

PROBLEM BASED LEARNING (PBL) MODEL TO IMPROVE STUDENT LEARNING OUTCOMES IN VIEW FROM COGNITIVE ASSESSMENT ON MATERIAL REACTION RATE

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Abstract

The level of completeness of learning outcomes is influenced by the implementation of the learning process. In the realm of education, learning chemistry is included as a field of study that is difficult to understand. Chemistry contains complex concepts. The rate of reaction is one of the most complex materials. For this reason, a Problem Based Learning learning model is needed. The method used in this paper is using the review method by selecting several articles and journals about improving student learning outcomes on the reaction rate material through the application of the Problem Based Learning learning model. Based on the search results, 22 research journals were obtained which were then exported in ris format using the Mendeley Desktop application and processed using VOSviewer. Based on research data from 3 analyzed journals, it can be seen that the use of Problem Based Learning learning models can improve student learning outcomes on the subject of reaction rates. This is evidenced by the increasing percentage of learning from the 3 schools where the 3 selected articles were researched. In MA Maarif NU 1 Samarinda, it increased by 70%; at SMA Negeri 4 Merauke increased 53%; and at Trisakti Catholic High School it increased by 26%.

Keywords: Learning outcomes, reaction rate, Problem Based Learning (PBL), VOSviewer

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INTRODUCTION

Education plays a very important role in people's lives in influencing intelligence and the level of civilization of the nation. Therefore, every citizen participates in totality in improving the quality of education in Indonesia. According to Trianto (2009), there are various challenges and problems that must be faced in improving the quality of education in Indonesia. The quality of education in Indonesia is low in the global context. Science material, especially chemistry, is abstract in nature, making it difficult to learn, causing low learning outcomes. This is one of the causes of the low quality of education in Indonesia. Suyanti (2010) states that another cause of the low quality of education in Indonesia is in the learning process of implementing learning which only leads to memorizing abilities. The ability to memorize is classified as lower order thinking which clearly does not meet educational targets. Good educators are educators who are able to guide students in terms of increasing understanding and generating motivation to learn in students.

In the context of education, learning chemistry is included as a field of study that is difficult to understand. Chemistry contains complex concepts. One subject that is complex is the rate of reaction. The reaction rate is a combination of abstract knowledge in the form of the reaction rate equation, order, factors that affect the reaction rate, reaction order and collision theory. However, based on its application, it is often found in everyday life, for example the process of exploding fireworks, rusting iron, fruit ripening to decay, burning paper, and so on. To increase students' learning motivation and attract students' interest in improving student learning outcomes on reaction rate material, appropriate learning models can be used and are relevant to the reaction rate material itself. In this case, the use of media is also important with the intention of making it easier to convey the material. In this case, it is necessary to apply the learning model of Problem Based Learning learning model.

PBL (Problem Based Learning) applies learning concepts that help students to improve learning outcomes needed in the current digitalization era. This learning model presents a real problem for students as the beginning of learning, then it is solved through investigation and applied with a problem solving approach. In this case, students are exposed to complex problems actively in real situations.

The learning concept applied in Problem Based Learning makes the problem a context for students in learning about skills in problem solving and critical thinking. This learning model makes the teacher a motivator and facilitator to guide students who have difficulty so that students become more active. So that learning outcomes increase.

This learning model aims to help students develop flexible knowledge, intrinsic motivation,

collaboration skills and effective problem solving. Problem Based Learning directs students to be creative and innovative. This learning model also collaborates with other people actively.

REVIEW METHOD

The method used in this writing is to use the review method by selecting several articles and journals regarding improving student learning outcomes on the subject of reaction rates through the application of the Problem Based Learning learning model. Based on the search results, 22 research journals were obtained which were then exported in RIS format using the Mendeley Desktop application and processed using VOSviewer. Below is a bibliographic map of the results of processing a collection of journals using VOSviewer.

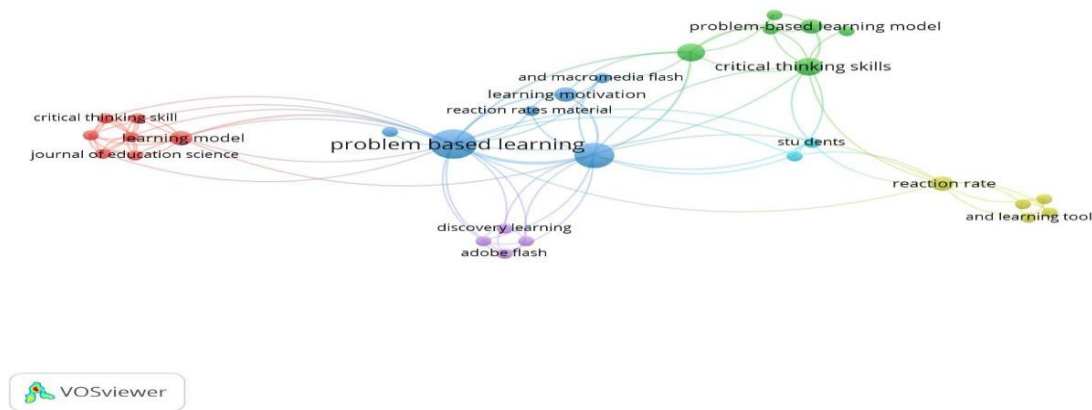


Figure 1. VOSviewer Review Results

Based on the bibliographic map above, it is found that the variables to be analyzed are problem-based learning, learning outcomes, reaction rates, learning motivation, learning tools, critical thinking skills, and learning models. Furthermore, it can determine the relationship between these variables. So that a review analysis can be carried out on the problem-based learning model in improving chemistry learning outcomes on the subject of reaction rates Review results and discussion

Of the 22 articles, 3 articles were obtained that matched the topic of the title proposed by the author. Articles with problem based learning variables, learning outcomes, and reaction rates are displayed and analyzed. From the 3 articles, research data were obtained which can be seen in Table 1 below:

Table 1. Percentage of completeness level of learning outcomes

No.	School Name	Completeness rate (%)		Enhancement(%)
		Before treatment	After treatment	
1.	MA Maarif NU 1 Samarinda	30	100	70
2.	SMA Negeri 4 Merauke	27	80	53
3.	SMA Katolik Trisakti	57	83	26

Based on the graphs of these three schools, we can see that the greatest increase in learning outcomes was found in MA Maarif NU 1 Samarinda with an increase in learning outcomes of 70%. Followed by SMA Negeri 4 Merauke with an increase in learning outcomes of 53% and Trisakti Catholic High School with an increase in learning outcomes of 26%. However, the level of completeness prior to treatment at Trisakti Catholic High School was in the highest position, namely 57% compared to the other 2 schools. Based on the analysis of research data from the 3 journals above, it can be proven that using the Problem Based Learning model on the subject of reaction rates can improve student learning outcomes.

From the table above, we can graph the increase in learning outcomes in the reaction rate material based on the percentage of the completeness level of each concept in the 3 schools. Look at the chart below:

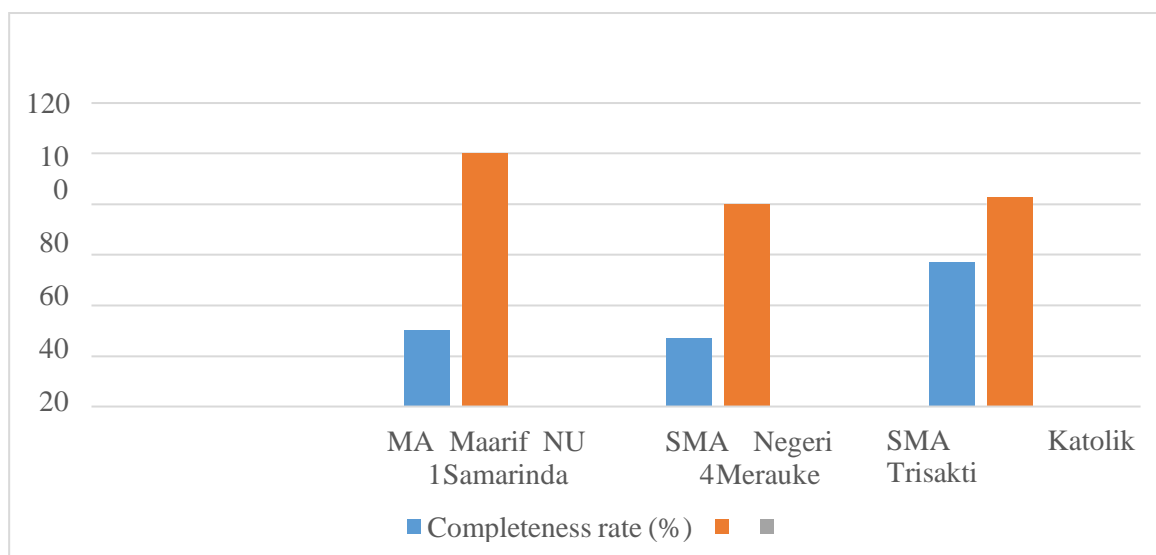


Figure 2. Graph of Improved Learning Outcomes

CONCLUSIONS AND RECOMMENDATIONS

A. Conclusion

Based on research data from the 3 journals analyzed, it appears that the use of the Problem Based Learning learning model can improve student learning outcomes on the subject of reaction rate. This is evidenced by the increasing percentage of learning from the 3 schools where the 3 selected articles were researched. MA Maarif NU 1 Samarinda increased 70%; at SMA Negeri 4 Merauke it increased by 53%; and at Trisakti Catholic High School it increased by 26%.

B. Saran

Based on the reviews that have been carried out, there are several suggestions put forward, including the study of problem-based learning models that can be used as a reference for further research and can be developed by measuring different variables and materials. In future research, cognitive assessments should be made the same so that the questions have the same level of objectivity and standards.

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