interests, attitudes, emotions, self-concepts, values and morals (Hamalik, 2008). Competence in the attitude domain relates to interests and attitudes that can shape curiosity, responsibility, cooperation, discipline, commitment, confidence, honesty, respect for other people's opinions and the ability to control themselves (Kunandar, 2013).

The teacher can apply the scientific process-based learning model that is the Problem Based Learning (PBL) model as a solution to the problems described above. Based on the literature study conducted, the implementation of the Problem Based Learning (PBL) model on learning can help students improve their learning competencies. It is evident that the PBL model can encourage conceptual change in the material taught (Loyens, et al., 2015; Nadiya, 2017), PBL models can help improve the critical thinking of students (Kong, et al, 2014), increasing student competencies (Fitria, 2015), student learning outcomes are increasing (Liliani, et al., 2014; Ramadan, et al., 2016; Listiani, et al., 2017), improving problem solving skills (Rokhmawati, et al., 2016), increasing learning motivation students when the learning process takes place using the PBL model (Bate, et al., 2014).

In order for students to be more interested in solving problems given in the PBL model, the learning process is used in the learning media. The use of multimedia in the application of the PBL model is proven to help students think critically and understand the material taught by the teacher. Ramadan, et al. (2016) mention the application of multimedia-assisted PBL models can improve student learning outcomes.

Based on the problems stated in the field and the benefits of using the Problem Based Learning (PBL) model with multimedia assistance in accordance with the 2013 curriculum, it is expected to be able to improve students' learning competencies and provide an interesting and different and pleasant learning atmosphere.

II. METHOD

This research is a quasi-experimental study (Widodo, 2008). The population in this study was class XII students of SMAN 4 Padang with a purposive sampling technique for sampling. The sample used in this study was class XI IPA 5 as an experimental class that would be treated with PBL models and class XI IPA 7 as a control class given direct learning. The design of this study was a randomized control group posttest only design. The steps that will be carried out are the experimental class and the control class will carry out the learning process using the PBL model and those without using the PBL model, after which the two samples will be tested (posttest) at the end of the learning process.

III. RESULT

1. Value of Cognitive Learning Outcomes

Students' cognitive learning outcomes are measured through the final test that students have done at the end of learning. The final test is an objective test with five choices in multiple choice. The final test can be seen in Table 1.

Table 1. Value of Cognitive Learning Outcomes

Parameters	Treatment		Information
	Experiment	Control	
Mean	80.78	72.59	Experiment > Control
Xmax	97	90	Experiment > Control
Xmin	70	60	Experiment > Control
Normality	0.105	0.79	Normal
Homogeneity	0.267		Homogen

Based on Table 1. it can be seen that the average biology learning competency of students in the realm of knowledge in the experimental class is higher than the control class with the average experimental class is 80.78 and the control class is 72.59. Likewise with the highest score (Xmax) the experimental class is higher than the control class with each value 97 and 90. In the normality test, it is known that the two samples are normally distributed and for the homogeneity test the two samples are declared homogene.

2. Value of Affective Learning Outcomes

The data obtained in the attitude competency in this study by means of observations made by two observers using the format of the assessment of the attitude of the

students. The assessment is carried out during the learning process. Competency research data in the attitude domain can be seen in Table 2.

Table 2. Value of Affective Learning Outcomes

Class	N	Mean (%)	Median	Category
Experiment	32	79.94	80	Good
Control	32	73.25	72.5	Good

Based on Table 2. It is known that the percentage of the average value for the competency domain of the attitude of the experimental class is higher than the control class with the percentage of the average value in the experimental class is 79.94% in the good category. Whereas in the control class the percentage of the average value was 73.25% which was categorized as good.

IV. DISCUSSION

H. Barrows as an expert PBL in Budiyanto (2010), states that the definition of PBL is a learning method based on the principle that problems (problems) can be used as a starting point to obtain or integrate new knowledge. Thus, existing problems are used as a means for students to learn something that can support their knowledge. According to Savoie and Andre (1994) Problem Based Learning learning models can increase motivation to give students thought about solving the problem at hand. Similarly, the results of Wiswayana's research (2006), show that the problem-based learning model is a learning model that is able to improve biology learning outcomes.

Here we can see the Problem Based Learning model, students can understand the concepts they learn through direct and real experience that connect between concepts in biology with real problems in everyday life and provide opportunities to show their best abilities. Students are trained to assume a responsibility, sharpen thinking skills at a higher level through identifying problems, analyzing problems, and creating solutions. Train students to carry out self-evaluations of the mistakes they make, and then make improvements to the mistakes they make so that students will not make the same mistakes as before. This will be able to improve student learning outcomes.

V. CONCLUSION

Based on the results of the study concluded that the average value of cognitive and affective learning outcomes of students who use the PBL model is better than students

who do not use the PBL model. The average experimental class is 80.78 and the control class is 72.59. the average in the experimental class is 79.94% in the good category. Whereas in the control class the percentage of the average value was 73.25% which was categorized as good.

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