

The Effect of Problem Based Learning Model with Vee Diagrams on Science Competence of Class VIII Public Middle School 3 Tambusai Based on Learning Motivation

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Abstract – This research is motivated by the implementation of this PBL model, especially in class VIII at SMPN 3 Tambusai. This is evidenced in the realm of attitude and knowledge of students is still low, seen from some students who just sit quietly and do not want to ask questions, lack the courage to put forward ideas or ideas, record explanations if asked, make steps pratikum activities told by teachers, some students in the group are just waiting for the results of their friends, still unable to present the results of the practice in front of classmates. This fact shows that students are still passive in carrying out learning activities because students are still dependent on the teacher. Student learning outcomes in the realm of knowledge for Biology science subjects are not optimal. Efforts to overcome these problems by applying a scientific-based learning model with a model Problem Based Learning with vee diagrams and learning motivation. This study aims to determine the effect of PBL models with vee diagrams and motivation on the learning potential of VIII grade students of SMP Negeri 3 Tambusai. This type of research is quasi-experimental with 2x2 factorial design research design that is distinguished by groups of students with high motivation and low motivation for both classes of samples. Research instruments in the form of written tests for knowledge competencies and non tests for attitude competencies and skills. Analysis of the data used is two-way Anova and t test. The results of this study prove that the learning competency of students who apply the PBL model with vee diagrams is better than students who apply the PBL model and there is no interaction between the learning model with the learning motivation of the students' knowledge competence.

Keywords – Problem Based Learning; Vee Diagram; Motivation to learn; Learning Competencies.

I. INTRODUCTION

Learning Curriculum 2013 applies a scientific approach (*scientific approach*) in all subjects. The Ministry of Education and Culture (Kemendikbud) emphasizes that the 2013 curriculum aims to encourage students to have better abilities in observing, asking, reasoning, and communicating everything they know after receiving learning material (Kemendikbud, 2013: 3-4) In its implementation, the 2013 curriculum changed the one-way learning pattern into

interactive learning between teacher-students-community-natural environment and othersources media (Widyastono, 2014).

Science learning is one of the most important lessons to be learned starting from elementary school level up to college. Therefore, it takes the ability of students to support the science learning process such as the ability to solve problems. The ability to solve problems according to Wena (2011: 53) is very important for students and their future. The

ability to solve problems according to Simamora (2014: 3) is the ability shown since recognizing a problem, finding an alternative problem solution, choosing an alternative as a solution, and evaluating the answers that have been obtained. The ability to solve this problem also needs to be possessed by students in biology, because to be able to solve problems related to nature.

Learning models that support the formation of solving abilities of students' problem-while learning, a model that supports this is the model Problem Based Learning (PBL). Abidin (2014) states that PBL learning models need to be developed to help teachers develop thinking skills and skills problem solving in students. This model facilitates students to play an active role in the classroom through activities to think about problems in their daily lives, find procedures or steps needed to find the information needed, think about contextual situations, solve problems, and present solutions to those problems. Research conducted by Nurqomariah, Gunawan and Sutrio (2015) about the effect of PBL models with experimental methods on learning outcomes of science shows that the PBL model is a learning model that is student centered to solve a problem raised by both teachers and students.

Based on observations and interviews of researchers with biology teacher class VIII at SMPN 3 Tambusai on August 27, 2019, it is known that the learning process is still centered teacher-, lack of understanding of students' concepts, students do not foster attitudes scientific, students are still dependent on teachers who play a role as the source of information main, this causes boredom and does not make students motivated. Although learning has been done by PBL through Student Worksheets (LKS) whose aim is that learning is not centered on the teacher and in it discussion material and questions, but it is always the teacher who has the role to solve the problems presented in the worksheet.

One way that can be done so that PBL can improve student learning competencies is during the learning process. By fostering curiosity students' in experimenting / practicing, practicing the theories that are conveyed so that students are able to solve the problems given by the teacher. Students can also discover their own concepts from their new knowledge and experience. Obstacles that will be discovered, of course, not all students are able to link concepts and theories in solving problems. One way to organize solving process an interesting problem is to use a vee diagram.

In addition to learning model factors, learning motivation of students themselves also influences the improvement of their learning competencies, because motivation is a factor that influences student achievement. With the motivation, students will study harder, tenacious, diligent and have full concentration in the learning process. Encouragement in learning is one thing that needs to be raised in an effort to learning in school, students who are highly motivated to learn allowing will acquire the learning outcomes is also high, meaning that the higher the motivation, the intensity of the efforts and the efforts made, the higher the achievement learning gained (Hamdu, 2011). Research conducted by Aini (2016) states that student learning achievement can increase if students have a interest in learning high and with the motivation to learn from the teacher himself. Learning motivation has a great influence on learning outcomes because with motivation a person will do something he is interested in. Based on the problems described researchers interested in conducting study a entitled "The Effect of Model Problem Based Learning with Vee Diagram Of Competence Learning Science Class VIII SMP Negeri 3 Tambusai Based Learning Motivation".

II. METHODOLOGY

Type of research is a quasi-experimental study with a research Factorial design 2x2 for learning motivation and knowledge competence and Randomized Control-Group Posttest Only Design for attitude competence and skills. In study this students are divided into two classes, namely the experimental class and the control class. The class experimental was given treatment by applying the PBL learning model with vee diagrams while the control class applied the learning model commonly used, the PBL learning model. After that, both the experimental and control classes were given a *posttest*

III. RESULTS AND DISCUSSION

a. Results

Data on learning competencies in the domain of knowledge in this study were obtained through an assessment conducted at the end of the meeting in the experimental class and the control class for each one of the basic competencies through a final test with a written test in the form of multiple choice given to both sample classes. The results of research on the effect of PBL models with vee diagrams and students' learning motivation.

Table 1. Data Anova 2-Way Test Results on Knowledge Competence and Learning Motivation Class Students Sample

Parameter	Mean Square	F	Sig.	Information
Class (Model)	585,60	34,65	0,00	Significant
Initial Ability	1518,48	89,84	0,01	Significant
Class*Initial Ability	26,32	1,55	0,21	No interaction

Based on the results of a two-way Anova test of the model parameters and motivation learning shows there is no interaction between models with students' learning motivation. Seen in the picture that the two lines do not intersect and are relatively parallel, then it can be said there is no interaction.

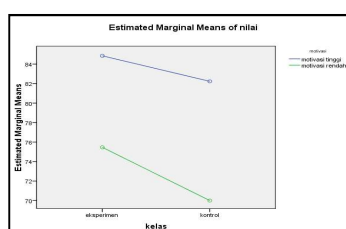


Figure 1. Interaction Curve between Class and Motivation Learning in Sample Class

b. Discussion

Biology learning competence of Biology students at SMPN 3 Tambusai that has been studied shows that using PBL models with vee diagrams has better overall value than PBL models without vee diagrams, both in terms of competencies knowledge grouped by high learning motivation and low learning motivation. Likewise with the attitude and skills competency of students. The difference in learning competence in the realm of knowledge on high and learning motivation is low due to the treatment of means in learning activities in following the implementation of models PBL with vee diagrams. The use of vee diagrams in PBL is done because the two components support each other. Problem solving can be more directed by the vee diagram. Vee diagrams can be used in learning PBL models because vee diagrams have the same goal to analyze the causes of a problem so the problem can be solved. To minimize the occurrence of concept errors because vee diagrams can help students in identifying misconceptions between problem solving and the material being studied (Purtandi, 2012).

The learning process in the PBL model with vee diagrams is assisted by LKPD which is one of the means to assist and

facilitate learning activities teaching and so that effective interactions between students and educators will form, so as to increase the activity of students in learning. Widjajanti (2008) said LKPD can be developed by educators as facilitators in activities in Learning accordance with the conditions and situations of learning activities to be encountered.

Attitude (attitude) is defined as an internal state that affects individuals towards actions directed at objects (objects) or events (Lufri, 2007). The affective domain is a domain related to attitudes and values. Attitude is seen as a person's tendency to behave. The results of learning attitudes can be seen in the form of will, interest, attention, changes in feelings and others. Attitudes can be learned and changed through the learning process (Sudjana, 2008). According to Kunandar (2013) the competence of the realm of attitude is related to interests, curiosity, responsibility, cooperation, confidence, discipline, respect for others and controlling himself. In this study, researchers focus on the assessment of students' social attitudes consisting of honesty, discipline, confidence and responsibility in interacting effectively with the social and natural environment in which they are. Attitude competencies in the 2013 curriculum are implemented in PBM activities through habituation and role models, which are demonstrated by students in daily life through learning. The assessment of attitudes is carried out by observers who are observed in each learning process.

Research in the experimental class where students have a higher attitude of responsibility, confidence, cooperation and curiosity than the control class. The ability of experimental class students to make observations shows a good change because LKPD is presented using the concept of vee diagrams that are able to make students develop their ability to solve problems. Students can optimize the ability possessed to find a concept from the material being taught. Trianto (2010) states, that learning will be more meaningful if the child experiences what he is learning, not knowing it. Meaningful learning in this study occurred when drawing

conclusions with techniques vee diagram. Then on the second level, students connect or associate the information with the knowledge (in the form of concepts) they already have. Students will connect the new concepts obtained during the learning process with the cognitive structure that they have when making vee diagrams, because both sides of the vee diagram emphasize two interdependent aspects of learning science, namely theory (thinking) and practice (doing). Vee diagrams are basically methods for making connections between thinking and doing that occur during a laboratory (Novak & Gowin, 2008).

The 2013 curriculum in building students' competencies not only focuses on attitudes and knowledge competencies, but skills competencies are inseparable from graduate competency standards, content standards, process standards and assessment standards. The Directorate of Middle School Development (2017) states that competency skills are used to measure students' ability to apply knowledge in carrying out tasks certain in various contexts in accordance with indicators of competency achievement. The assessment of skills used in this study is the performance or practicum. This assessment is done by observing the activities of students in observing by the observer. The assessment conducted by the observer includes 5 aspects of observation, namely the stage of preparing tools and materials, conducting practice, describing observations, and presentation of practice results.

Student competency assessment needs to be assessed because in this assessment seen how students apply the knowledge or theory that they have learned in class. This is in line with the opinion of the Ministry of Education and Culture (2015) stating that performance appraisal is suitable to assess the achievement of competencies that require students to perform certain tasks such as practice in the laboratory.

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