



THE OPTIMIZATION OF SCIENTIFIC APPROACH THROUGH OUTDOOR LEARNING WITH SCHOOL YARD BASIS

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Abstract

Inquiry cannot be separated in learning science activities. Students are actively involved in constructing knowledge of both hands-on and minds-on. Learning science will be more meaningful when students can get to know the material science is not in the form of textual but contextual where students can learn science closer to the event / phenomenon that occurs in the factual and the environment around them more real. The science acquisition process can be conducted using a scientific approach that is packed with outdoor learning. This article is the result of the study of literature on school-based learning outdoor yard (neighborhood school) which is expected to facilitate teachers in applying scientific approaches and outdoor learning so that students can be closer to the surrounding environment.

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INTRODUCTION

Teachers need to involve students caring their environment by giving them exercises which can be done in every context. Utami et al., (2014) states that “education teaches knowledge related to students surrounding environment which will accelerate their understanding”. This thing is correlated to National Wildlife Federation stating that “The school grounds become places where students not only learn about wildlife species and ecosystems but would also sharpen up their science process skills and raise their natural curiosity” (Ting & Siew, 2014: 96). It means the schools’ yard can be students’ place of learning. Not only identifying wild animals and ecosystems, but the students are also able to sharpen their understanding of scientific process and improve their curiosity. Therefore, learning process should be directed to take care of the environment as one of the learning media (environmental based learning).

The problems in school are generally sourced on teachers’ paradigm saying that learning is only limited to know something. The learning process is all controlled by teachers. Students only become the object of learning process. The students are limited in academic activities of class without any chance to have an interaction with the environment. Environment-based learning is rarely done at school.

Besides, schools are still poor in learning activity, so, the skills of understanding, processing, and cooperating still cannot develop well. Students are still have difficulty in understanding concept of the learning materials and still unable to master the life skills to socialize with society. The usual scoring of teachers from the teachers can only be done through cognitive aspect. The process of the students to understand the materials are rarely observed and appreciated. It makes the students difficult to understand the scientific concepts that they are not get the maximum outcome in the end. Therefore, the teachers should innovate the learning process. One of the attempts is by doing school yard-based outdoor learning combined with scientific approach. Through this model, teachers can arrange and implement scientific approach based on the understanding to the environment. In the end, the students will be able to construct the knowledge given to them.

METHODS

This research was a qualitative research. The sources of data in this research are mainly come from literature review from references, from books, journals, and previous research.

RESULTS AND DISCUSSION

1. Scientific Approach in Outdoor Learning Science

Learning is a challenging process for students to develop all of their potentials. One of the potentials is the thinking skills. Cross (Barkley, et.al. 2012: 16) states that students should be actively create connections in their brains and mindsets in order to reach ultimate understanding of the materials. These capabilities stimulate students’ curiosity, intuitive learning, and passion to explore. Therefore, the teachers supposed to make the learning process able to stimulate students in learning how to learn and to do. These meaningful learnings emphasize on inquiry based method. Through this method, the students are given chance to embrace their curiosity, stimulate their imagination, and motivate them to enhance their knowledge.

Learning science is a learning process based on scientific principles, whether scientific attitudes or scientific process. Scientific principles are based on inquiry or discovery. The process of learning science activity are not limited on inquiry activities where the students are trained to develop their scientific skills, such as observing, collecting data, asking questions, create hypothesis, arranging experiments, or concluding. In the inquiry process, teachers can open questions or motivate the students to ask open-ended questions, give chances to the students to investigate, and find their own answers to find the other questions. Therefore, learning science emphasize on giving direct experience on developing students’ competence making them able to explore the nature scientifically.

Learning science using scientific approach is a learning process adopting scientific steps in building knowledge (Majid&Rochman, 2014:3). Scientific approach emphasize on students’ learning process on how students have to find themselves the knowledge from their experience

in developing processing skills and scientific attitudes. Based on the guidance of 2013 curriculum implementation 2013 (2013: 14), learning process should focus on exploration, elaboration, and confirmation. In that moment, teachers are demanded to bring the main section of learning to be more scientific by the steps of observing, asking, trying, processing, concluding, and inventing. According to Majid&Rochman (2014:5), 5Ms in scientific approach are explained as follows:

Observing is aimed to make the learning process strongly contextualized to the real condition of the daily life by facts and phenomena. It includes seeing, hearing, reading, or heeding. Asking is aimed to make the students have critical, logical, and systematic mindset through discussions and group activities. Trying/ Collecting data is aimed to improve students' curiosity to strengthen the concepts and principles/procedures by collecting data, developing creativity, procedural skills. Associating is aimed to build students' thinking skills and scientific attitudes. The obtained data come from the classification that later is processed to find specific relation. Communicating is used as the platform of students to share their understanding orally, in written, through pictures/sketch/diagrams in presentation, in reports or galleries. It becomes the challenges for teachers to develop activities like observing, asking, trying/collecting data/ associating, and communicating.

Authentic assessment has strong relevance to scientific approach in 2013 curriculum. This kind of scoring can portray learning result whether in observing, reasoning, trying, building network, etc. Authentic learning tends to focus on complex exercises or contextualized ones allowing students to show their competence in authentic manners. It is in line to Swaffield(2011) stating that authentic assessments demand students to apply scientific knowledge and make reasons to similar conditions they face outside of the class.

According to Majid (2014: 62), in order to do authentic assessment, teachers should ask some things related to 1) behavior, skills, and knowledge; 2) assessment focus; and 3) the level assessed knowledge like reasoning, memory, or process. These assessments show how far students learned the materials. Teachers should make assessment related to the purpose of the learning which is arranged and experienced by them. So, all scientific learning aspects of making inquiry, scientific understanding, and scientific use are measured by

several methods, like work method, written attitude scoring, project assessment, product assessment, self-assessment, and portfolio.

2. The Implementation of Outdoor Learning with School Yard Basis in Learning Science

The most contextual learning source is environment and the whole world, instead of limited space inside classrooms (Abdurrahman, 2007: 95). Good learning environment is a challenging and stimulating environment to students giving them feel of safe and satisfactory to reach the goal of the materials (Ahmadiet al., 2011: 31). Andrian Rustaman (1977: 2) adds that environment can also be meant by something around schools or houses that can be the object of observation, facilities, or place to observe and experiments to obtain information. Wattchow (2005: 14) shows that "outdoor education is about learning relationships in, about or for the environment/nature". Thus, learning process from the teachers should build a conducive atmosphere that allows the students interact to their teachers, friends, and environment. Teachers can also bring something from the environment inside classroom or bring the students outside giving them chance to learn from it. One of the alternative methods to do that is through school yard outdoor learning.

Gordon (1997: 149-154) opines that the limitation of space inside of the classroom make specific problems to students making them difficult in memorizing concepts and having creative thinking. It means that outdoor learning creates a new atmosphere and helps to understand the material (Pamelasari & Khusniati, 2014). This is why classroom environment should be widened to the environment outside. The process of obtaining knowledge from science based on observation to the environment can be done inductively and deductively. According to Frank (Robinson, 1969: 116-117), concepting patterns from observing are called as inductive process. Conception patterns from theory, principle, law, hypothesis, prediction, and facts are called as deductive process.

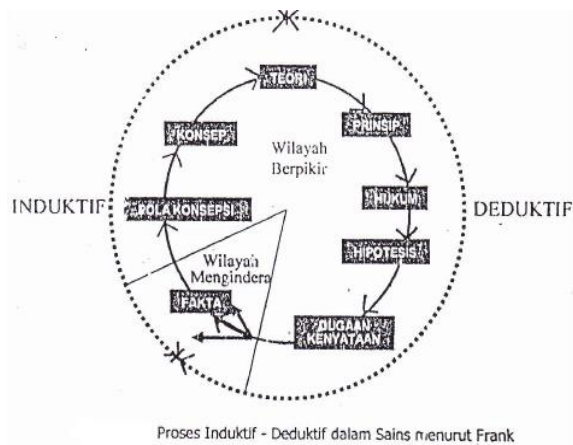


Figure 1. Inductive-Deductive Process

According to the figure, it shows that “starting”, “ending”, and “continuing” of observation emphasize on empirical basis of science. Observation is not given by science, it is provided by scientists with chosen background, principle, and pragmatic consideration. According to Bartlet, learning will be more meaningful with building input, processing in cognitive structure, and reconstructing memory. It is proved by Yuni Wibowo et al. (2013: 49) based on the result of research showing there is an improvement of students’ creativity. Learning is an individual discovery allowing them to a guided exploration instead of knowledge transmission. This thing is in line with Burton’s opinion (1962: 25) saying that “Learning is experience”.

Current curriculum should be translated to students not in a textual way, but in the forms of real objects and problems in the surrounding environment in the contextual manner. Environment as the learning source can be implemented in every subject based on the standard of competences and basic competences. Learning through environment will help students shaping their awareness to the dynamic changing of environment around and contributing back to it. Learning outside of the classroom can be done to make them able to experience directly the lessons they have got inside of the class. They can interact to the environment by doing interview, and identifying objects directly. Ting & Siew (2014: 103) adds that

Learning through outdoor school lessons may help students to build more complex cognitive structures with concrete activities in regards to ordinary activities inside the classroom. Through the interactions among environment, students may have

come to apply science process skills in order to solve daily problems better. In addition, learning through outdoor school ground lessons may have spurred students to make more explicit links to prior knowledge compared to the individual learning inside the classroom. This could account for their ability to relate science process skills to solve daily problems.

It means the learning process outside of the classroom can help the students in building more rooms to build more cognitive structure with concrete activities than classroom activities. Through environmental activities, students can apply scientific process to solve daily problems well. Besides, learning outside of the classroom makes students more able to create explicit link to previous knowledge in comparison with individual learning inside of the class. It explains that their skills with scientific process can be used to solve daily problems. This thing is in line with the research of Ting & Siew (2014: 96) that in their research, “The results showed a significant difference in post-test mean scores between students in “eco-hunt” group and control group in both students’ science process skills and scientific curiosity”. Rosmawati et al. (2011: 64) add that the use of environment as the learning source proven effective to improve students’ understanding of Social Science concepts in VII A class of SMP Negeri 1 Sitinjak academic year 2009/2010.

Outdoor learning is a learning process outside of the classroom which is based on experiential learning and contextual teaching. Experiential learning is a learning model activating learners to build knowledge and skills through direct experience. The purpose of this model is to improve students’ understanding by changing students’ cognitive structure, changing students’ attitude, and widening students’ skills (Majid & Rochman, 2014: 141). Contextual learning is a learning concept relating between real world situation and motivating them to relate the knowledge they have to the implementation in daily life involving seven main components, such as constructivism, asking, finding, learning society, modelling, and authentic assessment.

Brown (2008) state that outdoor education experiences. It is suggested that greater emphasis and acknowledgment be given to ‘place(s)’ and how they may help students make sense of both

their personal and communal identity. Pargusta et al., (2016) add that the purpose of outdoor learning providing students knowledge and understanding making them able to build appreciation to the environment. The components of outdoor learning are 1) Purpose: Students will be able to observe and record data then using the data to prove related concepts in the learning materials; 2) Activities: Students will observe and note activities or object based on the indicators; and 3) Learning Source: these sources offer good objects for scientific activities outside the surrounding environment. The split of students' learning environment from outdoor education according to Higgins & Nicol (2002: 44) should be done as follows:

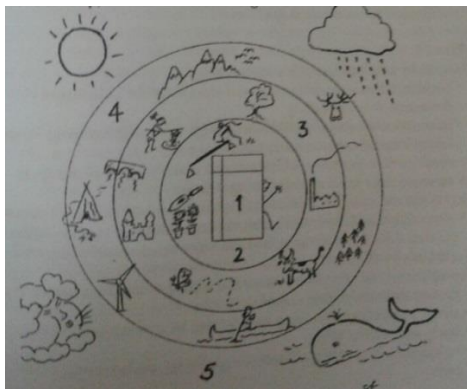


Figure 2. Learning Environment

The figure shows that outdoor learning environment starts from the students and school where 1) students and experience inside of the class; 2) surrounding environment of schools on how they can use their ability to develop the environment; 3) local environment for widening the scale of outdoor learning; 4) wider environment for chances and challenges of the outdoor learning; and 5) global environment/ the universe as the chance for students to use their knowledge, behavior, and skills 1 until the environment number 4.

Based on the preview of curriculum and the opinion of experts, Wijayanti & Munandar(2012) research entitled "The Attempts of Helping Elementary Students' Difficulty in Implementing the Planning and Execution of Science based on Processing Standard Based on Outdoor Learning in SD Negeri Percobaan 1 and SDIT Salman Al Farisi 2 Ngemplak Yogyakarta" conclude that outdoor learning can be portrayed as follows:

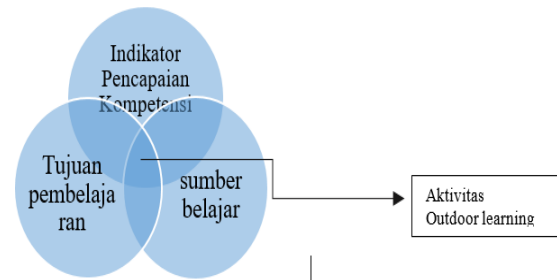


Figure 3. The development of outdoor learning

The development of outdoor learning which has the indicators of competences, learning purposes, and learning sources should be arranged in lesson plan arrangement based on outdoor learning. It is explained as follows:

Competence indicator fulfillment is the sign of basic competence reaching signed by the change of behavior measured by attitudes, knowledge, and skills. The indicators are developed based on the students' characteristics, subjects, education unit, local potential, and formulated in measured operational word which can be observed including knowledge, attitudes, and skills. Indicators are used as the basis of arranging scoring tools. These things are started from the easiest part to the difficult ones, simple to complex, near to far, and concrete to abstract. For instance, the reaching of competence for students in the VI grade is the learning main materials: The specific relation of plants (cactus and lotus) to the environment around based on these details: a) Describing the unique characteristics of lotus and cactus; b) Proving the unique characteristics of lotus and cactus; and c) explaining examples of the unique characteristics of lotus and cactus to their environment.

Learning purposes draws the process and learning result which is wanted to be achieved by the students based on the basic competence. The learning purpose becomes: a) through the observation of outdoor learning, the students will be able to explain unique characteristics of lotus and cactus; b) through the observation of outdoor learning, students can show the unique characteristics of lotus and cactus; d) through the discussion of observation from outdoor learning, students can differentiate between unique characteristics of lotus and cactus; and e) through the discussion of observation from outdoor learning, students can identify and describe the relation between the unique

characteristics of lotus and cactus to their environment.

Learning sources is the reference, object and/or the materials used for the learning process through printed or electronic media, interviewee, physical environment, nature, social condition, and culture. The way to determine the sources are based on the basic competence, standard of competence, the main materials, learning activities, and competence's indicator. Learning sources can be obtained by using lotus and cactuses from the field of the school.

According to Machin (2014) the scientific approach invites students directly to the problems that exist in the form of problem formulation and hypothesis, a sense of care for the environment, curiosity and likes to read. Astuti & Setiawan (2013: 90) state that students' worksheets from the teachers can be an alternative strategy of innovative, constructive, and centered learning from the students focusing on the reaching of competences. The steps of implementing outdoor learning using environment can be done according to these following steps:

1. Analyzing the standard of the contents competence standard and basic competence referred to the passing competence for developing the main materials.
2. Developing syllabus for developing learning activities.
3. Analyzing materials by referring some book sources to decide the passing competence goals.
4. Describing the main materials which become the essential materials in the forms of facts, concepts, principles, and procedures which can be developed or build for the environment.
5. Developing the competence indicator goals by using operational verbs/words starting from memorizing to elaborating purposes.
6. Based on the analysis of facts' essential materials' analysis, principle concepts, and the procedures to develop students' activities or experience through outdoor learning.
7. Developing lesson plans through several methods and learning model like what has been done by Paikem, contextual learning, and cooperative learning.
8. Making several assessment based on class scoring to measure the success of products, learning process, or students attitude and exercise assessments.

9. Doing the learning process based on the planning and notes the weakness to the evaluation.

In order to execute the outdoor learning well, there should be an analysis of curriculum in developing the lesson plan with this learning model. By doing this, teachers should be able to understand and master the steps of developing lesson plan from the elaboration of curriculum, including the passing competence, standards of contents, processing standards, and scoring standards, so, the outdoor learning can be executed systematically based on the running curriculum. The outdoor learning also insists the teachers to master the implementation of processing standards, scientific approach, and processing skills in implementing the inquiry learning as the demand from the curriculum. The implementation of outdoor learning can be applied of the relevant Basic Competence-Standard of Competence to the learning sources outside of the school environment.

CONCLUSION

The surrounding environment can be used for the science learning process or the other ones. The outdoor learning can make teachers create an active and creative learning condition which can develop students thinking ability, processing skills, and scientific attitudes. Students can find themselves the knowledge of the learning materials by actively asking with direct interaction to the environment through scientific approach. Through the optimization of scientific approach with outdoor learning, it is hoped that it can provide alternative ways in learning science. So, teachers can teach the students how to be scientific learners and use their knowledge to solve scientific problems around them.

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