Problem-based Writing with Peer Review (Pw-Pr) Learning Model in Environmental Management: A Best Practice at Al-Lathifah Islamic Boarding School

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Abstrak: This study discusses the effectiveness of Problem-based Writing with Peer Review (PW-PR) learning models in dealing environmental problems. This theme has been neglected due to scarcity of the similar research. There is one previous study but focuses on merely the understanding of student on environmental issues. The present study goes further by identifying the awareness of pupil in solving the destruction of nature, and maintenance of nature. Using descriptive-analytic method, this study discusses how Al-Lathifah Boarding School effectively teaches Problem-based Writing with Peer Review (PW-PR) learning model in dealing environmental problems. The study find that Environmental problems start from a crisis of human understanding of nature, which makes people lose consciousness and even tends to be exploitative of nature. The model is based on systematic problems direct students to solve it. The effectiveness of the PW-PR learning model is proven by the results of the Hypothesis Test of differences in cognitive and affective competence of the experimental class and control class students.

1 INTRODUCTION

Environmental damage that has occurred to date is included in the problem which is very concerning (Nasrudin, 2010). Human awareness of cleanliness and environmental preservation, especially in Indonesia, is still very far from the values in Islamic teachings (Akhtaruddin, 1997). Insufficient human awareness of environmental conservation is evident from small examples of garbage that are seen scattered on the streets, schools, and even in rivers. Air pollution, floods, landslides, forest fires, water pollution and other environmental damage are evidence of erosion of human awareness of environmental conservation The attitude of hedonism, exploitation and loss of human awareness of environmental preservation is a result of the paradigm of positivism that has been attached to human beings which judges nature as an object that can be exploited as they want. This positivism paradigm of nature must clearly be changed, because if it does not it will continue to occur due to human damage.

Learning Model Problem Based Writing With Peer Review comes as a learning model that is thought to be effective in strengthening knowledge,

raising awareness of students in an effort to overcome damage and preserve the environment, because this learning model is a problem-based learning model that systematically directs students to can solve a problem. So that eventually students grow up to be human beings who are able to preserve the environment.

This article is divided into five points, the first point is introduction, in the second part we will present a little discussion and literature review, at this point we will also present indicators and answer research questions, we will present the research methodology in the third point, then the results and discussion on the fourth point, this article ends with a conclusion on the fifth point.

2 LITERATURE REVIEW

2.1 The Importance of Environmental Education

New education and the most important in the present is environmental education. The education is related to the knowledge of the environment around

humans and maintains various elements that can bring the threat of destruction, pollution, or destruction (David Orr, 1994) Environmental education was taught by the Prophet Muhammad to his friends. Abu Darda 'ra. explained that in the place of study raised by the Prophet Muhammad, he had been taught about the importance of farming and planting trees and the importance of the effort to change barren land into a fertile garden. This action will bring great rewards in the sight of Allah SWT and working to prosper the earth is including worship to Allah SWT (Al Qaradlawi, 1997). From some figures' views, the emergence of volunteer movements and various cases of environmental problems that occur in various parts of the country, it can be concluded that environmental problems that occur stem from a crisis of understanding of the environment itself lack of understanding about the environment causes humans to act arbitrarily exploiting nature (Ahmed, Abubakr Bagader and others, 1994).

Therefore, theoretically and practically the world of education is considered to be able to change the understanding of the environment for the better. This indicates how important environmental education is in overcoming various environmental problems that occur. Making individuals and communities understand the complex nature and the environment through their physical, social, economic and cultural interactions in acquiring knowledge, attitudes and practical skills in managing and solving environmental problems, this is a basic goal of environmental education. This goal will be achieved if learning about the environment is carried out continuously and continuously (Ronald:1990)

2.2 Environmental Management in the Biology Subject of Madrasah Aliyah

The object of discussion on the environment is formally discussed in Chapter 10 Biology subjects in class X 2013 curriculum of Madrasah Aliyah with the title Environmental / Climate Change.

Environment / Climate changes in this chapter have some Basic Competencies as a benchmark for the minimum ability of students in a lesson. In Basic Competencies 1.3, it is stated that students must be able to understand the concept, be sensitive and care about the problems, have the motivation to maintain and love the environment as the practice manifestation of the teachings of their religion. If Basic Competence 1.3 is associated with Bloom's Taxonomy, it will be seen that Basic Competence 1.3 requires students to have two basic competencies in Bloom Taxonomy, they are Cognitive competence and

Affective competence. This is reinforced by the indicators of the Basic Competencies, the students at least have: (1) an understanding of the concepts (causes and impacts) of environmental damage caused by humans (water, soil and air pollution) and the concept of environmental conservation efforts.

(2) attitude towards environmental damage and determination or motivation to maintain and preserve the environment (water, soil and air) (Puskur, 2007).

(3) Finally, it can be concluded that the selection of an appropriate learning model in learning in the classroom is very important to be considered, in order to achieve Basic Competence or the minimum ability of students who have been determined in the study of Environmental Management.

2.3 Problem based Writing with Peer Review (PW-PR) Learning Model

The PW-PR Learning Model was introduced by Nancy J. Palaez from California University in 2002. According to him, the PW-PR Learning Model is a problem-based learning model by educators, the problem solving is put into writing by students, then followed by a response to the writing of students by other students with the final activity of strengthening the concept by educators, in addition to overcoming misconceptions that occur among students (Pelaez:2002). Steps or steps taken in the PW-PR learning models:

1) Educators give some questions to students.

2) Students carry out theoretical studies from various sources, from books, journals, the internet and through interviews.

3) Students complete or solve problems in writing with references from various references or sources.

4) Students do calibrated peer review by checking and responding to answers from their friends that have been prepared by the teacher, then the results of the students' responses are equated with the educator's response to the example of the answer.

5) Educators provide concept strengthening and discuss some misconceptions that occur in the results of the students' answers.

2.4 Relevant Research

Referring to the research conducted by David Orr, he said that the environmental crisis that occurred basically began with a crisis of understanding, and it was the world of education that was able to change that understanding for the better (David Orr:1994)

Moreover, Islamic education which combines aspects of divinity in environmental management, added Azila Ahmad Sarkawi and Alias Abdullah (Sarkawi:2015). Gregory S Keller and Julian D. Avery also emphasized in their research that educational institutions can help improve conservation awareness through the learning process carried out continuously (Keller:2006) Robert E. Slavin specifically stated that the process of education services is in a strategic position in the development of human resources, because human excellence in science is the proper management result of the education system (Robert:1994) The results of research conducted by Nancy J. Pelaez showed that Learning using Problem-based Writing with Peer Review (PW-PR) can improve student learning outcomes in the concept of human physiology compared to learning using traditional methods (lectures) both tested using test questions in the form of multiple choice or essay (Pelaez:2002).

3 RESEARCH METHOD

The research method used in this study is a mixed research method (mixed method / combination that combine qualitative and quantitative methods).

3.1 Research Sites and Objects

This research was held in Al-Lathifah Islamic Boarding School Cibitung-West Cikarang Bekasi. The object of the research is the students of class X Madrasah Aliah Al-Lathifah.

3.2 Data Source

Data sources in this study are divided into two, primary data sources and secondary data sources. The primary data source in this study is the source of data obtained from the results of multiple choice questions and scale questionnaires. Secondary data sources in this study are data sources obtained from observation, interviews, and from various kinds of literature relating to the discussion of research on the learning of PW-PR in Environmental Management Competencies.

3.3 Data Analysis Methods

Primary data collection techniques: (1) Test multiple choice questions to determine students 'cognitive competencies, (2) Scale questionnaires to determine affective competencies and students' responses to the

application of PW-PR learning models. Primary data collection techniques from multiple choice test results (cognitive competence) and scaled questionnaires (affective competence) were carried out through True-Experimental (real experiment) research methods [15]. The research design used was the randomized pretest-posttest control class group design. The research design can be seen in the following table:

Table 1: Research design

Class	Pretest	Application	posttest
Experiment	T1	X1	T2
Control	T1	X2	T2

Explanation:
T1 =   First Test
T2 =   Final Test
X1 =   Application by using PW-PR learning
X2 =   Application by using conventional learning

Secondary data collection techniques: (1) Observation of the environment of Al-Lathifah Islamic Boarding School to obtain data on the state of the environment in schools, (2) Interview with Principal of Al-Lathifah Islamic Boarding School and tutors of Al-Lathifah Islamic Boarding School to find out the history and school profile, (3) Various literature studies on Islamic Concepts of the Environment, Problem-based Writing Learning Models with Peer Review (PW-PR), Learning Evaluation, and Environmental Management Competencies.

4 RESULT

4.1 Education Evaluation based on Learning Model Problem based Writing with Peer Review (PW-PR) at Environmental Management Competencies

Theoretically, the learning model of Problem Based Writing with Peer Review (PW-PR) is assessed as an appropriate learning model applied in environmental management. To prove the effectiveness of this learning model, it is conducted to prove the evaluation of education or research quantitatively.

This research was conducted with the intention to find out whether there is an influence of the Problem-based Writing with Peer Review (PW-PR) learning model on the achievement of instructional education

goals in environmental management. The purpose of instructional education is to mean how students' abilities are measured through the cognitive and affective domains. To find out whether or not there is an influence, a comparison class or control class is needed. In this study, the control class is a class taught by conventional learning models.

PW-PR learning is assumed to be an effective learning model that contributes to the increase of knowledge and awareness of students in environmental maintenance and management. This is based on a systematic learning model that has systematic stages that can improve students 'abilities not only in increasing knowledge, but also in improving students' attitudes towards damage and maintenance of the environment in daily life that can be proven through a study compared to conventional learning model.

The proof of the effectiveness of the PW-PR learning model in environmental management is done through true-experimental research methods (real research) (Sugiyono: 2013) with the research design of the randomized pretest-posttest control class group design (comparison of two randomly formed groups with pretest and posttest). (Sukmadinata: 2008) The instruments used in this study are written tests and applicative tests as data collection tools.

The main data from this study is in the form of a written test instrument in multiple choice forms with a number of 20 questions that have been judged and tested. This written test is conducted to determine the cognitive abilities of students in environmental management. In addition, two non-written test instruments were used. First, non-questionnaire-shaped tests were used to determine affective abilities as well as student responses to the PW-PR learning model. Secondly non-test which is in the form of learning used to determine the response of students to the PW-PR learning model.

Giving the test was done twice, namely at the beginning of learning with the aim to find out the students 'initial competencies about learning material for environmental management, and at the end of learning with the aim of knowing students' final competencies after being given treatment. The test questions used at the pretest and posttest are the same problem. The use of the same questions is assumed by using the same evaluation tool to find out changes in the value of students after being given treatment. Significant differences between the two final test result, and between the initial test, and the final test in the experimental group showed the effect of the treatment given.

4.2 Effectiveness of PW-PR Learning Models in Cognitive Competencies of Students

Cognitive competence measured in this study is the cognitive abilities of students in learning material for environmental management. Based on the average value of posttest testing of cognitive competence, it shows that the experimental class is superior to the control class. The experimental class has an average grade of 57.3 at the pretest, and becomes 79.8 after the posttest. While the control class achieved an average of 57.5 at the pretest, and 63.3 at the posttest. This indicates that the PW-PR learning model has a significant influence on students' cognitive competencies on environmental management competencies.

The effectiveness of learning in both classes can be known by calculating the percentage of students' values. Effective learning is 75% of students get a value greater than or equal to 65 [16]. Based on the posttest results of the experimental class students and successive control classes have an average grade of 79.8 and 63.3 with Minimum Completeness Criteria (KKM) at a score of 65. In the experimental class, 30 students get more than or equal 65, or 100% of students achieving KKM. This indicates that the percentage level of cognitive competence of the experimental class students exceeds the average criteria of learning completeness that has been established and is included in very effective learning. Whereas in the control class, students who get a score greater than or equal to 65 totaled 14 students, or only 46% of students who achieved KKM, this shows that the percentage of cognitive competence of control class students is still below the average completeness learning criteria, that has been established and is included in less effective learning. The results of this study indicate that the learning model Problem Based Writing with Peer Review (PW-PR) has a significant effect on improving the cognitive abilities of students in learning environmental management.

Before the teaching and learning process begins, it is important to know the students' initial competencies in the subject of environmental management. Learning success depends not only on the environment and learning conditions but also on the students' initial competencies. The initial competencies possessed by students become the initial capital in the learning process that will be carried out so that it affects the results after the learning process is complete

4.3 Effectiveness of PW-PR Learning Models in Affective Competencies of Students

The student affective ability in environmental management can be known from the questionnaire given to students at the last meeting, after students have done the posttest. The answers of students in the questionnaire were calculated on the average value and then compared between the pretest and posttest scores between the experimental class and the control class.

The results of questionnaire processing indicate that the average value of the experimental class pretest is 57.1, and the posttest value is 80.8. While the average value of the pretest of the control class is 57.6 and the average posttest value is 63.7. For more details, the difference in the average value of the experimental class and control class can be seen in the graph below:

These results indicate that the affective competencies percentage of experimental class students exceeds the average criteria for learning completeness that has been established and it is included in very effective learning. The results of this study indicate that the Problem Based Writing with Peer Review (PW-PR) learning model has a significant influence on improving the affective competence of students in learning environmental management. Increased affective competence occurs when students conduct problem-based learning by carrying out a direct observations review of the phenomenon of environmental damage that occurred.

4.4 Response of Students to PW-PR Learning

We can see from the questionnaire filled out by students after attending PW-PR learning. From the results of the questionnaire, 81.03% of students stated that PW-PR learning on environmental management material can improve the ability of students to find solutions to problems, help improve writing skills, train students in criticizing other people's writings, and constitute fun learning models, can help students learn more effectively and help increase awareness and ability of students in environmental management. This is confirmed from the acquisition of the average value of the experimental class tested through the response instrument for PW-PR learning to obtain a class average value of 81.

The responses of students to the Problem Based Writing With Peer Review (PW-PR) learning model in this study were students who were in the experimental class as the respondents showed, 24 of the 30 students or 80% of the experimental class responded very strongly that Problem Based Writing with Peer Review (PW-PR) learning models can help them in learning to solve a problem by thinking systematically through PW-PR learning, starting from exploring the causes of problems by conducting direct reviews to the level of how students are able solving problems by doing various kinds of literature studies from various sources even asking experts directly.

The second statement about the response of students to learning Problem Based Writing with Peer Review (PW-PR) showed that 23 out of 30 students or 76.6% of the experimental class mostly responded strongly agreeing that their writing skills had increased because it is required to pour out an answer to a problem in written form.

The third statement about the response of students to learning Problem Based Writing With Peer Review (PW-PR) shows, 24 out of 30 or 80% of experimental class students mostly responded strongly agree that PW-PR learning trains students to criticize the writings of others, so that their critical thinking skills grow and develop.

The fourth statement about the response of students to learning Problem Based Writing with Peer Review (PW-PR) shows, 25 out of 30 or 83.3% of experimental class students generally responded strongly agreeing that learning uses PW-PR in it. Includes conducting literature studies, writing down the resolution of a problem, reviewing the resolution of problems made by friends helps facilitate them in understanding the material being studied.

The fifth statement about the response of students to learning Problem Based Writing With Peer Review (PW-PR) shows, 25 out of 30 or 83.3% of experimental class students generally responded strongly agreeing that the way to learn using the PW-PR model is fun learning methods and can help them learn more effectively.

4.5 PW-PR Learning Model as Effective Learning Model in Environmental Management Competencies

Sustainable environmental damage is occurring until now, including a problem that is very concerned in various parts of the country. Human awareness of cleanliness and environmental preservation, especially in Indonesia until now is still very far from the values guided in Islamic teaching.

Environmental damage is evident from a small sample of garbage that is seen scattered on the streets, schools, even in rivers. Air pollution, floods, landslides, forest fires, water pollution and other environmental damage are concrete evidence of the erosion of human awareness of environmental preservation. The attitude of hedonism, exploitation and the loss of human awareness of environmental preservation are the result of the positivism paradigm that has been inherent in humans so far who views nature as an object that can be exploited as desired and is not sacred. Since the end of the 17th century, scientists intensified the degradation of nature into a mechanistic knowledge.

Nature is seen as a machine that has a regular system, and its parts are intended as natural laws that are deduced through rational thinking and verified using experiments. At this time nature was no longer regarded as a living organization, but was only seen as an object that could be exploited and manipulated then the findings of modern technology are increasingly advanced as a result of this positivistic-mechanistic view.

The development of this increasingly advanced technology strengthens the position of man in his position as the "ruler of nature" with the various riches contained in it. In the next stage, it is man's superior attitude towards nature that provides many opportunities for human beings themselves to destroy various kinds of environmental settings.

Dualistic arising between spiritual and material, subject and object, is a serious consequence of the dominance of the above view, which then results in for example the arbitrary and excessive objectification of nature and the exploitation of the natural world at the limit. In the view of positivism, nature is not seen as something sacred but is seen as an object that can be exploited as desired. From here then a phenomenon called the ecological crisis occurs.

On the other hand, this view also tends to position humans as objects, and engineered society functions as a machine, causing human values to be lost, or often referred to as inhuman humans. Furthermore, this view of knowledge that is empirical, rational and positive is the highest standard of truth, so that moral and religious values are then ignored. The result arise religious moral disorientation which ultimately leads to mental depression, violence and destruction of the environment.

The positivism paradigm for nature clearly must be changed, because if not, then there will continue to be environmental damage caused by human activities.

The positivism paradigm of nature can be changed, one of which is by presenting the Islamic concept of the environment and several cornerstones of contemporary scholarly Muslim science epistemology by applying the right learning model. Because the environmental damage that occurs comes from the crisis of human understanding that is wrong with nature, and the world of education which is considered as the right place to change that understanding for the better with the right learning model. In the technical order, the selection and use of the right learning model determines success in fostering knowledge, fostering awareness and realizing the ability of students to preserve the environment. Learning Model of Problem Based Writing with Peer Review is present as a learning model that is considered appropriate in achieving successful learning in environmental management. Finally grow students become human beings who are able to preserve the environment.

If we see from various aspects, PW-PR learning model has advantages and disadvantages, but in general the PW-PR learning model is more able to improve cognitive and affective competency of students compared to conventional / traditional learning. The characteristics of the PW-PR learning model are unique, causing this learning model to be categorized into an effective learning model in an effort to overcome environmental damage even to the level of environmental management and preservation efforts. The characteristics of the unique PW-PR learning model have a variety of distinctive characteristics in each step of their learning. First, PW-PR learning model can train students to solve problems through systematic and scientific thinking. Second, Problem-Based Writing trains students to explain thoughts as well as express cognitive structures that arise from their understanding into written form. Third, peer review or peer review can enrich students 'knowledge of the material being studied and sharpen and require students to have more knowledge because they are required to respond to friends' answers.

Learning using PW-PR strongly demands the active role of students, because educators only act as facilitators when students solve problems and conduct peer-reviews. Educators only provide reinforcement of concepts and overcome misconceptions at the end of learning. Conventional learning models are more teacher-centered, so conventional learning models do not provide opportunities and facilities for students to develop their own knowledge and there is no opportunity to play an active role in the learning process.

The effectiveness of the PW-PR learning model in environmental management competencies in the Al-Ahliyah Islamic Boarding School in Karawang is shown by changes in the acquisition of class average values. The significance of changes in students' cognitive competencies can be seen from the change in class average values from 57.3 to 79.8 in the experimental class using the PW-PR learning model, while in the control class using conventional learning models the class scores only change from 57.5 to 63.3. The significance of changes in the affective competence of students can be seen from the change in the class average value from 57.1 to 80.8 in the experimental class using the PW-PR learning model, while in the control class using conventional learning models the class scores only change from 57.6 to 63.7. Aside from the significant changes in class average values, the effectiveness of the PW-PR learning model was also strengthened from the results of the questionnaire responses of students to the use of the PW-PR learning model in environmental management materials. 81% of students in the experimental class stated that the learning model using PW-PR can help students understand, master and apply the subject matter.

Referring to the research that has been conducted, PW-PR learning is proven to be an effective learning model in environmental management competencies.

5 DISCUSSION

Imam Nasrudin (2010) states that a good environment in the form of abundant natural resources that God gives to humans will not last and recover without human concern

Abdussalam Ibadi (2010) stated more specifically that gratitude for God's favor by preserving nature must be instilled early so that later the quality of human education is in an order that can take care of the earth with full responsibility

Referring to the research conducted by David Orr (1994) who said that the environmental crisis that occurs basically starts from a crisis of understanding, and the world of education is able to change that understanding for the better, especially Islamic education that combines divine aspects in environmental management, added Azila Ahmad Sarkawi and Alias Abdullah (2015)

Gregory S Keller and Julian D. Avery (2006) also emphasized in his research that educational institutions can help increase conservation awareness through continuous learning processes.

Robert E. Slavin (1994) specifically states on the technical order that the process of education services is in a strategic position in the development of human resources, because superior human beings in science are the result of proper management of the education system.

The results of research conducted by Nancy J. Pelaez (2002) show that Learning using Problem-based Writing with Peer Review (PW-PR) can improve student learning outcomes in the concept of human physiology compared to learning using traditional methods (lectures) both tested using test questions in multiple choice and essay forms.

Meanwhile, research conducted by R.P. Dewi (2008) shows that the PW-PR learning model affects the improvement of critical thinking skills of high school students in the concept of environmental pollution

Francis Bacon's Paradigm of Positivism which states that knowledge must be a force for humans to master nature, where nature is an object that can be exploited as desired. In the opinion of John Fischer who doubted the concept of education as an important instrument that can be used to deal with the natural crisis. In contrast to the above opinion, David Orr stated that the environmental crisis that occurs basically starts from a crisis of understanding, and it is the world of education that is able to change that understanding to be better, especially Islamic education that combines aspects of divinity in environmental management. Gregory S Keller and Julian D. Avery more specifically emphasized that educational institutions can help improve conservation awareness through the learning process that is carried out continuously, and finally the research conducted by R.P. Dewi, which shows that the PW-PR learning model influences the critically thinking ability of students in the concept of environmental pollution.

6 CONCLUSION

The root of the damage and pollution of the environment that occurs is sourced from western science and technology based on the assumptions of positivistic views. This Positivist view has been inherent in humans and has developed to this day. Positive paradigms assume that this nature must be seen as an object that can be exploited in accordance with the wishes and not a sacred thing. This positive paradigm for nature must clearly be changed, because if it does not, there will continue to be environmental damage caused by human activities.

This positive paradigm can be changed by presenting the Islamic concept of the environment. Environment in the concept of Islam is interpreted as a unit consisting of biotic elements (humans, animals, and plants) and abiotic elements (air, soil, water, climate and others) as proof of God's power.

This view creates responsibility to God, because insulting and doing damage to the environment means insulting God. It is this divine aspect that does not exist in the Western view.

Theoretically, in education the PW-PR method is seen as the right method to change understanding and foster human awareness of environmental conservation for the better. To change understanding and awareness of the environment to be better, in the world of education technically requires the right learning model.

This study proves the effectiveness of the Problem-based Writing with Peer Review (PW-PR) learning model in fostering the competence of environmental management of students of Al-Ahliyah Islamic Boarding School.

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