

Need Analysis on SETS (Science, Environment, Technology and Society)-Based Practice Guidance Development for Semester II of X Grade of Senior High School

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Abstract— Purpose of the research was to reveal, analyze, describe and explain reality about the need for developing SETS (Science, Environment, Technology, Society)-based Biology practice guidance. It was a descriptive research by using qualitative approach. It was conducted in SMAN 4 Padang. Based on data analysis, results of this preliminary research are: First, practice guidance used in school has not been arranged systematically. It is still in form of students worksheets. Second, it does not have complete components, such as cover and supporting materials. Third, it is not valid, practical and effective. Fourth, it does not implement learning approach and model to improve students' motivation and skills. Fifth, SETS (Science, Environment, Technology, Society)-based Biology learning materials is not available. Sixth, which is expected to be able to train students' integrative skill in four components (Science, Environment, Technology, Society) has not been optimally trained.

Keywords - *Need Analysis, Development, Practice Guidance, SETS (Science, Environment, Technology, and Society), Students*

I. INTRODUCTION

Educational success is influenced by changes and innovations in all components of it. The components which influence education include curriculum, facilities, learning materials, teachers, students, and appropriate learning model in learning process. All components are interrelated in supporting educational purpose achievement [4]. In implementing of the 2013 Curriculum, especially in Biology learning, it is expected that it can lead scientific thinking skills because Biology, essentially, is technology products, processes, and attitudes.

One of important activities in learning process is practice activity. Practice is an activity to establish applicative learning materials [8]. The practice activity can gain more experiences, develop scientific attitudes, improve students' memories on learning materials they practice. It is in line with Lufri, who states that one advantage of practice learning method is students have direct experiences in an activity [7].

Formally, practice has been a component of Biology learning. However, application of practice is not optimal to achieve learning objectives. There are some problems which constrain practice activity. According to Simamora, the problems are facilities in Biology laboratory are inadequate, there is no practice guidance, there is no clear practice schedule, teachers' skills in practice are low and there is no laboratory staff [11]. Beside that, according to Anggriyani, the problems are practice facilities are not complete, there is no practice guidance available, students' difficulty in concluding results of practice, and inadequate time of practice [2].

The use of practice guidance can facilitate students to work together in doing practice systematically. According to Hofstein, et al., in doing practice, it needs instructions from teacher and a guidance which can be used in order to make practice activity goes well and to achieve learning objective [5]. Based on the problems above, it needs an effort to overcome them in doing practice. One of the efforts is by arranging practice guidance systematically.

Teachers are expected to make more innovative learning process in order to encourage students to learn optimally to increase their learning outcomes. In this research, it gives an innovation by integrating SETS (Science, Environment, Technology, Society) learning model in learning process. According to Prastowo, learning through SETS model is an integrative learning which is expected to make students have integrative skills in four components, which are science, environment, technology, and society [10]. It is supported by Lee and Erdogan, who state that SETS learning gives positive effects on scientific attitudes and improves students' creative and critical thinking skills [6]. Students can understand science and its effects on environment, technology, and society [3].

Based on the background of the problem above, it could be concluded that a preliminary research to develop SETS based practice guidance needed to be conducted. Purposes of this research were to describe the compatibility of core competence (KI) and basic competence (KD) of Biology learning in the 2013 Curriculum in semester II of X grade of Senior High School, to describe characteristics of practice guidance needed by teachers and students as guidance in learning process, to explain students' characteristics as users of developed product, and to know characteristics of practice guidance used in learning process.

II. RESEARCH METHOD

It was a descriptive research in order to know the need for developing SETS (Science, Environment, Technology, Society)-based Biology practice guidance for semester II of X grade of Senior High School. It was conducted in Faculty of Mathematics and Natural Science (FMIPA) of State University of Padang (UNP) and SMAN 4 Padang. There were some steps done in the research. They are as follows:

1. Curriculum Analysis

This Analysis is conducted in order to determine sequences and scopes of learning materials which are needed appropriate with the existed core competence. Beside that, it was to analyze the demands of learning outcomes described in Biology learning process. It was as a basis for formulating practice activities and developing practice guidance in learning process.

2. Problem and Need Analyses

These Analyses are conducted in order to collect information about problems in Biology learning process. In addition, it was to analyze practice guidance characteristics which are needed by teachers and liked by students. In this analysis, interviews were done to get as much as the needed information. The result of this analysis was used as consideration in designing and developing the Biology practice guidance.

3. Students Analysis

This Analysis is conducted in order to know students' needs in using the developed practice guidance. Activities done in this step were interview with students. Then, they also fulfill questionnaire about practice guidance. The result of this analysis was used as guidance in developing the Biology practice guidance.

4. Practice Guidance Analysis

This Analysis is conducted in order to know problems in practice guidance currently used in school. The problems might be compatibility between competences and objectives of practice, components in the practice guidance, and appropriate model in practice activity. The result of this analysis was used as important guidance in developing the Biology practice guidance.

Data were collected by using precise instruments and analyzed by using descriptive statistical analysis technique.

Descriptive statistic is to describe and illustrate the object of research through data of sample or population. It can be done without doing analysis and drawing the generally valid conclusion. Ada beberapa data yang menyediakan statistik deskriptif yang dapat digunakan seperti tabel dan grafik [13].

III. FINDINGS AND DISCUSSION

1. Curriculum Analysis

Curriculum Analysis is focused on Core Competence (KI) and Basic Competence (KD) analyses in Content Standard of Biology. The purpose is to produce practice guidance which refers to the used curriculum and to fulfill the set competence. Furthermore, it is also as guidance in developing SETS (Science, Environment, Technology, and Society)- based Biology practice guidance for semester II in grade X of Senior High School.

Based on the result of curriculum analysis, practice activities in the developed practice guidance are related to cognitive and psychomotor competences. The cognitive competence is all learning materials in semester II of X grade, such as: plantae, animalia, ecology, and environmental changes. In learning in these materials, practice should be done in order to improve students' understanding on the theories which are being learned. Therefore, it needs to develop more systematical practice guidance and integrate with SETS learning model so that students can do practice activities well and adapt to science development, environmental, technology and social changes.

2. Problem and Need Analyses

Problem and need analyses are done to know problems faced by teachers and students in Biology learning process and what changes should be done to overcome the problems. The Biology learning is more focused on practice activities. Data of problem and need analyses were obtained from interview done to teacher in SMAN 4 Padang and questionnaire administered to some X grade students of SMAN 4 Padang.

Based on the interview done on July 30th, 2018 to Mrs. Wilda Gusyarni, S.Pd as a teacher in SMAN 4 Padang, it is known that there is no systematically arranged Biology practice guidance in the school. In addition, teacher uses student worksheets in practice activities. Teacher also reveals that sources of practice worksheets are from Biology textbook and internet. Students only follow procedures in

the practice worksheets. Consequently, it gives less opportunity for them to involve actively and their skill in doing practice cannot improve.

Based on the interview with teachers, it is known that they want systematically arranged practice guidance and it can support theories which are learned in Biology learning process. Furthermore, it should have interesting appearance, pictures and illustrations. In addition, it should also have clear work process and can develop students' thinking skill.

Moreover, based on interview and questionnaire done to 27 students on August 20th, 2018, it is known that 96% of students like Biology practice activity, 88% of students state that they do not have systematically arranged Biology practice guidance, 86% of students say that worksheets used in learning process do not have interesting color combination, 100% of students state that they can deepen their knowledge after doing Biology practice, and 100% of students say that Biology practice guidance that is used needs to develop.

3. Students Analysis

Subjects in this research were X grade students of SMAN 4 Padang. SETS (Science, Environment, Technology, Society)-based Biology practice guidance is for senior high school students, who are in ages of 16-18 year old. Based on learning theory, proposed by Piaget (1980), children in the ages of 11-18 year old are in formal operational stage. In this stage, they can think abstractly, logically, draw conclusion, interpret, and develop hypotheses. So, it can be concluded that they can think and make important decision about problems in society and take action related to the decision they have made.

According to Sugiarto, SETS learning can train students about the way to face problems in society. Beside that, learning through this model can help them to understand science and its development, and effects of science development on environment, technology and society reciprocally [12]. The positive effects of SETS are it can improve students' critical thinking skill and they will be creative in making decision related to science and daily life contexts [1].

4. Practice Guidance Analysis

Overall, the result of practice guidance analysis reveals that currently practice guidance used in school is student worksheets. It is a combination of worksheets for theory

learning and practice activities. Based on analysis, it is known that there is no learning material, no supporting concepts, no components (preface, table of content, laboratory safety rules and guidelines) in practice sheets. Next, it does not have interesting colors and supporting pictures or illustrations. Moreover, it does not integrate learning approach and model as an innovation to improve scientific skills.

IV. CONCLUSION

Based on the result of data analysis and preliminary research, it can be concluded that: First, practice guidance used in school has not been arranged systematically and it is still in form of students worksheets. Second, it does not have complete components, such as cover and supporting materials. Third, it is not valid, practical and effective. Fourth, it does not implement learning approach and model to improve students' motivation and skills. Fifth, SETS (Science, Environment, Technology, Society)-based Biology learning materials is not available. Sixth, integrated learning which is expected to be able to train students' integrative skill in four components (Science, Environment, Technology, Society) has not been optimally trained.

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