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## THE EFFECT OF PROBLEM BASED LEARNING ON ENVIRONMENTAL CARE ATTITUDES AND LEARNING OUTCOMES

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**Abstract.** This study aims to 1) determine the effect of problem-based learning on environmental care attitudes and 2) determine the effect of problem-based learning on learning outcomes. This research is a quasi-experimental with control group pretest-posttest design. The research subjects were students of the Social Sciences Education Department, UIN Maulana Malik Ibrahim Malang. Research data were analyzed by t-test technique at a significance level of 5%. The results showed that 1) problem-based learning effects on the environmental care attitude of Social Studies Education students, UIN Maulana Malik Ibrahim Malang and 2) problem-based learning affects the learning outcomes of social studies education students, UIN Maulana Malik Ibrahim Malang.

**Keywords.** Problem-based learning; environmental care attitudes; learning outcomes

### A. INTRODUCTION

Howard Barrows introduced problem Based Learning (PBL) in 1969 during a study at McMaster University School of Medicine, Canada (Savin-Baden & Major, 2004; Etherington, 2011; Nadarajah et al., 2016). The learning model is used to solve health problems. In its development, PBL models were taught in schools to improve learning outcomes.

PBL emphasizes the process of solving problems in everyday life as a whole (Amir, 2013). In line with Trianto statement that PBL is a learning model based on problems with authentic problems that require investigation for the exam (Trianto, 2009). Authentic problems that occur in the student environment is a stimulus in PBL learning. Students are encouraged to gather various information in solving problems (Bilgin et al., 2009; Woods, 2012).

PBL learning characteristics according to Barrows, namely 1) authentic problem-based learning; 2) learning to solve problems; 3) student-centered learning; 4) learning is independent in finding problem-solving solutions; and 5) learning is reflective in transferring knowledge to find solutions to problem-solving (Anderson, 2007; Buff, 2011). Based on its characteristics, PBL is appropriate in learning to solve contextual problems surrounding the student environment. Students are easy to find solutions to problem-solving, such as environmental pollution problems.

Stages of PBL learning, namely 1) giving problems to students; 2) direct students to research; 3) students conduct investigations; 4) students present the results of the discussion; and 5) students analyze and evaluate problem-solving processes (Arends, 2004). The PBL stage is used as a reference for data collection in this study. The implementation of learning is carried out in groups and the teacher is a companion in solving problems.

The implementation of the PBL in this study is based on ecopedagogic education directed at solving environmental problems around students. Students can analyze environmental problems by the ecological and social characteristics of the local culture. Ecopedagogic education based learning directs students to adapt to their environment and use them as learning resources.

Ecopedagogic is an important ecological competence to be built in students. Ecopedagogic education is a critical awareness of students in understanding the environment to preserve and preserve it. The ecopedagogic can be interpreted as an academic movement to make students aware of an individual who has understanding, awareness and life skills in harmony with the interests of nature conservation (Khan, 2010). The e-learning as an instructional approach is supported by critical and pedagogical critical theory (Supriatna, 2016). Therefore, eco pedagogic-based learning can build critical awareness and develop students' character to understand and behave wisely towards nature.

PBL with eco pedagogic education is very appropriate if applied in geography subjects with sustainable environmental material. Learning by utilizing the surrounding environment provides opportunities for students to improve their ability to explore environmental conditions authentically. This can be implemented in the stages of solving environmental problems sustainably in PBL learning. Students will be encouraged to have critical and creative thinking so that the learning process takes place pleasantly and leads to the achievement of learning outcomes (Surata, 2015).

The application of PBL in this study is based on its influence on environmental care. PBL is student-oriented using a scientific approach (Argaw et al., 2017). PBL makes it easy for students to solve problems in the environment and help develop students' attitudes based on problem-solving abilities (Lestari, 2015). The ability to solve problems in PBL can affect the type, quality of interaction, and student behavior which have an impact on the development of environmental care attitudes (Ferreira & Trudel, 2012).

Empirically, the effect of PBL on environmental care attitudes is supported by the results of Lestari's research that the Problem Based Learning (PBL) learning model influences the environmental care attitude of class XI students of Malang 6 Public High School (Lestari, 2015). Also, the results of Djuandi's research show that after the application of problem-based learning (PBL) in SMA 1 Purwadadi, the attitude of the experimental class students has increased (Djuandi, 2016). There are differences in environmental care attitudes between students who are taught using problem-based learning models with conventional methods. Problem based learning model with a high category of increasing environmental care attitudes of class VII students of Pontianak Public Middle 6 (Susanti, 2017).

In addition to influencing environmental care, PBL also has implications for student learning outcomes. Empirically, the results of the research by Haniyya & Bintari showed that the learning outcomes and environmental care attitudes of students in the experimental class were higher than those in the control class, meaning that learning the PBL model of applied pollution material had a positive effect on student learning outcomes and environmental care attitudes (Haniyya & Bintari, 2017). Further explained in the results of research that the average learning outcomes of groups of students who were taught with PBL models were higher than conventional groups, so that there was an influence of PBL models on economic learning outcomes in SMA Negeri 1 Palu (Ibrahim, 2017).

Based on the theoretical and empirical studies above, PBL learning that is applied with eco pedagogic education is appropriate when applied in the introductory geography course on sustainable environmental material. Geography studies the phenomena that occur in everyday life so that it requires critical ecological thinking skills in solving environmental problems. So PBL learning in this study aims to 1) determine the effect of problem-based learning on environmental care attitudes and 2) determine the effect of problem-based learning on student learning outcomes.

## **B. METHODS**

This research is a quasi-experimental with control group pretest-posttest design. The research subjects were students of the Social Sciences Education Department, UIN Malang in the odd semester of 2017/2018 academic year who taught the Introduction to Geography course. The instrument for assessing environmental care using questionnaires as measured by a Likert scale is 1-5. Indicators of environmental care attitudes include: 1) maintain environmental sustainability;

2) provide information about environmental management; 3) improve the environment; and 4) solving environmental problems (Yaumi, 2016). Learning outcomes assessment instruments use tests. Testing instruments in this study include validity and reliability. Data analysis using independent sample t-test with SPSS 16.0 for Windows program at 5% significance level.

### C. RESULT & DISCUSSION

#### Environmental Care Attitude Data on Experiment and Control Classes

Data on environmental care attitude between experimental and control classes in the form of average questionnaire results with 1-5 Likert scale. Comparison of the average value of students' environmental care attitudes in the two classes is visualized in Figure 1 below.

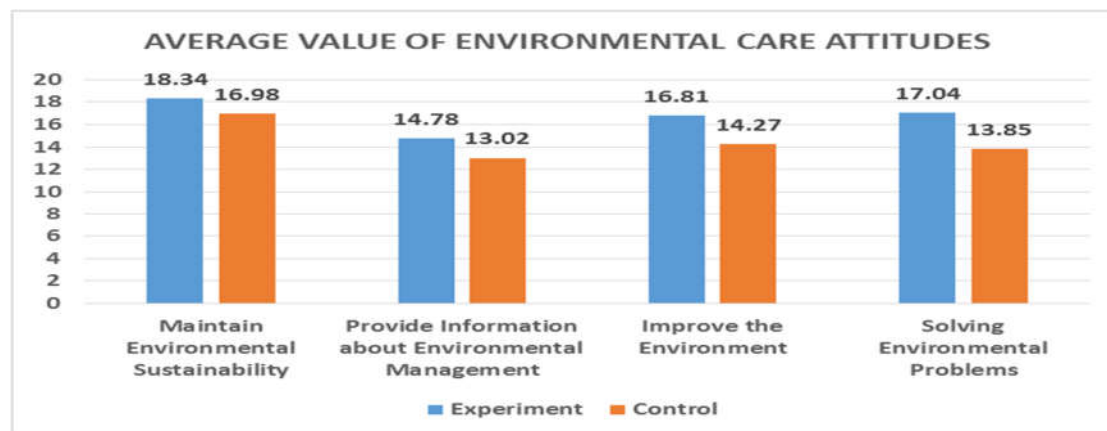


Figure 1: Average Value of Environmental Care Attitudes

Based on Figure 1, there is a difference in the average value of environmental care attitudes between experimental and control classes. In general, the average value of the experimental class's environmental care attitude is higher than the control class on all indicators. The average value of environmental care attitude on 1) indicators of maintaining environmental sustainability of the experimental class is 18.34 and controls 16.98; 2) indicators provide information about the environmental management of the experimental class at 14.78 and control class 13.02; 3) indicators maintain and improve the experimental class environment of 16.81 and control class 14.27; and 4) indicators provide solutions to the environmental problems of the experimental class at 17.04 and control class 13.85. The conclusion of these data shows that eco pedagogic based PBL has a higher effect on environmental care attitudes in the experimental class than the control class.

#### Learning Outcomes Data on Experimental and Control Classes

Learning outcome data consists of the average value of pretest, posttest, and gain score. The average learning outcomes in this study are visualized in Figure 2 below.

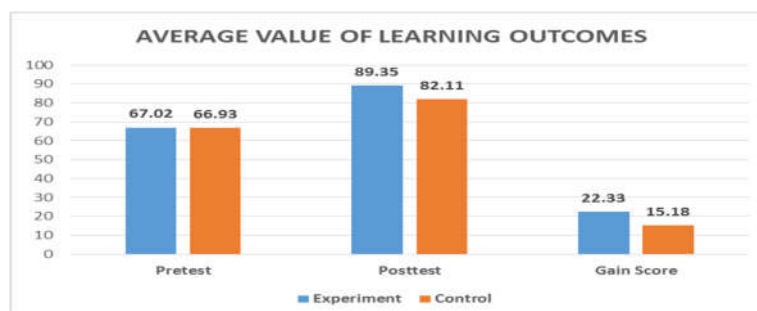


Figure 2: Average of Student Learning Outcomes

Based on Figure 2, there is a difference in the average value of learning outcomes between experimental and control classes. Learning outcome statistics show that 1) the mean score of the experimental class pretest is 67.02, and the control class is 66.93; 2) the average posttest value of the experimental class is 89.35, and the control class is 82.11, and 3) the average gain score of the experimental class is 22.33, and the control class is 15.18.

Data of student learning outcomes were tested using independent sample t-test. The summary of the results of the t-test analysis can be seen in table 1 below.

Table 1: Summary of T-Test Analysis Results

| <b>Gain-Score</b>           | <b>Df</b> | <b>Sig. (2-tailed)</b> | <b>Mean difference</b> | <b>Std. Error Difference</b> |
|-----------------------------|-----------|------------------------|------------------------|------------------------------|
| Equal variances assumed     | 57        | 0.000                  | 16.859                 | 2.735                        |
| Equal variances not assumed | 47.847    | 0.000                  | 16.859                 | 2.713                        |

Based on the table above, the results of the t-test indicate that there are significant differences between the experimental class and control learning outcomes. This can be seen from the results of the t-test which is a sig. (2-tailed) = 0,000 <sig. = 0.05 (coefficient). So, it can be concluded that problem-based learning affected learning outcomes. The experimental class learning outcomes that use problem-based learning models are higher than conventional models.

### **PBL Learning Affected on Environmental Care Attitudes**

PBL learning on the sustainable environmental material applied in the experimental class includes examples of environmental problems. The environmental problem solving around the students is repeated so that they are motivated to maintain the environment sustainably and can form a caring attitude towards the environment. The attitude of environmental care is instilled through the learning process, this attitude is carried out repeatedly with different contexts and accompanied by the results of students' treatment of the environment so that students feel they have an obligation to protect the environment (Wesnawa, et al., 2017).

Based on the results of the study, PBL learning with eco pedagogic education based has a positive effected on environmental care attitudes. The high score of environmental care attitudes that occur after learning with the PBL model shows that students' environmental care can develop. The average environmental care attitudes in the experimental class are higher because in PBL there are several stages of learning that must be carried out by students, thus involving students to think to find solutions to environmental problems actively. Students actively build knowledge based on what they have learned, from the beginning to the end of the learning process (Atan et al., 2005). Learning activities are fully carried out by students so that the results obtained are more complex, more durable, and integral in understanding environmental problems.

PBL models with eco pedagogic education based provide students with a thorough understanding of environmental problems. The assessment starts by mapping the problem, determining the priority of the problem, conducting a field investigation, discussing the results of group work, and presenting the work that is related to environmental issues — such learning, encouraging students to analyze various facts, events, and environmental problems. Students can form a logical and critical thinking framework, curiosity, inquiry, problem solving, and other cognitive skills in finding solutions to solving environmental problems that occur in the surrounding environment (Hung, 2009).

The formation of students' environmental care attitudes will develop well when environmental issues are present. Students will be moved to have a positive attitude towards their environment. This attitude will shape a positive self-concept for students in responding and behaving by ecological principles.

New knowledge possessed by students after obtaining PBL learning with eco pedagogic education based is used to make decisions in behaving and behaving towards the environment.

Increasing PBL classroom caring attitudes higher than non-PBL classes can be caused by students getting real problems perceived in everyday life (Darmawan, 2015). The problem must be resolved together with the group. Problems in PBL are open so that each student can develop their solutions through various methods of data collection and discussion. Diverse information or data can be used by students to determine various alternative solutions to problems. New knowledge about the prevention of environmental damage is the foundation for students to behave towards the environment.

Increased environmental care is also caused by the experimental class learning process taught by a PBL model with eco pedagogic education based. The learning process in the experimental class consists of five phases, namely 1) the orientation phase on the problem, students are given problems about sustainable environment; 2) the phase of organizing students to learn, where students are asked to study sustainable environmental material; 3) guiding the individual / group experience, students work together to agree on the results of the discussion, provide answers to the problem-solving process and design a work in the form of an invitation post for environmental care; 4) the phase of presenting and developing the work, students in groups presented the results of work in the form of discussion reports and posters asking for environmental care in front of the class; and 5) the phase of evaluating the problem-solving process. So through the PBL learning stages students not only accept the theory and remember but also act as a solution seeker of the environmental problems that are around.

Although learning with attitude planting has been implemented, but the results obtained are not as perfect as expected. Planting attitude requires a long time and process. Growth and care for the environment through a process of socialization and a long time and are influenced by various factors such as attention to the environment and role models at home, school and in the community (Raharjo, 2010). In the assessment of environmental care needs to be carried out deepening and reflection, to see the extent and strengths. The planting of attitudes requires a short amount of time which emphasizes habits that are constantly practiced and carried out (Pratiwi, Sarwi, and Nugroho, 2013).

One of the weaknesses of the PBL model is that the teaching and learning process requires quite a lot of time, besides changing students' learning habits with a lot of thinking and solving problems becomes a problem because students are not used to carrying out discussions in solving problems given (Rusman, 2014). Students lack time when presenting the results of work in the form of discussions and posters asking for environmental care. Furthermore, in carrying out the presentation, each group that wants to ask is limited by one question because in this learning students must be guided in discussing and directed to present the work.

### **PBL Learning Affected on Learning Outcomes**

The application of PBL learning models with eco pedagogic education in this study that can influence student learning outcomes is suspected because PBL models are problem-based learning. Students become accustomed to solving sustainable environmental problems around, so the learning outcomes are higher than students who only listen to the teacher's explanation (Xian & Madhavan, 2013). The use of PBL models can develop students' thinking ability through a series of skills such as collecting information/data, reading data, and others whose application requires practice and habituation (Sumarmi, 2012). Environmental problems presented in PBL are used as a trigger for student learning to find alternative problem-solving solutions so that the experimental class learning outcomes are higher than the control class. The closer the problem is with the real world, the better the effect will be on improving student learning outcomes (Amir, 2013).

PBL learning trains students to find problem-solving solutions through group discussions. The stages of research and group investigation make students exchange ideas when solving problems (Pinho, et al., 2015). PBL learning makes students have more discussion and question and answer so that it can improve students' understanding and learning outcomes (Koestiningsih, 2011). The contribution of thought from group members allows students' knowledge to increase so that learning outcomes increase.



Kosasih supports the results of this study about the effect of PBL on improving learning outcomes that PBL can develop critical thinking skills and problem-solving abilities as well as develop the ability to build their knowledge (Kosasih, 2014) actively. Furthermore, Sanjaya states problem-based learning (PBL) is a good technique to understand the content of the lesson better, provide satisfaction to find new knowledge for students, and increase student learning activities (Sanjaya, 2006). Students who understand the contents of the lesson mean mastering the material given. Students finding new knowledge also have implications for deeper knowledge absorption. Students actively seek and find knowledge so that learning has a positive effect on learning outcomes.

#### D. CONCLUSION

Based on the results of testing hypotheses and discussion, it was concluded that:

1. problem-based learning effect on the environmentally caring attitude of Social Studies Education students, UIN Maulana Malik Ibrahim Malang;
2. problem-based learning affects the learning outcomes of social studies education students, UIN Maulana Malik Ibrahim Malang.

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