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## THE EFFECT OF MODEL PROBLEM BASED LEARNING (PBL) (Case Study at Class VIII MTsN Meureudu)

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### Abstract

*This study aims to determine the effect of the application of PBL models of science process skills (PPP) and the understanding of the concept of chemical substances in food at eighth grade students MTsN Meureudu. This study is a descriptive study using the research design one group pretest and posttest design. Samples were 19 eighth grade students MTsN Meureudu school year 2013/2014. Data collected by pretest and posttest to determine the effect of the application of PBL models and observation sheets to determine the feasibility of learning. The results showed that affects the application of PBL model of PPP and understanding the concept of chemical substances in food MTsN Meureudu eighth grade students. The influence can be seen from the results of hypothesis testing, the value is significantly smaller than a (0.05). In addition, the ability of a class VIII student representation MTsN Meureudu after application of PBL models on chemical substances in food material for the better. The ability of the student representation on enactive is 74%, 63% iconic, and symbolic 68%.*

**Keywords:** PBL Model, Understanding, Science Process Skill

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### A. Introduction

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Natural Sciences (IPA) is a systematic and structured knowledge on a regular basis, generally accepted (universal). A collection of data from observation and experiment or set of knowledge is also a process (Murniati, 2012). Thus, IPA is a set of knowledge that includes requiring the teaching of science through appropriate approaches or methods so that students can easily accept. Teaching science, especially chemistry is one of the difficult subjects and is not attractive to students MTsN Meureudu, especially on materials related to the trial. This negative impact on student learning out comes. Evident from the low test results of students in each semester and final exam results. This situation is extremely alarming if left unchecked in the absence of solutions to overcome them.

Based on the results of interviews with science teachers about the learning process chemistry in MTsN Meureudu, students' understanding of the material being taught poorly understood and students have difficulty in develop their basic skills they have. This is also confirmed by the teacher teachers teaching science that is very difficulty in PBM due to lack of engaging students in the learning process. If the above facts allowed continuing, it may be learning chemistry in MTsN Meureudu will not run properly and learning objectives will not be realized. Should be in the learning process, teachers use learning model that is able to streamline the student in learning.

The learning process can be done by involving students in problem solving; allowing students to be active, build and manage learning, one such model of learning is Problem Based Learning (PBL). Model PBL is an instructional model to create confrontation to students with problems as a stimulus in the study (Kelly and Finlayson, 2008). The results of some studies showed positive results after application of PBL models. Tarhan, et al. (2008) stated PBL effectively to improve student achievement, social skills, as well as tackling misconceptions students significantly. PBL also can improve students' understanding of concepts (Wahyu and Widiarti, 2010).

Novita, et al. (2014) states affect the PPP model of PBL fifth grade elementary school students in group IV Diponegoro Mendoyo District of the academic year 2013/2014. This is consistent with the results of research Harefa (2010) states that the model is able to improve the PPP

PBL students. That suggested there is a strong relationship between the ability of the representation with problem solving skills. Gagne and Mayer (in Fadilah: 2010) in a study stating that good representation ability is the key to obtain the exact solution in solving the problem.

According to Bruner (in Dahar, 2011) three skill system to express the ability to be perfect, called the three ways of presenting or ability representation, namely enactive, iconic, and symbolic. Through these three aspects of students can be more effective in the learning process, students are able to grasp abstract concepts through effective model in terms of the ability of the student representation.

## **B. Methods**

The type of study is a descriptive study. This study research design one group pretest-posttest design (Fraenkel, 2012). The population in this study were all eighth grade students MTsN Meureudu consists of six study groups, namely the class essence, VIII-A, VIII-B, VIII-C, VIII-D, VIII-E. The sample in this study were students of class VIII-A, amounting to 19 students.

### **1. Research Procedures**

Stages were divided into three main stages, namely stages of preparation, implementation stages and the final stage. The stages of the research procedures that; (1) the stages of preparation, determine the problem, literature review, and prepare the learning and research instruments; (2) The stage of implementation, perform pretest, treatment and observation of the application of PBL, and posttest; and (3) The last stage, processing and analysis of data and draw conclusions.

### **2. Data Analysis**

Data were collected using test instruments and observation. The data were analyzed by calculating the results of the test scores and grades N-gain using the following formula.

$$g = \frac{S_{post} - S_{pre}}{100\% - S_{pre}}$$

Data observation results calculated scores and the percentage value. In addition, the data representation capability student scores obtained from the calculation of the students' answers to a test based on the form about enactive, iconic, and symbolic.

### **C. Results and Discussion**

#### **1. Implementation of PBL Model**

Based on observations, 71.4% have step by PBL models done in class VIII MTsN Meureudu. There are some activities that do not appear in learning. However, this does not affect the achievement of learning outcomes. Description enforceability of PBL models at each stage of learning is as follows.

##### **a. Provide Problems To Student Orientation**

This stage is carried out at the second meeting, right after the students working on the pretest at the previous meeting. This stage equaled the purpose of the teacher, explaining the steps of learning, linking learning with the previous concept of "chemicals around us" and give apperception through questions. The question asked was "whether the example of the use of chemicals in everyday life?". Three to five students answered alcohol. The teacher directs students to the issues through the students' answers. The question posed is expected to arouse the curiosity of students. Question in the form of problems that occur in everyday life related to chemicals in food.

Based on the observation, students were listening to all matters submitted by teachers of additives and their use in food. Furthermore, the teacher added some questions to increase student motivation. Setting the appropriate use of time made RPP. Furthermore, the students were divided into five groups. The division of the group submitted to the student, whether based on number absent, seat, or his own choice. Finally

it was agreed the division based on the seat. Once formed five groups, each student put themselves in accordance with their respective groups. Each group received one LKS.

#### **b. Organizing Students to Discuss**

Students are directed to the problem by the teacher. Group members collaborate to plan the stages of activity that must be done to solve the problem. Students are directed and guided to break the problem by answering and discussing the contents of LKS. She also directs students to divide tasks on each member of the group to perform activities on the worksheets.

This stage is important that students understand what is to be achieved in the study will be conducted. In practice, this stage is very influential for students, through a given problem, the students in the class to be more excited to start learning early. Teachers seek learners to actively engage and interact through questions related to the problem. It also looks at the teacher when asked again about the problems contained in the worksheets as well as providing the classical question.

#### **c. Directing the Independent Investigation or Group**

The third phase, the activities undertaken includes the investigation and discussion in the classroom. After discussing about how work should be done, each group began an investigation based on problems in LKS. Observation group and write observational data in worksheets. The group analyzed the observational data obtained to answer the questions in the worksheets.

The teacher assigns students working on worksheets by using other sources such as the internet and other guide books. Students discuss and divide the tasks on each member of the group. The situation that occurs when learning takes place; students were active in finding solutions to problems and present the results of the activities of presentation. Learners are vying expression and ask about the problems discussed.

#### **d. Developing and Presenting Results of Work**

After completing all the activities of the investigation, then the students create a work that is used to convey the results of the discussion in class. The work-shaped ornaments, made using cardboard, markers, and paper mica colors. One group was randomly selected to present their work. Actually researcher wants each group presents the work with different creations each other. However, international based on the agreement with the student when the initial meeting, it was agreed that the work of each group exhibited in the classroom and then taped to each class.

Students were keen to make the work in the form of display to get a better value than other students. Implementation of a group presentation is not done by the whole group, but was represented by one of the group. This is due to the limited time for presentation. Cover the shortage, students are given the opportunity to showcase their work in the classroom and silt free opinion or responses from other students.

#### **e. Analyzing and Evaluating Problem Solving Process**

This phase was conducted to determine whether the activities carried out have been able to address and solve the given problem. This stage, each group gives its opinion on the work done by other groups. Students can write their opinions on the paper are available in addition to the works on display. In addition, the teacher invites students participated assess the work of each group, namely, by attaching an asterisk on the work that is considered the most creative and addressing properly. Students can assess the work according to teachers' explanations of the answers to the problems and learning conclusions.

The third meeting, students given a post-test to determine the level of students' understand and PPP related concept of chemical substances in food. It is intended to look after the students' understanding and application of the model of PPP PBL.

Application of PBL models in class VIII MTsN Meureudu have demonstrated the characteristics of PBL models by Arends (2008), namely: (a) the submission of questions or problems, (b) focuses on interdisciplinary linkages, the problems posed completely real to be



solved, (c) authentic investigation, (d) produce and publish, and (e) collaboration. In addition, activity in the application of this model of PBL assign it to the same effect with the results Abrantes, et al (2007), in which the quality of learning and teaching characteristics greatly affect the perceived learning. Similarly Batdi (2014) stated, the problem is more effective approach than the conventional approach.

## **2. Students Understanding the Concept of Chemical Substances in Food**

Understanding of eighth grade students MTsN Meureudu, the concept of chemical substances in food are known from the value of the average percentage score posttest students higher than the average percentage score pretest students. In addition, the average percentage score of N-gain students is 50%, the criteria N-gain medium. Hypothesis test results show that, there is a significant difference in the value of pretest and posttest student understanding. The significant differences indicate that the application of PBL models affect students' understanding of the concept of chemical substances in food.

The findings of this study in accordance with the findings in the study Akınoğlu and Tandoğan (2007), the implementation of the model PBL models showed positive results. Affect students' academic achievement and attitude. In addition, the applications of the model affect the development of a conceptual model of PBL students positively and make the students' misconceptions remain low. In line with this, Inel and Balim (2010) in his study states, obtained a significant difference in the class that implements the model PBL with conventional classroom on student academic achievement test scores

### **a. KPS Students**

KPS students identified through the students' answers on the test scores of students PPP. The percentage of the average post-test scores of students KPS higher than the average percentage score pretest students. The percentage of average N-gain medium category.

Table 1. Scores pretest, posttest and N-gain KPS students



Students Understanding Value	<i>Pretes</i>	<i>Postes</i>	<i>N_gain</i>
Maximum Score	11	20	0,73
Minimum Score	5	12	0,15
Average Score	8,63	15,74	0,46
% Average Value	36	66	46

Statistical analysis showed that there were significant differences in pretest and posttest values KPS students. The significant differences indicate that the application of the PPP model of PBL affect students. The findings are consistent with research Rusnayati and Prima (2011), an increase in PPP higher in classes with the application of PBL models with very significant difference compared with an increase of PPP in a conventional classroom. Accordingly, Novita, et al (2014) suggest that the learning model Problem Based Learning (PBL) to give effect to the PPP-the students.

**b. Representation Ability Students**

The results of student test data analysis, known representation ability of students increased after learning with PBL models. This occurs because of an association with the PBL model of student representation capability. The ability of the highest representation of students before learning is on enactive, namely 44%. Students are better able to answer the question with delivery in enactive before getting learners. Enactive more understandable representation of students because students know the concept without using the mind or words.

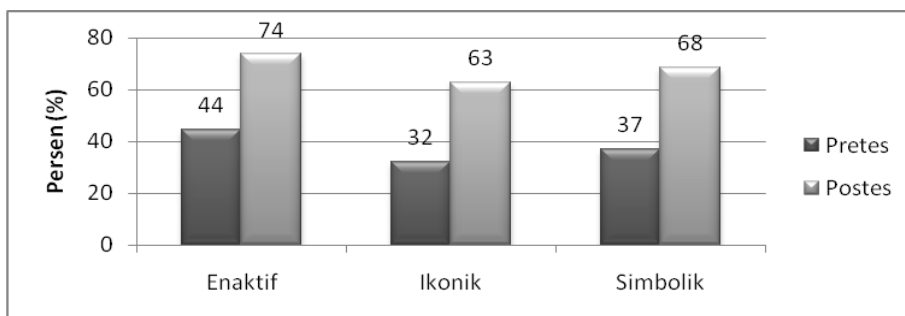


Figure 1. Comparison of Percentage of representation capability before and after learning with PBL Model

Ability after learning increases student representation, either enactive, iconic, and symbolic. This suggests that PBL models applied can affect and improve student representation. In line with this, the results Wiryanto (2012) suggests the same conclusion, the students have grasped the concept (through internal representation of students) well at every level of the theory of Bruner and students are able to grasp the concept of the transition (transition) from the concrete representation to the iconic, from iconic to form a more abstract representation (symbolic representation).

Another study by Sukayasa (2012) showed that students' understanding can be improved by applying learning strategies that are designed based on the constructivist approach (Bruner learning theory). In addition, the ability to communicate both verbally and in writing also influences students' understanding in the study. In this case, the model PBL is also a constructivist learning model.

#### **D. Conclusion**

Based on the results and the discussion it can be concluded that: (1) Application of PBL affect PPP models and understanding of eighth grade students MTsN Meureudu on chemicals in the food material. The influence can be seen from the results of hypothesis testing, the value is significantly smaller than  $\alpha$  (0.05). (2) Ability representation MTsN Meureudu eighth grade students after the application of PBL models on chemical substances in food material for the better. The ability of the student representation on enactive is 74%, 63% iconic, and symbolic 68%.

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