



Problem-Based Learning With Mind Mapping in Respiration System to Improve Creativity of High School Students

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Abstract

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This research aims to identify the development of creative thinking skills among students with problem-based learning models with mind mapping. This study is a quasi-experiment using a non-equivalent control-group design. The population of this study was in eleventh grade of the mathematics and natural science program of SMAN 1 CISARUA year 2018/2019 with respiration system as material. Used two classes as a sample which implemented learning models in the respiratory system. XI MIPA 3 was an experimental group implementing problem-based learning with mind mapping and XI MIPA1 was a control group. The result shows there is an increase in student's creativity to 56.80%. Therefore problem-based learning with mind mapping is increasing students' creativity.

Keywords: *creative thinking, mind mapping, problem-based learning model*

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INTRODUCTION

Learning is a teacher's effort to organize a learning environment where students are the subjects of learning and learning is an interactive and constructive dialogue. In the current 21st century, learning must train students' life skills and the formation of good student character. The implementation of the 2013 curriculum is expected to improve the competence of thinking and acting skills productively and creatively in the concrete, and abstract realms and the competence of skills in presenting knowledge possessed with clear, logical, systematic language, aesthetic works, faith, and noble character. The implementation of the 2013 curriculum will run well with the role of teachers being very important in the learning process.

In learning activities, teachers need learning activities that can improve all the skills that students have. Optimizing learning will train all students' skills in learning activities so that learning becomes meaningful. In biology learning, teachers are required to be able to develop students' potential from an early age by doing various variations in learning. But in reality, there is still learning that always focuses on sourcebooks. Such learning can make students less able to explore their abilities. Sudirgayasa (2014) said that biology learning in class emphasizes more on the aspect of providing information and that what is wanted to be achieved is only academic achievement. This results in students



understanding that learning biology has nothing to do with problems in everyday life, learning biology is only to face tests or exams.

The results of initial observations and interviews with researchers with Biology teachers at SMAN 1 Cisarua, Bogor Regency, biology learning is carried out in general, teachers deliver materials using lecture methods and Q&A still dominates. The learning model used is limited to trying without following up. Evaluation of biology learning carried out by teachers tends to be in the conceptual domain, so student learning outcomes are often less than satisfactory. Students have not been able to relate the material to everyday life. Conditions in the field show that learning is still centered on the teacher, the teacher's understanding of the implementation of the learning model recommended in the 2013 curriculum is still very lacking. Students are passive only as listeners, interactions in class follow the teacher as a result students are not used to thinking about solving problems, making plans, and deciding on a problem. With the above problems, teachers need to change the learning process to be more interesting. One alternative solution to deal with the above problems is to use a learning model that can develop students' thinking skills. The learning model applied is Problem-Based Learning with the mind mapping method.

Problem-based learning is a learning model that uses real-world problems as a context for students to learn about thinking and problem-solving skills, as well as to acquire essential knowledge and concepts from learning materials (Utami 2013 in Supiandi Julung 2016). This model confronts students with problems as a basis for learning, in other words, students learn through problems or based on problems. Supiandi Julung (2016), the PBL model significantly increases problem-solving skills by 17.73% and students' cognitive learning outcomes by 23.65%. The mind map method is one of the learning methods that strives for students to be able to explore creative ideas and be active in participating in learning activities. Mind maps are a very good learning method used by teachers to improve students' memorization and strong understanding of student concepts, students can also increase their creativity in biology material (Ramadhani 2015).

Lilik & Arifa (2017). The Mind Mapping learning model is a learning model that aims to improve student learning outcomes to be more active in learning activities. Mind Mapping is applied to instill concepts and understanding of Biology concepts so that students can more easily understand the material being taught.

Nurhasnah (2018), the results of the hypothesis test using the t-test obtained $t\text{-count} > t\text{ table}$ or $6.040 > 1.718$ with a confidence level of 0.05, so H_a is accepted and H_o is rejected, so it is stated that there is a significant influence of the use of the Mind Map model on students' Biology learning outcomes in the Excretory System sub-material on the kidneys and lungs at SMA Prayatna class XI IPA 2 in the 2015/2016 Academic Year.

Students' creative thinking skills developed in learning using the problem-based learning model can develop well if each step is carried out well. In the theory of cognitive development, Piaget mentions the stages of child development, one of which is the formal operational stage. At this stage, students already have the ability to conclude the information obtained. This means that

when students are faced with problems, they are able to make conclusions based on data or information that has been obtained. Data or information obtained can be obtained from various sources books, interviews, observations, or experiments. Students will be accustomed to using various sources of knowledge. The benefits of this creative thinking ability are that students are able to find as much information or data as possible to solve problems which makes students more confident in a concept being taught.

Creativity is a cognitive activity that produces a new view of a form of problem and is not limited to pragmatic results (always viewed according to its usefulness) (Solso, Maclin & Maclin, in Oktaviani, H. 2014). According to Oktaviani (2014), creativity can be understood as a thinking process to produce new ideas, new approaches, or new works that are useful for solving problems or the environment. These new things can be seen either from an idea or a work of art. Creative thinking skills consist of fluency, flexibility, elaboration, and originality.

RESEARCH METHODS

The method used in this study is quasi-experimental. The research design used is a pretest-posttest control group design. Students are given a pretest and posttest to see the increase in scores before and after learning. In addition, observations were also made during the learning process. The research was conducted using a problem-based learning model with mind mapping media for the experimental class, while for the control class, it was only carried out with problem-based learning. The subjects of this classroom action research were students of class XI SMAN 1 Cisarua, Bogor Regency in the even semester of the 2018/2019 academic year.

Sugiono (2015) conducted the research design twice, namely a pretest and posttest in each class given different treatments, then calculated the gain score of the difference in the results (N-Gain) for each student, in the two classes that received the learning treatment, calculated based on the pretest and posttest scores and the ideal maximum score.

RESULTS AND DISCUSSION

This study was conducted with the aim of obtaining information about the implementation of the problem-based learning model with mind mapping strategy, the differences in the increase in creative thinking skills of students who use the problem-based learning model with mind mapping and students who use the problem-based learning model and the responses of teachers and students to learning activities using the problem-based learning model with mind mapping and learning activities using the problem-based learning model.

The implementation of the research is the application of the lesson plan that has been made and agreed upon between the researcher and the biology subject teacher of grade XI. Learning activities begin with an introduction. In the preliminary activities, the teacher conditions the class and motivates students to enter the learning atmosphere and submits apperception so that students and explain the learning objectives and convey the scope of the material as part of the introduction.

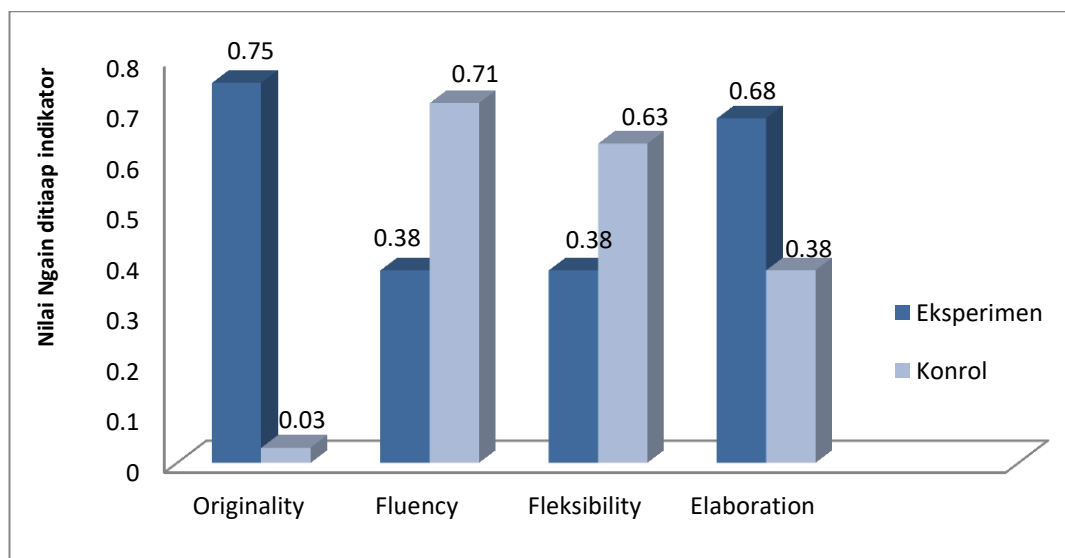
Based on the results of observer observations recorded in the observation sheet of teacher and student activities in the learning process, in general, the teacher can carry out all the steps of the problem-based learning model well. All learning activities can run smoothly. Student responses are seen enthusiastically following the entire series of learning activities because students are given the freedom to actively explore information and find solutions to the problems given.

The creative thinking ability of students in the experimental class and control class was obtained from the results of the pretest-posttest and then analyzed using SPSS and obtained data including the average value, standard deviation, maximum value, minimum value, and number of students. The results of statistical processing in Table 1.

The following general N-Gain data describes the improvement of creative thinking skills in the experimental and control classes obtained from the pretest-posttest and N-Gain values in the human respiratory system subject, which can be seen in Table 1.

Table 1 N-Gain Data of Creative Thinking Ability for Experimental Class and Control Class

Description	Experimental class	Control class
	N-Gain %	N-Gain %
Minimum	20,00	9,09
Maximuml	80,00	70,00
Average	56,80	38,50
Students	36	36



Picture 1. N-Gain Creative Thinking Ability of Experimental and Control Class Students in Each Indicator

Based on Table 1 and Picture 1, it shows that the N-Gain of each indicator of creative thinking ability in the experimental class is higher when compared to the control class. In this class, it can be seen that the highest increase occurred in

the Originality indicator (0.75) including the high category and the medium N-Gain in the medium Elaboration indicator (0.68) including the medium category. In the control class, the highest N-Gain in the Fluency indicator (0.70) includes the high category and the lowest in the Originality indicator (0.03) includes the low category.

CONCLUSION

The problem-based learning model with mind mapping can improve students' creative thinking skills.

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