

MEDIA EXHIBITION IN THE BIOLOGICAL LEARNING PROCESS TO IMPROVE THE SCIENTIFIC SKILLS, CREATIVITY AND INNOVATION

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Abstract

Biology has developed very rapidly in the XXI century and affect various aspects of human life. The biological progress from time to time growing in terms biofunction, biodevelopment, bioenvironment, biotechnology, biomanagement and bioethic, which also carries a different direction of the biology education. Therefore, it is not wrong Naisbitt and Aburdene opinion of the XXI century as the century of biology. Change the position of biology is clearly a challenge for biologists and biology educators. To address these challenges, need to be prepared prospective teachers who excel and be able to compete , to have science process skills and innovative and creativity. Learning science especially biology are less likely to develop process skills, as a result of students being passive, boring and became less interested to learn in the end. Therefore, it is necessary for innovative efforts in order to study biology can go further to provide opportunities for students to be able to do science process skills. Media exhibition in learning biology is a public event that showcases real and student performance. The activity aims to apply science - biology products (concepts of biology, the process of science, (science process skills), as well as the scientific attitude. Through this exhibition is expected to develop various aspects of independence, creativity and innovative, producing and communicating the real work. From the study above, the idea of the exhibition media in learning biology is a focus on the exposure of this article.

Key Words: *scientific process skills, creativity, innovation, media exhibition, biology learning*

I. Introduction

Biology has been progressed over time evolves from biofunction, biodevelopment, bioenvironment, biotechnology, biomanagement and bioethics. Biology has developed very rapidly in the XXI century and affect various aspects of human life. Naisbitt and Aburdene (1990) mentioned that the XXI century as the century of biology. Changes in the carrying direction of biological approach should be used in preparing the Indonesian people, who will come superior and able to compete in terms of physical, emotional and thinking. The change is clearly challenge for biologists and biology educators.

Biology is part of science and it is an applied science. There are three aspects in it: the science processes, the science products and the science attitudes. As a consequence a little bit different of how to learn and to teach from other disciplines. Biology teachers need to design and implement learning that allows students to actively carry out the process of science. Djohar (2012) informed that biology

teacher should be able to create opportunities and conditions which allow students to interact with a variety of learning objects as sources of knowledge. Ideally science process skills are present in every learning biology. It is an evident from that the student achievements of scientific process skill in biology is low, both in the national and international level competitions. Data from PISA (Programme for International Student Assessment), showed that 61.6% of Indonesian students have very limited knowledge of science, 27.5% has the ability to do simple research, 9.5% has the ability to identify scientific issues, and only 1.4% capable of utilizing science to daily life (Suciati, 2011). Frequency of utilization of research and science in biology learning device is not optimal, which only reached 51.04% (Fauziyah, 2001). Results of interviews and observations from PPL students in several schools in Jember, showing a minimum used of media (props) in learning biology. Thus, improving the science process skills which are more innovative and creative should be done. The way to do so are by the development of instructional media biology and using more creative and innovative through the manufacture of biological media.

Media exhibition used in learning biology exposed for public is important to show the real work of students, especially their ability of science skills, creativity and innovation. Through media exhibition, students are given the opportunity to design media that will be developed through modification procedures, simplification or manipulation. The activities carried out in groups and independently under the supervision of lecturers. Media exhibition visitors are students, biology teachers and their students. Through media exhibition, students are expected to express their potential freely. The assessment may include cognitive, affective and psychomotor. The exhibition media aims to: 1) Develop students' academic ability to understanding the concepts of biology as a product, 2) Develop skills of the student science such as designing media, create media innovation and communicate the work of the media, and 3) Develop a scientific attitude such as cooperation, confidence , and others.

Based on the description above, the exhibition media can be used as an alternative solution to the low development of science process skills in learning biology and also equip students to be more creative and innovative. So the focus of

this article entitled “*Media Exhibition in The Biological Learning Process to Improve The Scientific Skills, Creativity and Innovation*”.

II. Method

Describe about the scientific skills in biological learning, the use of media (props biology) in the biological learning, innovation and creativity in developing biology learning media, as well as the implementation of media exhibition in biological learning.

III. Result and Discussion

Scientific Skills in Biology Learning Process

The process of science leads to a series of logical steps performed by scientists when he wants to answer their curiosity about nature, when he wants to acquire scientific solutions to problems that it faces. Observation, problem identification, hypothesis formulation, conduct experiments, recording and processing of data, testing truth, and draw a conclusion is an element example an of the science process that is often done by scientists in the experiment (Carin & Sund, 1989; J. Jinks, 1997) Through the steps of the science process, will obtain a certain amount of knowledge as a science product.

Hardy and Fler (1996) understand science in a broader perspective. According to the scientists, science has several meanings and functions, which include: 1) Science as a collection of knowledge (body of knowledge), 2) Science as a process, 3) Science as a set of values, and 4) Science as a way to know the world. Science as a set of values, Hardy and Fler (1996) emphasizes the aspects of scientific value inherent in science. This includes the value of honesty, curiosity, and openness during and after a person perform the processes of science. Einstein (1940) has a very firm opinion about the science, science is the attempt to make the chaotic diversity of our sense experience correspond to a logically uniform system of thought. This physics expert opinion can be interpreted that science is a form of effort / activity that allows from a variety of sensory experience capable of forming a system of thought or mindset that is rationally uniform. The mindset is known as the scientific thought.

Science process skills are aspects of intellectual activity that is practiced by scientists in solving the problem and determine the products of science. Science process skills is also defined as the ability or skills to carry out an act in the science of learning, resulting in concepts, theories, principles, laws, and scientific facts (Mundilarto, 2002). Science process skills is learning-oriented approach to the process of natural sciences which is a translation of the scientific method, as well as process skills that include thinking skills or intellectual skills that can be learned and developed by students through the learning process in class and outside of class. Process skills can be classified into two. First, the basic science process skills which is scientific activities that include: 1) observe (observation) is looking for a picture or information about the object of research through the senses; 2) communicate the results of observations of data in various forms such as: images, charts, tables, graphs, text, etc .; 3) characterize (classification) for ease in identifying a problem; 4) interpret the data, which gives the sense of something phenomena/events based on other events; 5) forecast, the estimated incidence based on previous events and the laws that apply. Forecasts can be divided into two kinds, intrapolation forecasts that forecasts based on the data that has happened and extrapolation forecasts that forecasts based on the logical beyond the data involved; 6) ask a question, a question that demands an answer through thought processes or activities.

Second, the integrated science process skills which consists of: 1) identify the variable; 2) describe the relationship between variables; 3) conduct investigations; 4) analyze data on the investigation; 5) formulate hypotheses; 6) operationally defining variables, conduct experiments. Basic science process skills and integrated the above, ideally integrated in each learning biology.

Through the process or steps of science that is, a (subject of study) were able to build "a set of" scientific attitude which include curiosity, persistence, thoroughness, honesty, openness, in addition to numerous scientific skills such as the ability to measure, abstraction, using symbols, calculate, organize, etc resulting in a wide range of knowledge. The attitude of science that is part of building character, at least cannot be cultivated and even strengthened the impacts of their study science; as nurturant effect. Meaning nurturant effect probably not very precise, but as an illustration, because students often facilitated to observe correctly,

then the next he finds or knows something is observed, then the students also formed the attitude of careful, thorough, and honest result trained to work closely and regularly. In this case, careful, thorough, and honest is the impact or effect nurturant.

Creative and Innovative Media Through Development Learning Biology

Thought towards technological innovation learning biology and biology instructional media needs to be done. Development of biological media can be done through: 1) Modification: Change the composition, shape or function of media adapted to new needs, 2) Simplification: Simplify array of media without changing the function and 3) Manipulation: Deviating tool or media from its function to be adjusted to new needs.

Step modification, simplification and manipulation of media learning: 1) Pay attention to the function of the tool, 2) Pay attention to the arrangement of the tools, 3) Learn how or mechanism of action of the tool, 4) Identify the basic principles of science that underlie how the tool works, 5) Pay attention to opportunities appliance parts which can be modified, simplified and manipulated, 6) Perform design and 7) Develop a set of tools and test it.

Media development procedures: 1) Analyze the needs and characteristics of students, 2) Formulate instructional goals, 3) Formulate particles of matter in detail that supports the achievement of goals, 4) Develop tools for measuring success and 5) Conduct tests and revisions.

Criteria for media development: 1) Be able to simplify the process, 2) Be able to visualize things that are abstract, 3) Low costs from the environment materials around us (the principle of benefit, for students to give examples to utilize thrift or creative thinking), 4) Easy to be assembled and used by individual students or groups and 5) Use of materials with low costs .

Media Exhibition Activities in The Biological Learning Process

Exhibition biology learning media is a public event featuring the work of a real student from major biology education. The characteristics of these activities is the involvement of the general public (biology teachers, high school students and students from various faculties) to jointly express biological sciences from various

viewpoints. In addition, to promote and unearth the biological sciences to the public and inspire people directly with the biological sciences as well as their implications.

Through this media exhibition, occurs scientific dialogue between the presenter (students) and the general public who viewed the exhibition, it is possible to occur scientific debate about the concepts of biology and its application in the process of learning from daily life. The exhibition will inspire visitors about learning of biological media. Indirectly, this exhibition will bring changes in the learning environment, consultation, public and others.

Exhibition media can be a place in developing science process skills. This exhibition is a scientific activity that packaged in a public event, also it can improve science process skills because students will be directly involved in the activities of both groups and individuals. Students as a presenter in the exhibition, will make the process of science to be able to present the work of a real media and can be understood by the public. In its activities, the students are required to prepare, observe, analyze, conclude independently, to create a real work who are eligible to be shown to the public. Students applying a biological concept which has been obtained from the study that has been done previously designed the work of a real media.

Through the activities of media exhibition, it is expected to appear a lot of developing ideas for the media displayed by the students. The emergence of media development ideas of students will definitely improve process skills, and may increase the percentage of students who have the ability to identify scientific issues and be able to improve the utilization of science for daily life. Increased student science process skills into early stage in the achievement of scientific attitude in learning, especially biology. Thus, biological learning can meet essentially as a science in every learning component. The final result obtained generation that could compete in the international level. Many of the benefits derived from improved science process skills through media exhibition activities. Achievement in various aspects in particular that relate directly to the nature of biology as a branch of science is able to indicate successful learning biology. Media exhibition activities can be realized in order to improve science process skills, especially the successful of learning biology.

Implementation of Media Exhibition in The Biological Learning Process

Media exhibition in biological learning can be done outside of class but still an integral activity in biological learning. Thus, in designing these activities lecturers do not need to add or reduce the allocation of a specified time, but simply adjust the existing indicators in the lesson plan. In detail, the steps that can be done by the lecturers and students in designing media exhibition activities are: 1) Lecturer with students select and define the concepts of biology that are appropriate to be developed as shown in the media based on the media exhibition Competency Standards (CS) and the Basic Competency (BC) and indicators of learning that has been set in the lesson plan, 2) Grouping students in pairs based on its potential and share their duties according to biological materials that will be on display, 3) Guiding students create a draft design of media that will be presented in the exhibition, 4) Students presented the draft design proposal of media development, 5) Lecturer along with students criticize and advise improvements media design plans, 6) Students create media that will be exhibited, 7) Students presenting media that is already finished, 8) Students formed media exhibition committee, 9) Determining the time of the exhibition, 10) Announcing the media exhibition, 11) Inviting various parties among others, biology teachers and students as well as students from various faculties, 12) Develop assessment instruments to the students' work displayed at exhibitions media. Assessment is done by lecturers and visitors in attendance.

IV. Conclusion

Based on the study above conclusion can be formulated as follows: 1) Biological media exhibition can be used as one of the models of activities that can develop science process skills of students especially in biological learning, 2) Students understand biological media development procedures either modification, simplification and manipulation, 3) Students become more creative and innovative in media development, 4) Another advantage gained is: a) the activity of biological media exhibition in the faculty will support the achievement in particular various aspects that relate directly to the nature of biology as a branch of science, b) biological media exhibition activity helps students to pour scientific ideas freely, c) biological media exhibition activities make learning not only done in the classroom,

but can be done outside the classroom, d) the exhibition media can establish academic cooperation with various parties, as well as a promotional tool for the department of biology education.

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