The Influence of Problem Based Learning Model Using Lesson Study Patterns on Creative Thinking Ability of Students

Marhamah¹, Baiq Miftahul Jannah²
Universitas Hamzanwadi
Email: mansaniki@gmail.com

Abstract. His study aims to determine the effect of the Problem Based Learning model on the ability to think creatively with Lesson Study patterns in class X students of SMA Negeri 2 Selong. This type of research uses the experimental method. Lesson study is applied in Class X IPA4 as an experimental class and class X IPA 5 as a control class of one cycle which includes the plan, do, and see stages. The study design uses Pretest-Posttest Control Group Design. Data collection techniques using creative thinking tests in the form of essays. Based on data analysis, the average value of students’ creative thinking abilities in the experimental class was 72.57 and the control class was 56.59. While the results of hypothesis testing at a significant level of 5% obtained t count (9.85)> t table (1.988). The conclusion of this research is that there is an influence of problem based learning model with Lesson Study pattern on the ability of creative thinking in class X students of SMA Negeri 2 Selong

Keyword: Problem Based Learning, Lesson Study, Creative Thinking

1. Introduction

Advances in science and technology require skills for students to overcome the 21st century. One of the lessons taught is creative learning and learning models that are appropriate for the 21st century are problem-based learning [1] [2]. Indirectly, education has a very important role in learning provided through the application of appropriate learning methods and models. The reality is that most biology learning has not been maximized in developing creative thinking learning in students. This can be seen from the learning process carried out more demanding the ability to memorize the concepts contained in textbooks. In addition, the low ability of creative thinking in students also has an impact on learning that is applied in schools only contain memory knowledge, the ability to think logically or convergent thinking is the ability to find the most appropriate answers to the problems given to the information available. Thus, students will find it difficult to think convergently so that the compilation is faced with a problem, students who have difficulty finding solutions to solve or provide several alternative solutions to the problem. This can be seen by the compilation of students who have problems, students are less
able to solve the ideas they have, students are less able to solve problems in detail, and students are less able to create new ideas. This fact is because students still need an explanation from the teacher and do not need to develop thoughts about learning activities. In fact, thinking skills really need to be developed to prepare students to be able to overcome problems in the next life.

One of the thinking skills that need to be trained in students is the ability to think creatively. Creative thinking as the ability to see various possible solutions to a problem, a form of thought that until now has received less attention in formal education. Therefore, problem solving must be seen as a whole as a process and involve it in the stages of the creative thinking process.

One alternative to improving students' thinking skills is to encourage questions that can trigger thinking processes [3]. In this sense, the concept of a problem or question is used to bring up a "culture of thinking" in students. Based on this, we need a learning model that can stimulate students to ask questions, express opinions, solve problems, and practice students' creative thinking skills. One learning model that can build student knowledge is the application of the Problem Based Learning model [4] [5].

Problem Based Learning (PBL) is learning that is delivered by presenting problems, asking questions, facilitating investigations, and opening dialogues [6]. In problem based learning, authentic and relevant tasks or problems are presented through a context [7]. The aim is that students have experience because they will later face their professional lives. By presenting problems as a stepping stone in learning, it can encourage students to find information needed to solve problems [8] [9].

The application of the Problem Based Learning (PBL) model can be done effectively with the Lesson Study pattern. The principle of Lesson Study is the gradual improvement in the quality of learning by learning from one's own experience and the experiences of others in it do learning activities. Through the application of Lesson Study, the team is involved together planning learning, making observations, and reflecting on the learning that has been done [10].

Through the application of this learning model, activities in learning are more dominated by students (student center). Whereas teachers tend to be empathetic facilitators, mediators, motivators, and listeners. With the application of learning like this, it is hoped that students will be motivated to search for information from various sources and use their thinking power so that they can increase knowledge, increase diversity of skills and meaningful learning outcomes obtained.

2. Method
The research used was an experiment, with Quasi Experimental Design, which is a design that has a control group but cannot function fully to control external variables that affect the conduct of the experiment. The design form of Quasi Experimental used in this study is Pretest-Posttest Control Group Design [11].

The population in this study were all students of class X IPA SMA 2 Selong 2016/2017 Academic Year consisting of 5 classes with a total of 197 students. Determination of the sample is done by simple random sampling consisting of class X IPA 4 as many as 39 people as the experimental class and class X IPA 5 as many as 40 people as the control class. Lesson study is carried out in both classes for one cycle consisting of plan, do, and see stages. The Lesson Study implementation plan can be seen in Figure 1.
The instrument used in this study was an essay test in the form of a creative thinking test with indicator questions covering fluency, flexibility, and originality in environmental management material. Considering that in this study using the experimental group and the control group, the hypothesis test used was a t-test of two correlated samples [11].

3. Results and Discussion
Lesson Study conducted involves teachers, lecturers and research teams. This Lesson Study activity is carried out both in the control class and in the experimental class on environmental management material. In the implementation of Lesson Study, it includes 3 stages, namely the plan, do and see stage. The results of observations made by the team in the control class or experiment include: 1) At the beginning of learning, some students feel tense and scared by the observers in the class; 2) Students are enthusiastic in working on group assignments, on average active and involved in discussion; 3) The interaction between the teacher and students looks familiar; 4) The use of image media used by the teacher in accordance with the material being taught; 5) Teachers are less able to manage time in learning activities; 6) Organizing groups is still not right; 7) In the discussion activities, there are still several groups that open books; and 8) There are still students who are not focused when learning takes place.

Problems found in the learning process are a shared responsibility to find solutions. Thus, this Lesson Study can be a learning tool for observers / teachers involved in it so that the quality of learning undertaken can continue to be improved. Lesson study is a cycle in which teachers work together to consider their long-term goals for students, realize these goals in actual "research lessons", and jointly observe, discuss, and improve learning [12] [13]. In addition, the implementation of Lesson study is very possible based on research [14]. The results of this study can be seen in Table 1.

| Group       | Fluency | Flexibility | Originality | Amount |
|-------------|---------|-------------|-------------|--------|
| Experiment (LS) | 84.86   | 78, 75      | 54,09       | 72.57  |
| Control (LS)  | 73.69   | 67.98       | 28.10       | 56.59  |

Furthermore, testing the hypothesis shows that t arithmetic (9.85)> t table (1.988), at a 5% confidence level is 1.98, meaning that the problem based learning model has a positive effect on the creative abilities of students at SMAN 2 Selong.

The results of this study are in line with the results of previous studies applying the Problem Based Learning model in learning showing an increase in critical thinking in the research results of Marhamah et al (2016), and an increase in learning outcomes [15], problem based learning increases the ability to think creatively [5].

Improved student understanding is caused in this learning students build their knowledge through learning activities, which also affect the ability to think creatively. In addition, the active involvement of students in the formulation and planning stages of problem solving can build their knowledge and increase student confidence [16]. Likewise in grouping when the learning process can support students to work together, respond to each other, exchange ideas,
and share information so they can find ideas as alternative solutions to problem solving in many ways, because there are some students who may have different thoughts in solving an problem.

4. Conclusion
Based on the results of research and discussion it can be concluded that the Problem Based Learning model with Lesson Study patterns affects the ability to think creatively in class X students of SMA Negeri 2 Selong. This can be seen from the results of testing the hypothesis which shows that $t_{\text{arithmetic}} (9.85) > t_{\text{table}} (1.988)$, at a 5% confidence level is 1.98. In addition through learning that is carried out with the Lesson Study pattern, the team involved can understand various models or methods of learning, how to teach a material and can understand various characteristics of students.

5. References

[1] J. Barell, “Problem-Based Learning : The Foundation for 21st Century Skills,” 21st Century Ski. Rethink. How Students Learn, 2010.
[2] J. Raiyn and O. Tilchin, “Higher-Order Thinking Development through Adaptive Problem-based Learning,” J. Educ. Train. Stud., 2015.
[3] C. E. Hmelo and M. Ferrari, “The problem-based learning tutorial: Cultivating higher order thinking skills,” J. Educ. Gift., 1997.
[4] A. J. Khoiriyah and H. Husamah, “Problem-based learning: Creative thinking skills, problem-solving skills, and learning outcome of seventh grade students,” J. Pendidik. Biol. Indones., 2018.
[5] K. Ulger, “The effect of problem-based learning on the creative thinking and critical thinking disposition of students in visual arts education,” Interdiscip. J. Probl. Learn., 2018.
[6] S. Sungur and C. Tekkaya, “Effects of problem-based learning and traditional instruction on self-regulated learning,” J. Educ. Res., 2006.
[7] B. S. Kendler and P. A. Grove, “Problem-Based Learning in the Biology Curriculum,” Am. Biol. Teach., 2004.
[8] A. Nakada, Y. Okada, A. Yoshihara, A. Namiki, and N. Hiroi, “Problem-based learning,” J. Med. Soc. Toho Univ., 2017.
[9] M. C. English and A. Kitsantas, “Supporting Student Self-Regulated Learning in Problem- and Project-Based Learning,” Interdiscip. J. Probl. Learn., 2013.
[10] M. Asyari, M. H. I. Al Muhdhar, H. Susilo, and I. Ibrohim, “Improving critical thinking skills through the integration of problem based learning and group investigation,” Int. J. Lesson Learn. Stud., vol. 5, no. 1, pp. 36–44, 2016.
[11] P. D. Sugiyono, metode penelitian kuantitatif, kualitatif, dan R&D. 2016.
[12] Catherine Lewis and Rebecca Perry, “Lesson Study to Scale Up Research-Based Knowledge: A Randomized, Controlled Trial of Fractions Learning,” J. Res. Math. Educ., 2017.
[13] E. Gustina, S. Hendayana, and A. Supriatna, “Sharing and Jumping Based Didactical Design In Collaborative Learning on the topic of Covalent Bonding,” Int. J. Res. Couns. Educ., 2018.
[14] C. Lewis and A. Takahashi, “Facilitating curriculum reforms through lesson study,” Int. J. Lesson Learn. Stud., 2013.
[15] H. Awang, “Creative thinking skill approach through problem-based learning,” pp. 635–640, 2008.
[16] H. Yoon, A. J. Woo, D. Treagust, and A. L. Chandrasegaran, “The Efficacy of Problem-based Learning in an Analytical Laboratory Course for Pre-service Chemistry Teachers,”
Acknowledgments

Thank you to the lesson study team and the principal of SMAN 2 Selong for helping to carry out this research.