

Development of Problem Based Learning Model with Self Regulated Learning on Science Subjects of Junior High School in The Coffee Plantation Area of Jember

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ABSTRACT

Education in a country is a benchmark of the progress of a nation. Today, education in Indonesia is still experiencing many problems that have an impact on the low quality of education that have been seen from the achievements or student learning outcomes at every level and education unit. As evidenced by the TIMSS survey in 2015, Indonesia's position was ranked 45th out of 48 in the field of science with an average score of 397. Another problem faced by Indonesia is uneven education. For example in urban areas, educational facilities and infrastructure are very advanced and modern, but on the plantation areas only use makeshift facilities and infrastructure. So that learning is needed that can overcome the difficulties of teachers to delivering material to students based on these problems by learning of students' real world situations and making connections between the knowledge that they have and the application of student life. One suitable learning method is the Problem Based and Self Regulated Learning that are related with learning independence. This type of study is a research and development by using the model of Borg and Gall (1983). The results of applying this model were measured by using N-Gain to analyze the extent to which the learning outcomes target was achieved from the beginning before learning to the target after learning. It can be concluded that the cognitive learning results in the form of mastery of concepts have increased in the height category with N-Gain score of 0.74.

Keywords: Problem Based Learning Model; Self Regulated Learning; Improvement of N-Gain.

1. INTRODUCTION

The progress of a nation can be measured by the quality and existing education system (Savery, 2006). To advance a nation, education plays a very important role in ensuring the continuity of the nation and state live, because education is a means to improve the quality of human resources as well as a way to achieve the objectives of nation-building (Rohim, 2011). Education in Indonesia is currently experiencing many problems, one of which is the low quality of education at every level and education unit (Rohmat, 2010).

The low quality of Indonesian education can be seen from the study results of the PISA (Program for International Student Assessment) in 2015 which showed from the three aspects have assessed in science competencies that Indonesia only have an increase from 382 points on ranked 69th out of 71 countries in 2012 to 403 points on ranked 66th out of 72 countries in 2015. So, of course this rating is not a pride for Indonesia, but as a motivation for

education in Indonesia (Ministry of Education and Culture of Indonesia, 2016). The results of the other international studies that measure the level of achievement of students' scientific abilities are Trends in the International Mathematics Science Study (TIMSS). In TIMSS 2015, Indonesia's position was ranked 45th out of 48 in the field of science with an average value of 397. The TIMSS assessment information showed that the scientific abilities of Indonesian students have a decline in achievement. The scientific ability of Indonesian students in TIMSS is still below the average value (500) and generally is in the lowest stage (Low International Benchmark), so that Indonesia is still included in developing countries (Ministry of Education and Culture of Indonesia, 2016).

In addition the problem of the low quality of education, Indonesia is also faced with other problems like uneven education. At present the condition of education in Indonesia is still not evenly distributed. For example, in urban areas, educational facilities and infrastructure are very advanced. While in plantation areas only rely on makeshift facilities and infrastructure (Rizal, 2016). Based on preliminary studies conducted by researchers through the distribution of questionnaires to science teachers of Junior High School in Jember which consisted of schools in urban areas and among them were also schools in the coffee plantation area. From the results of the questionnaire, the problems of teachers in urban areas is different with plantation areas, the schools in urban areas have adequate facilities and infrastructure. Whereas the facilities and infrastructure of junior high school in coffee plantation areas are still inadequate, so they often feel difficulties to delivering material to students. Therefore, from the results of the preliminary test only 33.3% of the teachers who taught in the plantation school area could connected the material learned with the context in the school environment through the contextual approach to help the students understanding concept of science materials.

Students in the plantation areas have less learning independence, so they need the teacher-guide learning to foster a scientific attitude in themselves. So that is needed the learning which can overcome these difficulties like Problem Based Learning (PBL) model with Self regulated learning (SRL) which is a learning model that trains and develops the ability to solve problems that are oriented to authentic problems from students' actual lives, to stimulate high-level thinking skills with student learning independence, student self-regulation, and student self-management (Glynn et al., 2005). To overcome these problems and to improve student learning outcomes in science learning especially in plantation areas, the use of PBL models with SRL and interaction patterns of PBL models with SRL is considered necessary to achieve learning objectives.

2. METHODOLOGY

This type of study is research and development. This development design use the Borg and Gall model (1983). The subjects in this study are the seventh grade of junior high school students in the coffee plantation area of Jember in the 2017/2018 academic year. The place of study was at the State Islamic Junior High School 11 of Jember which was a school in the coffee plantation area. In this study carried out with 4 meetings, starting on Wednesday, August 15, 2018 to Saturday, September 1, 2018.

The results obtained from this study are the effectiveness of the Problem Based Learning model with Self regulated learning. The effectiveness of the learning model is measured through the results of student concepts mastery and Metacognitive Awareness Inventory (MAI) skills. The results of the student concept mastery test were obtained from the pretest at the beginning of the learning and the posttest at the end of the learning in the form of an essay test. MAI skills for Junior High School were modified by Sperling, Howard, Miller & Murphy (2002) from filling out questionnaires by students given at the beginning of learning and at the end of learning. The aim is to determine the students cognitive improvement after the learning model is applied. To measure the improvement in the extent of which the target is reached from the beginning before the treatment (pretest) to the target of learning outcomes after being given treatment (posttest). To test the effectiveness between learning models, manual calculation is used, by use N-Gain formula. The following is the Normalized gain formula.

Table-1. Normalized

$$N - gain = \frac{\text{posttest score} - \text{pretest score}}{\text{ideal score} - \text{pretest score}}$$

Gain criteria

<i>Normalized Gain Score</i>	<i>Normalized Gain Criteria</i>
$0.70 < \text{normalized gain}$	Height
$0.30 < \text{normalized gain} < 0,70$	Adequate
$\text{normalized gain} < 0.30$	Low

(Source : Hake, 1998)

3. RESULT AND DISCUSSION

3.1 Effectiveness of Problem Based Learning model with Self Regulated Learning

A. Metacognitive Awareness Inventory (MAI) Skills

Table-2 Results of MAI skills analysis

Number of Students	Number of MAI Score		N-gain	Category
	Pretest (M1)	Posttest (M4)		
27	10.1	17.0	0.87	Height

*M: Meeting to-

Based on Table-2, it can be seen that the average number of MAI score of students before use the Problem Based Learning with Self Regulated Learning is 10.1 and after use Problem Based Learning with Self Regulated Learning is 17.0. Normalized gain (g) of the MAI skill analysis is 0.87 with a height category.

B. Cognitive Test Results of Concepts Mastery

Table-3 Data on concept mastery results of the large group test

Meeting to- (M)	Number of students	Average score		N-gain	Category
		Pretest	Posttest		
M1	27	44,2	74,7	0,61	Adequate
M2	27	50,8	87,2	0,75	Height
M3	27	56,8	89,1	0,76	Height
M4	27	53,0	88,4	0,83	Height
Average of total score		51,2	84,9	0,74	Height

*M : Meeting to-

It can be seen in table-3, the average of total score of the pretest is 51.2 while the average total score of the posttest is 84.9. That is, there is an increase in the value of pretest and posttest by 33.7 points. The results of Normalized gain analysis show that the average score reaches 0.74 included in the high category.

PBL model with SRL which is a learning model that trains and develops the ability to solve problems that are oriented to authentic problems from students' actual lives, to stimulate higher-order thinking skills with student learning independence, regulation- students in learning, and self-management of students in learning. The purpose of this learning model was developed to improve student learning outcomes, especially in the plantation area. Some studies state that PBL and SRL can improve the students cognitive learning outcomes, like the study of Masykurni (2016) about computer-based PBL model at High School of Padang Tiji 1 which is a school close to the plantation area. The results of statistical tests show an increase of student learning outcomes taught by computer-based PBL model higher than those taught by conventional methods on buffer solution material. As well as study have conducted by Adnyani et al. (2015), which showed that there was a significant difference of science concepts

understanding between students who participated in conventional learning and learning by SRL model. Based on study, it can be concluded that PBL model with SRL are effectively applied in learning to improve students' cognitive learning outcomes.

4. CONCLUSIONS

The low quality of Indonesian education have seen from the student learning outcomes in each education unit, this problems makes educators have to explore more about how learning objectives can be achieved, so that they can improve student learning outcomes. One of them is to use the right learning model in learning. The Problem Based Learning (PBL) learning model with Self regulated learning (SRL) applied in learning is the right solution, because it is proven in this study that the students learning outcomes at meeting 1, meeting 2, meeting 3, and meeting 4 have improvement, evidenced from the results of N-Gain in every meeting.

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