Need analysis of to development guide-module based on inquiry in respiratory and excretion topics for students of class XI senior high school

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Abstract. Biology as a science learning essentially consists of products, processes, and attitudes that require students to invent and solve the problems. Learning science is a process of knowledge construction through the thinking activities of learners. In this situation, students are given the opportunity to develop their knowledge independently through an investigation activity. According to the 2013 curriculum, it is recommended that some of the learning models are the inquiry learning model. This inquiry model is designed to guide students directly into the scientific process through exercises that emphasize the scientific process. This study aims to determine the needs of students on the development of guide module based on inquiry for senior high school students. This research is a descriptively. The subjects were thirty students of Class XI and a teacher of Biology SMAN 7 Padang. Data collection used descriptively to book analysis instruments, curriculum analysis instruments, and interview guides. The results showed that (1) Handling teaching materials for students focus on science as a product, presentation of material has not directed students to be involved in finding knowledge, (2) Presentation of material on the students' instructional materials has not been based on one of the recommended learning models in the 2013 curriculum, (3) Handling instructional materials for students have not been able to motivate students to learn, the pictures in the material presentation appear unclear and incomplete information, (4) The presentation of the material on the students' teaching materials is not systematic and directed, (5) The respiratory system material and excretion require an investigation or observation of the concept of the material being studied.

1. Introduction
The 2013 curriculum was developed to change the mindset of students in the learning process that was originally as a user or memorizer to be the inventor and owner of knowledge. The implementation of learning in the 2013 Curriculum, especially Biology learning requires students to build their own knowledge. Students are seen as subjects who have the ability to search, process, construct, and use their knowledge actively, so that learning must provide opportunities for students to form knowledge in their cognitive processes [9].

Biology as a science learning essentially consists of products, processes and scientific attitudes [14]. Biology learning in schools should not only prioritize students' mastery of facts, concepts, principles, and scientific theories, but students are required to gain experience by conducting scientific investigative activities to enable them to discover these facts, concepts and principles.
Science learning is nothing but a process of constructing knowledge (science) through students' thinking activities. In this situation, students are given the opportunity to develop their knowledge independently through a communication process that connects the initial knowledge they have with the knowledge they will find. Therefore, science should be studied in ways that enable the development of thinking skills in solving real problems.

Based on the author's interview with the Biology teacher and the author's analysis of the teaching material of the eleventh grade students of the high school, the following results were obtained. First, the teaching materials used by students are in the form of private published textbooks and LKS that are lent by schools. The results of the questionnaire showed that as many as 64% of students stated that they learned from borrowed textbooks in the library, 11% of students had their own teaching materials purchased and 29% of students did not have any teaching materials.

The teaching materials used by these students focus on science seins as products. The material presented has not directed students to be involved in finding knowledge. Secondly, the presentation of the material on the students' handout materials has not been based on one of the recommended learning models in the 2013 curriculum.

Third, the instructional materials used by students are less attractive so that they cannot motivate them to learn, the pictures in the material presentation appear less clear, and incomplete information. The results of the questionnaire showed that 36% of students stated that the teaching materials they used were not attractive, 21% were normal, and 32% of students expressed interest.

Fourth, the presentation of material on the students' handout material has not been systematic and directed, and the evaluation is only found at the end of the overall material topic so that students cannot assess the extent of their understanding of the material that has been studied. With this condition, it can have an impact on the poor understanding of the concepts and processes of science of students' learners.

Teaching and learning activities can run effectively and efficiently if quality teaching materials are available. Teaching materials that are designed in a complete and interesting way will affect the learning atmosphere, so that students are more motivated to learn. With these teaching materials students can learn things needed in an effort to achieve learning goals, for example in the form of knowledge, skills, attitudes and other experiences [6]. One of the teaching materials that can be used when teaching and learning is a module.

2. Methods
This research use descriptive research. Descriptive research is a kind of method to describe and interpret the object as real. Several steps acquired as follows:

2.1. Problem and Need Analysis
At this stage, information is collected about the problems contained in the biology learning process and determine the characteristics of the book needed by the teacher and students as teaching material. Information gathering is done through interviews with teachers and students using the interview guidelines sheet. The results of this problem and needs analysis are taken into consideration in the design and development of products in the form of guided inquiry-based modules.

2.2. Curriculum Analysis
At this stage, the curriculum analysis focuses on the core competencies and basic competencies that have been established in the content standards in biology learning. The results are used as a basis for formulating indicators and learning objectives and concepts needed in learning activities [8]; [17].

The analysis was carried out to produce indicators and learning learning objectives as outlined in the digestive and respiratory system material to fulfill the 2013 curriculum demands. The author carried out this process to become the basis for formulating guided inquiry-based module material studies.
2.3. Concept Analysis

Concept analysis is carried out to identify, detail, and systematically compile the concepts needed and serve as references in the development of guided inquiry-based modules. Activities that will be carried out at this stage are determining the main material, supporting material and determining problem solving. The results of this concept analysis will be used as a reference in product development in the form of guided inquiry-based modules.

2.4. Student Analysis

Student analysis is carried out to test the character of students who are the target users of the product to be developed. Activities carried out at this stage are interviews with teachers of SMAN 7 Padang. This analysis includes age, academic ability (cognitive, affective, and psychomotor), and motivation for the use of textbooks so that the modules produced are in accordance with the characteristics of students.

Data consists of qualitative data. Qualitative data is obtained from observation with students and interviews with teachers [16]. Data collected through the right instruments are being analyzed using certain analytical techniques. The analysis technique used in this study is descriptive statistical analysis. Descriptive statistics are statistics to describe or provide illustrations to objects that are examined through sample or population data. Descriptive statistics can be done without analyzing and making conclusions that can apply to the public [12].

3. Results and Discussion

3.1. Problem and Need Analysis

Based on the author's interview with the Biology teacher and the author's analysis of the teaching material of the eleventh grade students of the high school, the following results were obtained. First, the teaching materials used by students are in the form of private published textbooks and LKS that are lent by schools. The results of the questionnaire showed that as many as 64% of students stated that they learned from borrowed textbooks in the library, 11% of students had their own teaching materials purchased and 29% of students did not have any teaching materials.

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This guided inquiry-based module is considered effective for learning in respiratory system material and excretion due to various reasons. Among them is being able to overcome time constraints, train students to think scientifically, respiratory system material and excretion requires an investigation or observation of the concept of the material being studied, forming a student-centered classroom environment, enhancing student science processes, creating a learning atmosphere in accordance with the demands of the curriculum 2013, creating learning resources in accordance with the demands of Basic Competencies (KD) in the 2013 Curriculum, training students to do their own evaluation and reflection on the knowledge gained.
Based on the problems that have been revealed, the researcher believes that the module is the most appropriate learning resource because it can be used independently by students with minimal assistance from the teacher. In addition, using a module can make students more reflective and able to evaluate the learning process in stages independently. This was confirmed by [1] who revealed that learning using modules can guide students to learn according to their own speed and ability.

3.2. Curriculum Analysis

Curriculum analysis done by looking at what is taught and the core competencies and learning outcomes that should be owned by learners [13]. This analysis aims to adjust the learning indicators and objectives in accordance with the 2013 Curriculum Demands. The guided inquiry-based modules are compiled covering two material namely K.D 3.8 and K.D 3.9. The K.D includes respiratory system material and an excretion system in humans.

The right analysis results can help the writer to compile the material in the guided inquiry based module that is in accordance with the Indicators and learning objectives. Module materials that are compiled with the achievement of the 2013 curriculum can improve the feasibility of modules for students to use.

The 2013 curriculum advocates learning models that use a scientific approach. Inquiry learning model is one of the recommended learning models in the 2013 curriculum [9]. Guided inquiry learning model requires students to find their own concepts through an investigation activity and can guide students directly into the scientific process. The aim of using guided inquiry is to develop the ability to think systematically, logically, critically, develop science process skills, and students' scientific literacy. [2] explains that inquiry learning can improve the mastery of concepts and science process skills of students.

Guided inquiry learning enables students to have the opportunity to broaden their knowledge and help them develop conceptual understanding [3]; [11]; [15]. In guided inquiry learning, the teacher does not just let go of the activities carried out by students. The teacher will provide guidance and guidance to students in conducting investigative activities. With teacher guidance, students can concentrate on building new knowledge and benefiting each stage of the investigation process [10].

In this research, the module used contains the syntax of inquiry from the [7] and [9]. The syntax of inquiry used in accordance with the scientific method that includes the orientation stage, formulating hypotheses, collecting data, testing hypotheses, and formulating conclusions.

Concept Analysis

Concept analysis is the identification of the main concepts Biological material class XI material for the respiratory and digestive systems. Researcher set the main concepts that will be taught systematically and order material and subject matter so that understood by students. After identifying the concept material, formulating learning objectives based on learning indicators that are in accordance with the 2013 curriculum.

The most important goal of learning science is to improve students' understanding of the concept of science. The concept of science is identified as scientific data, scientific attitudes, and information gathering. The most important thing from the concept of science is how to collect scientific information and methods. The way to collect scientific data is a technical process. Thus, students must have the ability to find knowledge using scientific methods. Inquiry-based learning emphasizes investigative activities and analyzes scientific questions. Learning also emphasizes the use of many process skills, such as manipulation, cognitive, procedural [5].

3.3. Student Analysis

The subjects used in this study were Biology students of class IX SMAN 7 Padang. An inquiry-based module to be developed designed for high school students aged 16-18 years. Based on Piaget's (1980) study theory that children at age aged 11-18 years are in the formal operational phase. This phase student has been able to think abstractly, logically, draw conclusions, interpret and develop
hypothesis. The results of this analysis become the assumption that high school class XI students who belong to that age are able to do learning with a guided inquiry model.

Students grade XI Senior High School includes the belonging ages able to apply the aspect inquiry. Science examination that using approach of students’ centered has a lot of beneficial, which is mean students do not only do experiment regularly but actually the students think about the outcome that they have collected and meaning of that outcome. When they are in practical, students tend to say that they get the mistake experiment when they get vice versa result or different from what they’ve expect. In the learning of process based, student never mistake when they get insufficient result, but student should evaluate positive and negative from the result they’ve collected [4].

Guide inquiry module involves cognitive/intellectual, manual and social skills. Cognitive or intellectual skill through guide inquiry will be applied when student uses their mind, manual skill involve in using tool and material, measurement, organizing and constructing tools. Social skills through guide inquiry will be applied students interact each other in the process of teaching learning in the group. Cognitive development has tight relation with model guide inquiry.

4. Conclusion
From data analysis that has been conducted, preliminary research result can be stated: first, Handling teaching materials for students focus on science as a product, presentation of material has not directed students to be involved in finding knowledge. Secondly, Presentation of material on the students’ instructional materials has not been based on one of the recommended learning models in the 2013 curriculum. Thirdly, Handling instructional materials for students have not been able to motivate students to learn, the pictures in the material presentation appear unclear and incomplete information. Fourth, The presentation of the material on the students’ teaching materials is not systematic and directed. Fifth, The respiratory system material and excretion require an investigation or observation of the concept of the material being studied.

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