**The Effect of Application of Problem Based Learning Model Learning on Salt Hydrolysis Material Learning Outcomes**

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Abstract

*This research is a preliminary research study on the description of the effect of the Problem Based Learning model on the results of learning the chemistry of salt hydrolysis material. This study uses a quantitative descriptive method. Problem Based Learning Model is a learning model that stimulates students to think about solving contextual problems. Learning with a problem-based learning model is an effective learning method to help students process information and compile their own knowledge about the social world and its surroundings. Implementation of the problem-based learning model is directed by giving problems related to the subject matter being studied by students. The model of problem-based learning is used to change the tendency of students to actively construct their knowledge to solve problems given by the teacher. Through this literature, the study aims to examine the problem-based learning model in chemistry learning. So that it can be seen the possible effects of the implementation of the problem-based learning model, especially in terms of learning outcomes in salt hydrolysis material.*

*Keywords: Chemistry; Problem Based Learning; Salt hydrolysis*

**1. Introduction**

Learning chemistry is a field of study about a matter and the changes that occur in it. In studying chemistry, of course, it cannot be separated from its application in daily life. Learning chemistry must prioritize the process to be able to find a concept. The process of evaluating chemistry learning is only focused on the cognitive domain. Based on the facts in the field, it shows that learning activities that are often applied in schools are teacher-centered learning activities and still rarely develop process skills in concept formation. Though a lot of material in chemistry learning emphasizes the ability of scientific attitude and process skills. This shows that chemical learning is not enough only through cognitive aspects, but the effective and psychomotor aspects are also absolute to be involved. Assessment of the three aspects is the domain of student learning outcomes assessment.

The implementation of the 2013 curriculum is oriented towards the learning process by using a scientific approach. The learning model applied must be student-centered. One of the learning models that can be applied is Problem Based Learning. Problem Based Learning (PBL) is a total approach to education, both curriculum and process, this learning consists of carefully selected and designed problems aimed at making students critical in thinking to construct knowledge, problem-solving skills, self-directed learning strategies, and skills in working together and processes in solving problems or challenges faced. Problem-based learning is intended as a way of conceptualizing and stimulating student activities, developing critical thinking skills and problem-solving. A very interactive way of stimulation on problem-based learning by asking questions is used to challenge students' critical thinking on a given task (Etiubon and Ugwu, 2016).

Problem Based Learning consists of five steps: giving problem orientation to students, organizing students to research, guiding students' investigations independently or in groups, developing and presenting work, and analyzing problem-solving processes (Arends, 2008). The syntax contained in Problem Based Learning can play a role in improving student academic achievement (Tosun, 2012). Problem-based learning encourages students to be active and courageous in presenting their work with little guidance given by the teacher (Quattrucci, 2017). Students will feel comfortable working and participating in small groups followed by confidence to identify and seek information needed to solve problems in chemical material (Abanikannda, 2016).

Salt hydrolysis is one of the main material in chemistry subjects which contains concepts with everyday life. Based on teacher experience, the concept of salt hydrolysis is an abstract concept for students. Difficulties experienced by students due to lack of information possessed through sourcebooks and they only learn by memorizing existing formulas, so that important concepts in the material of salt hydrolysis have not been embedded in the cognitive structure of students which causes not to understand and quickly forget.

The application of the Problem Based Learning model is oriented to the ability of students' problem-solving processes to find concepts. Thus, the model of problem-based learning that has been done is expected to improve the mastery of students' concepts that influence learning outcomes for the better. Based on the background of the problem, the formulation of the problem is whether the Problem Based Learning model influences the learning outcomes of the salt hydrolysis material? This study aims to determine the effect of applying the Problem Based Learning model to the learning outcomes of salt hydrolysis material.

**2. Method**

The method used in writing this article is descriptive qualitative based on a literature review as a preliminary study. The selection of this method is expected to provide a clear picture of the object that has been studied regarding problem-based learning in salt hydrolysis material.

**Discussion**

The model of problem-based learning that is effectively carried out is a process that relies on students to follow a process that is explained with direction and support. The teacher provides guidance and direction by working with each small group during problem identification, analyzing problems, and reflection activities. The teacher acts as a facilitator to optimize students' abilities in problem-solving, the collaboration between students, making hypotheses, drawing conclusions and presenting the results of the discussion (Aidoo, et.al, 2016). The role of the teacher in guiding students must use the metacognitive skills needed to discuss problems faced and for future practice. This learning can also improve students' ability to argue (Based *et al.*, 2012). Thus, students can actively construct the knowledge they have to solve problems given by the teacher.

The application of the 2013 curriculum requires active student-oriented learning. This is so that students can construct the knowledge they have to solve the problems given by linking the chemical material taught. Based on the literature review, it shows that chemistry learning still exists that applies expository learning to lectures. This is supported by observational study data that learning by the lecture method is considered more effective than the application of learning models. Although, it is also sometimes interspersed with the application of learning models applied in the 2013 curriculum, one of which is Problem Based Learning. The state of the class that applies the learning model usually becomes less effective when discussion and presentation groups are formed because some students are not familiar with the learning. This learning requires students to be active and think critically in solving the problems given by the teacher so that students' problem-solving skills still need to be improved.

**2.1 Problem Based Learning in Chemical Learning**

Chemistry subjects require a correct understanding of the concepts in them. The lack of understanding of students' concepts is because learning that is carried out tends to be teacher-centered. Learning that tends to be teacher-centered causes students to be less able to solve problems and low chemistry learning outcomes. This causes the knowledge received by students is not meaningful or students only memorize knowledge so that knowledge does not last long.

The existence of this matter requires the application of learning models that can activate students, one of them is Problem Based Learning or problem-based learning. The learning model constructs the thinking and activities of group students such as organizing tasks, managing conflicts, negotiating agreements, and facilitating communication between individuals. In addition, students also identify what they want to know, gather information and collaboratively evaluate their hypotheses based on the data that has been collected. Problem-based learning is also developed to help students develop thinking skills, problem-solving, and intellectual skills. Problem-based learning shows that students can express themselves to make their own work procedures or discussions to improve thinking skills in problem-solving (Laredo, 2013). Learning activities with this model are intended to train students' thinking skills.

The Problem Based Learning model can be applied in chemistry learning related to everyday life. The teacher organizes students in discussion groups to analyze chemical problems related to life. The syntax can encourage students to be active and try to find solutions to the problem-solving. Problem Based Learning can increase student motivation and learning outcomes to understand the material they are studying (Tarhan and Acar-sesen, 2000). Problem Based Learning is not only improving understanding of students' concepts but also developing self-abilities and cooperation in problem-solving (Clougherty, 2008). Problem-Based Learning trains students' skills in linking existing basic concepts with new concepts based on their own understanding so that students have a deeper understanding of the concepts learned. The application of the Problem Based Learning model can improve students' conceptual understanding skills in chemistry subjects (Wardani *et al*, 2017).

**2.2 Problem Based Learning in Chemical Learning Hydrolysis Material**

Hydrolysis of salt is one of the materials in chemistry subjects. This material is one of the chemical material that is abstract and macroscopic so it is very important for students to understand the concept of the material. Besides that, salt hydrolysis material is very closely related to daily life, for example in water purification, soap dissolution, and fertilizer making. Learning models that can engage students actively in problem-solving and are trained in science process skills. One learning model that can be applied is the Problem Based Learning model.

Learning with the Problem Based Learning model is oriented to problems related to everyday life so as to make students more active and open to solving problems related to hydrolysis material. Giving problems for students to be solved so that students can find a concept that can improve critical thinking skills, creative thinking skills, metacognition, learning outcomes and student learning activities. For example, student learning outcomes applied to Problem Based Learning will increase because basic conceptual understanding and student activity are needed (Razali *et al.*, 2018). In addition, the application of Problem Based Learning can also improve student learning outcomes (Mataka and Grunert, 2015). This is in accordance with Hastuti's research (Hastuti, 2015) which shows that the application of the Problem Based Learning model can improve the completeness of student learning outcomes from 70.59% to 97.06% in salt hydrolysis material.

Other research that shows the effect of applying the model to learning outcomes is an increase in the completeness of the results of learning salt hydrolysis material (Green *et al.*, 2014)The application of the Problem Based Learning model has a positive influence on the learning outcomes of students of salt hydrolysis material. The application of the Problem Based Learning model has an effect on increasing learning outcomes completeness which is from 13.05%, increasing to 86.96%. This increase in learning outcomes shows that the application of the Problem Based Learning model has an effect on student activities which include knowledge, attitudes and skills activities.

Many things that cause salt hydrolysis material to be difficult to understand. This difficulty arises because students only hear the teacher's lecture, besides that, some students feel the difficulties when working on the questions are presented together with the buffer solution material. Some students have not been able to distinguish calculations between salt hydrolysis material and buffer solution. They learn only by memorizing the existing formulas so that important concepts in the material of salt hydrolysis have not been embedded in the cognitive structure of students which causes them to not understand and quickly forget. By applying the Problem Based Learning model, it is expected that it can have a positive influence on chemical learning.

**3. Conclusion**

Referring to the literature study conducted, the author argues that the Problem Based Learning learning model is one of the learning models that involves students to be active when learning activities take place and have a positive effect on the learning outcomes of students of salt hydrolysis material. This is because in that model students are required to actively construct their knowledge in order to solve problems related to the chemical matter.

Some ways that can be done so that the application of problem-based learning can be effective, among others, teachers must continue to accompany students during the problem-solving process so that there is no misconception in the material being studied. Another thing to note is the readiness of students in learning activities. In addition, there is a need for further experimental research regarding the application of the Problem Based Learning model to find out the positive effects on learning outcomes in chemistry learning.

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