IMPROVING ECOLOGICAL INTELLIGENCE IN THE USE OF PLASTIC FOOD THROUGH THE MODEL OF PROJECT BASED LEARNING IN THE STUDY OF SOCIAL STUDY (IPS)

(Classroom action research in grade 4BSDN 2 Jayagiri Bandung)

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Abstract: This research is based on the condition of students at SDN 2 Jayagiri who use a lot of plastic as food packaging. Students are still not aware of the impact of plastic waste used to the environment. The method used in this study was a classroom action research method to overcome environmental problems and to improve students' ecological intelligence. The research design used was the Kemmis and McTaggart Classroom Action Research models. Based on the results of research conducted, there were three cycles and three meetings which increased the ecological intelligence of students in terms of knowledge, attitudes and skills. In cycle I, the value of ecological intelligence obtained by students was in lower category.In cycle II, the students' ecological intelligence have increased and was in the moderate / sufficient category and in cycle III, the students' ecological intelligence experienced a significant increase into good category. Based on these data, it can be concluded that the project based learning model can improve students' ecological intelligence.

Keyword: *ecological intelligence, plastic waste, project based learning, social study(IPS)*

1. Introduction

Basically, humans have a close relationship with nature and the environment. Therefore, the ecological education is necessary to improve the ecological sensibility and to raise theenvironmentalawareness as part of an ecosystem that affects human life. Human life is very dependent on theenvironment. Humansrely on the environment to run their life, while the environment is influenced by human activities. Itsuggests that all the good or the bad actions done by humans will return to themselves (Hamzah, 2013). According to Suma Atmadja (2012, p. 9), humansin natural systems are part of nature that interacts with nature as their environment.

To this day, while human recognizes the value of nature, there are still numerous environmental pollution problems. These issues have become unresolved problems, which up until now, has not find any fixed solutions. In other words, there have been ecological crises in various forms that have negative impacts and hit humans back in various aspects of life (Muhaimin, 2015).

The students of SDN 2 Jayagiri have not been accustomed to being discipline in throwing garbage to the garbage bin. It was found that the school was really clean in the morning before the students are recess, and on the contrary, the school became dirty with quite a lot of garbage after recess. Other facts that can be observed and found by the researcher included many paper and plastic waste, that are used in food and beverage packaging, found at the students' desk in almost every class, when disposing the garbage students could notdistinguish organic waste from anorganic waste, students were easily wasting paper for playing games that are not useful causing the classroom dirty, students seem to lack of empathy and do not care about the school's environment including classrooms where they study.

Related to the explanation above, ecological awareness and intelligence must be the most important part of educational goals. Education must be able to produce a generation with character and awareness that nature has a close relationship with humans and must be maintained in the best way.

The ecology understanding and awareness are not onlyachieved through an educational process that is only limited to the transfer of knowledge, but also through a learning process that places students as subjects in learning so that students are active in learning activities. According to Muhaimin (2015),the *transfer of knowledge* kind of education will make students only have knowledge about the environment but lack of awareness and concern for the environment. Consequently,it will also adversely affect the character of students who generally do not aware and have a proper understanding toward the environment (Soemarwoto, 2001; Supriatna, 2002). It can be seen from the large amount of garbage, especially plastic waste scattered in the school environment and the students are still unable to differentiate between organic and inorganic waste, so that it can be concluded that students have low ecological intelligence. In line with this statement, Muhaimin(2015) also stated that most of the studentsin the school still have low ecological intelligence.

In an effort to resolve these problems, the researcher used the Project Based Learning model. It is a learning model that encourages the students to actively explore problems in the real world, provide challenges, and gain deeper knowledge (Lucas, 2015). In a different view, Johnson & Lamb (2007) stated that *"project based learning focuses on creating a product or artifact by using problem-based and inquiry based learning depending on the depth of the driving question"*. Aside from Johnson & Lamb (2007), Markam et. al (2003, p.4) described that the project-based learning model is *"Systematic teaching method that engages students in learning knowledge and skills through an extended inquiry process structured around complex, authentic questions and carefully designed products and tasks"*.

Based on the opinionsabove, the project-based learning model is a learning model with systematic steps that involve students in learning to gain knowledge and their skills through a structured and complex investigation process, through authentic questions and designed products and assignments. Hence, project-based learning models can improve the quality of students' learning. It was confirmed by Doppelt (2005, p. 10) based on his research, which revealed that the project-based

learning model was able to improve the quality of students'understanding in certain materials and make students able to apply certain knowledge in a particular context.

In addition, project-based learning emphasizes group collaboration. Through this collaboration, it will encourage the social skills needed by students to establish good and harmonious social relations with their social environment (Jarolimek& Parker, 1993; Barbara, Groh & Deborah 2001; Sapriya, 2011). With its various advantages, the project based learning learning model will be able to improve students' ecological intelligence so that the problems that have been experienced can be resolved well and thoroughly.

2. Literature Review

a. Project Based Learning Model

Project-based learning (project based learning) is process-centered learning, relatively timed, focusing on problems, meaningful learning units by integrating concepts from a number of components, whether knowledge, scientific or the field that uses projects / activities as media. To produce meaningful learning, students must explore, assess, interpret, produce, and inform as a form of learning outcomes. Project Based Learning is a learning model that uses problems as a first step in collecting and integrating new knowledge gained based on real experiences and activities. Project-based learning activities have the potential to train and to increase the students learning activities and motivation that are done collaboratively in heterogeneous groups to conduct research on complex problems. In line with the opinion of Hosnan (2014, p. 321), project based learning is a problem-based learning strategy that can develop all aspects of students' development, namely cognitive with comprehensive, affective thinking by feeling firsthand of what is happening and psychomotor by being directly involved in the real life project to solve problems in learning process.

Project-based learning model has several advantages, such as it can help the students to design project to determine an outcome, to train the students to be responsible in managing information carried out on a project that produces a real product presented in the class (Amirudin , et al, 2015). In addition, the project-based learning model also helps students in learning: (1) consistent and meaningful-use knowledge and skills obtained through authentic tasks and works; (2) through the authenticity of curricular activities to expand knowledge in the process of learning activities in designing or open-ended investigations, with results or answers that are not predetermined by certain perspectives; and (3) building knowledge through real-world experience and interpersonal cognitive negotiation that takes place in a collaborative work environment (Santi, 2011: 77).

b. Ecological Intelligence

Ecological intelligence is students' capability or competency to respond to their environmental conditions and apply them in their lives. According to Goleman (2010) ecological intelligence is the ability to comprehend nature or the environment comprehensively. In addition, ecological intelligence can also be interpreted as empathy and a deep concern for the surrounding environment, as well as a critical way of thinking about the surrounding environment due to our actions (Jung, 2010). Whereas in Orr's opinion (in Ardiansyah, 2015, p. 11), explaining the description of someone who has ecological intelligence is characterized by '*The ecologically literate person has knowledge necessary to comprehend interrelatedness, and attitude of care or stewardship. Such a person would also have the practical competence required to act on the basis of knowledge and feeling"* The purpose of Orr's statement is that someone who is ecologically intelligent has the knowledge of the importance of understanding the relationship or interrelation between one group and another and being concerned about a task. It means someone who is ecologically literate knows how to relate and behave with the ecosystem.

It is important for every individual to have ecological intelligence to gain a good understanding of nature and live in harmony with nature. The ecological intelligence can be improved through the learning process at school. The learning process is done by providing an understanding of ecology and familiarizing students to not do activities that can damage nature, will train students' sensibility and make students wiser in taking action (Palmer, J & Neal, P, 1994; Supriatna, 2016).

c. Plastic Waste

Garbage or waste, according to SNI 19-2454-2002 (in Radityaningrum, et al., P. 2) is a solid waste consisting of organic materials and anorganic materials that require management to be safe for the environment. Garbage or waste becomes a problem when the quantity is so much that the environment is unable to neutralize it naturally again (Mulasari, et al, 2014: 35).

Plastic waste has an impact on the environment, including soil pollution, ground water and soil microorganisms; Plastic bags will interfere with the waterway that seeps into the ground; reduce soil fertility because plastic blocks air circulation in the soil; plastic bags are difficult to decompose; the disposal of plastic waste in rivers will result in silting of the river and blockage of the river flow causing flooding.

Plastic polypropylene waste is often used as food packaging, beverage packaging, food plastic and plastic bags. The use of plastics these days is significantly increasing that human dependence on plastics is very high. Plastic is a food packaging material or practical container and looks clean, easy to get, durable, cheap. Unfortunately, people are not aware of the danger of plastics and the correct way to use plastic, creating a problem for the environment.

d. Learning Social Study

The Social Study (IPS) is one subject that can be integrated with environmental education. NCSS (1999) defines IPS or *social study* as follows:

> *"Social study is the integrated to promote the civic competence. Within the school program, social studies provides coordinated, systematic study drawing upon such diciplines as anthropology, archeology, economics, geograpahy, history, law, philosopy, political science, psycology, religion, and sociology, as well as appropriate content from the humanities, mathematics, and natural science.:*

Related to the definition of IPS according to NCSS, it can be explained that social studies studies involve a variety of scientific disciplines both inside and outside the social study to build social capabilities. Environmental awareness can be developed if the teacher himself has a good ecoliteracy so that the teacher can teach his students.

Characteristics of social study in elementary schools as formulated in *Development Appropriate Practice* (1992) have characteristics such as: (1) learning from close and accessible distant from children; (2) showing from all factual levels (concrete operations); (3) thinking about everything that is learned as a whole and integrated (holistic and integrative) entity; (4) conducting meaningful learning activities through manipulation process while playing.

A comprehensive social study program is a four-dimensional program (Sapriya, 2008) which includes:

1) Knowledge Dimension
   Everyone has different insight on social knowledge. Some argue that social knowledge includes events that occur in certain communities. Others also argue that knowledge includes students' beliefs and learning experiences. Conceptually, knowledge should include: (1) Facts; (2) Concept; and (3) Generalizations understood by students.
2) Skills Dimension
   The skills needed to become an element in the IPS dimension in the process of social studiy learning are (a) research skills; (b) thinking skills; (c) social participation skills; (d) communication skills.
3) Values and Attitudes Dimension
   The essence of a value is something valuable. The intended value is a set of beliefs or principles of behavior that have been attached in a particular person or group of people who are attracted when thinking or acting.
4) Action Dimension
   Social action is an important dimension of social studies because action can enable students to become active students and can learn to practice in a concrete and practical manner. By

learning from what is known and thought about social issues to be solved so that it is clear what will be done and how, the students learn to be effective citizens in the community.

The four learning dimensions above have different characteristics from each other, but in the four-dimensional learning process, they are complementary and can be used by teachers in designing social studies learning systematically.

3. Material & Methodology

a. Data

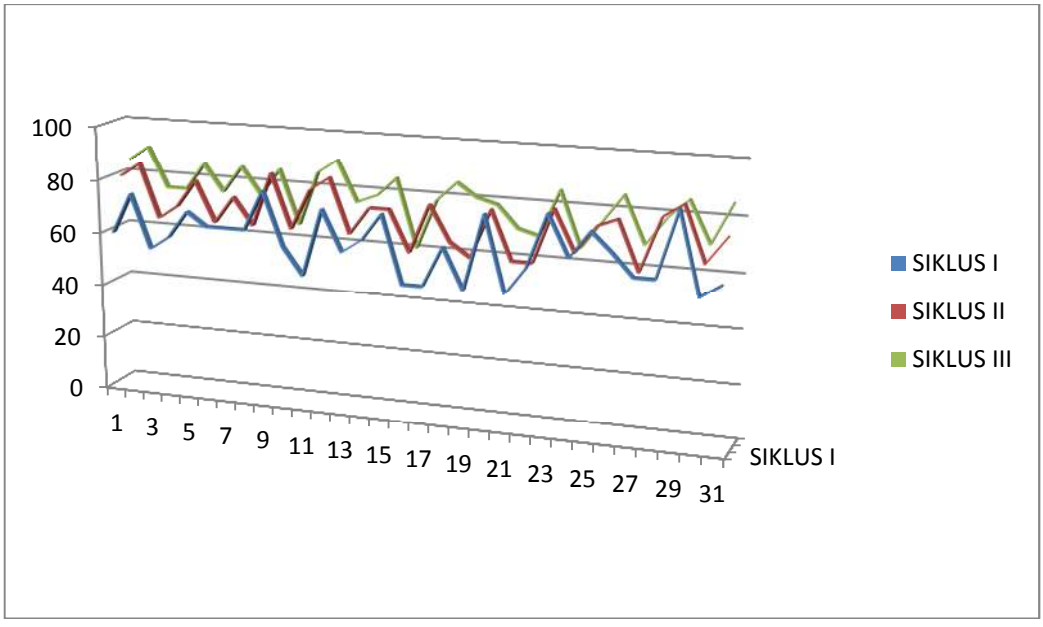
This research was conducted to improve the ecological intelligence of students in the use of plastic food packaging through a project based learning model in social studies learning at SDN 2 Jayagiri, Lembang District, West Bandung Regency. The research subjects in this study were grade 4B at SDN 2 Jayagiri, with 31 students, namely 19 male students and 12 female students.

b. Method

The method used in this study was the Classroom Action Research method. Classroom action research method is a research conducted by the teacher in his/her own class by designing, implementing, and reflecting actions in a collaborative and participatory manner, with the purpose of improving his/her performance as a teacher so that students learning can be improved (Ministry of National Education, 2005; Arikunto, 2009). The research design used in this study was a design developed by Kemmis and Mc Taggart, adapted from Wiriaatmadja (2005, p. 66) which consisted of four components, such as, action plan, action implementation, observation, and reflection. Data collection techniques in this study were carried out by observing, interviewing, documenting, learning outcome tests and student worksheets based on ecoliteracy competency indicators developed by the Center for Ecoliteracy.

c. Table and Figure

Based on research conducted from the first cycle to the third cycle, the result showed improvement from each cycle. The following is an overview of the results of the improvement of each cycle.



SIKLUS I (CYCLE I)
SIKLUS II (CYCLE II)
SIKLUS III (CYCLE III)
Figure 1. Data of the students' improvement in each cycle

4. Results and Discussion

a. Result

This research was conducted in 3 cycles. Before conducting research,the observer designed the learning, prepared learning scenarios in the form of RPP (lesson plan) which contained material, learning methods, evaluation forms and LKS (Students' worksheet). Plans compiled in the lesson planwere implemented in 3 cycles. In the implementation, the observer noted and observed the findings in the classroom and school environment that later was discussed in the reflection. To improve the ecological intelligence of students in the use of plastic food packaging as a source of social study learning, Classroom Action Research was carried out through observing the school environment.

In cycle I, the focus of learning was to develop students' ecological intelligence. Learning was done by inviting students to observe the state of the school environment, students asking questions to get information about the observed environment, gathering information, processing information that has been obtained, discussing alternatives in solving plastic waste in the school environment, then communicating the results of their reasoning. In this cycle students were invited to identify the type of waste, described the dangers of using plastic waste for health and the environment, as well as alternatives in solving plastic waste problems in the school environment.

Based on the results of evaluations carried out in cycle I, students had obtained a low score. Only 8 students (25%) obtained scores above the KKM (standard score). It proved that students' ecological intelligence was still low.

In cycle II, it focused more on growing and teaching awareness to reduce the use of plastic as a food wrapper or packaging. At this stage, students were invited to analyze the dangers of plastics and their impacts on the environment and health. In the second cycle, students were asked to make posters in the form of an invitation to reduce the use of plastic and students were asked to find a solution as a substitute for plastic food containers that are environmentally friendly.

Based on the results of evaluations carried out in cycle II, students' ecological intelligence had increased. The increase in students' ecological intelligence in cycle II was 58%. There are 18 students whose grades reached above the standard score.

Learning process in the third cycle was carried out by project based learning method. The main focus of this cycle was emphasized on aspects of skills in achieving ecological intelligence, this stage encouraged the students to do a project in the form of a lunch box for students' food. Project activities in the third cycle were very useful for students because students could make a real contribution in reducing plastic waste which has been a problem in their environment.

Based on an evaluation of the results of the evaluation conducted in the third cycle, it had increased by 80% of students who obtained scores above the standard score. There were 25 students who received grades above the KKM.

5. Conclusion

Planning social study learning using a project based learning model to improve ecological intelligence in the use of plastic food packaging by the teacher was relatively good. For learning achievement, the teacher compiled a Lesson Plan (RPP), created learning media, created Students' Worksheets (LKS), used a project based learning model and used lecture, discussion and presentation methods by students.

The implementation of social study learning to improve ecological intelligence in the use of plastic food packagingwas done by the teacher quite well in each cycle. Reflection was done to evaluate the achievement of goals and improve learning as planned. In the dimension of knowledge, student competencies were increasing in understanding and awareness related to hazards and the impact of using plastic food packaging for health and the environment. The improvement of the students in terms of ecological intelligence and awareness of environmental health was seen by not using plastic wrap on food and replacing it using a *lunch box*.

After a series of treatments and actions from the first cycle to the third cycle through social study learning through the project based learning model, it showed an improvement in students' ecological intelligence competencies from various aspects, both knowledge, attitude, and skills. The average increase in ecological intelligence in the first cycle is in the category of "less" because it was below the standard score<71, in the second cycle the category is "enough" because the students' grades above the standard score which reached 58% or as many as 18 students, and the category of "good" in the third cycle of 80% or as many as 25 students. Improved aspects of knowledge were higher than aspects of attitude and skills. So it can be concluded that the project based learning model can improve students' ecological intelligence.

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