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Need Analysis Development of Guided Inquiry Based Learning Module in Plantae and Animalia Learning Materials for Student of Senior High School Grade X

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Abstract. The 2013 Curriculum has basic view that knowledge cannot be just transferred from teacher to students. Learning should give opportunity to students to construct knowledge in their cognitive process. Guided inquiry based learning model is one of recommended model in the 2013 Curriculum. Through guided inquiry based learning module, students are facilitated to discover knowledge by themselves. Purpose of the research was to determine and analyze students' needs about development of guided inquiry based learning module for X grade Senior High School students. Subjects of the research were 92 students and three Biology teachers in grade X of SMAN 7 Padang, SMAN 8 Padang and SMAN 12 Padang. Data were collected by using interview guides, students' need analysis questionnaire, instruments of curriculum analysis and instruments of learning material analysis. Findings show that (1) learning materials used by students focus on science as a product, not on process. Material presentation do not lead students to actively involved in discovery learning; (2) material presentation is not based on one of learning models recommended by the 2013 Curriculum;(3) material presentation cannot motivate students in learning because it is not colorful, pictures are not clear, and examples are not familiar for students; and (4) material presentation is not systematic and not appropriate with demands of basic competence in the 2013 Curriculum.

Keywords - Learning Module, Guided Inquiry.

I. INTRODUCTION

Education is a conscious and planned effort to realize learning atmosphere and process to make students develop their potency and competence actively. Besides that, education is an empowerment process through learning process, training process, experience process, or other activities [14]. To reach the purpose of education, a design which determines learning activities and atmosphere is arranged. According to Indonesian Government Regulation No. 32 year 2013 about National Standard of Education (Chapter I article 1 section 16), the curriculum is a set of plans and arrangement about purpose, content, materials and method as a guidance of learning implementation to reach a specific education purpose[11].

The 2013 Curriculum has basic view that knowledge cannot just be transferred from teacher to students. Students are subjects who have ability to find, process, construct, and use knowledge actively. In order to understand and able to implement knowledge, they need to be encouraged to solve problems, find anything for themselves, and try to realize their ideas [9].

Learning process in the 2013 Curriculum uses scientific approach or science process based approach. It is mentioned that learning process consists of five primary stages, which are: observing, asking, collecting information (reasoning), associating (creating), and communicating. These stages are known as scientific approach [10]. Therefore, guided inquiry based learning should be used to

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implement this approach in learning process.

Through the inquiry model, learning is more useful, especially learning sciences. Basically, Biology as one of sciences contains concepts, facts, principles, theories and procedures which should be understood by students through active involvement in learning process. Knowledge and skills got by students are not the result of memorizing a series of facts, but they are the result of self-discovery [12].

Based on interview between researcher and Biology teacher, questionnaire administration to students, and researcher's analysis about learning materials used in X grade Senior High School in Padang, there are some facts found. First, generally, students use textbooks borrowed from library. Some of them have their own book. Besides that, teacher provides student sheets but they only for certain basic competence.

Second, learning materials used by students are not appropriate with the demands of basic competence, like in learning material of Animalia. Some materials are wrong in concept, like learning material of Protista. In the learning material, Protista is called plant cell. Result of questionnaire shows that learning material used by students is less interested, the language is difficult to understand, and it is colorless.

Third, result of questionnaire shows that difficult materials according to students are Archae bacteria and Eubacteria (67.39%), Plantae (60.87%) and Animalia (58.69%). It is caused by materials are too much, many confusing terms, abstract, unfamiliar examples, and no picture to support understanding. This situation could give bad effect to students' understanding about science concepts and processes.

To make learning process goes effectively and efficiently, qualified learning materials should be available. Learning materials which are designed completely and attractively can influence learning situation in the classroom so that students are more motivated to learn. One of printed learning materials is module. Module is one of learning sources which enables students to learn independently and contains learning objectives, materials, worksheets and evaluation [13].

II. METHOD

It was a descriptive research because its purpose was to know the need of guided inquiry based learning module development about learning materials of Plantae and Animalia for X grade Senior High School. It was done in Faculty of Math and Natural Science (FMIPA) State University of Padang, SMAN 7 Padang, SMAN 8 Padang and SMAN 12 Padang. Subjects were 92students of X grade from 3 schools in Padang. Research object was textbook used as learning material. Stages in the research were as follows.

a. Problem and need analysis

Analysis is done to know what problems faced in biology learning process, determine characteristics of module preferred by students as target of the module, and determine module needed by teacher as learning media. Activity done in this stage is interview with teachers and administer questionnaire to students. The result is then considered to design and develop the module.

b. Analysis of curriculum

It is done to determine scopes and sequences of learning materials according to the basic competence, to see logical sequences of learning materials, and to identify indicators of competence achievement and essential materials. The result is used as guideline in learning module development.

c. Analysis of students

It is done to know students' characteristics as users of the module. It is used as a consideration in designing and developing the product in form of learning module.

d. Analysis of learning materials

It was done to know content presentation of textbook. It was used as a guide in developing learning module.

III. FINDING AND DISCUSSION FINDING

Data of students' problem and need analyses are obtained from a questionnaire. Need analysis data of learning material development can be seen in Table 1 below.

Table 1. Data of Need Analysis of Guided Inquiry Based Module Development

	Questions	Items	%
1	Learning materials used in learning process	Module	0
		Handout	0
		Worksheets	88.04
		Textbook	55.43
		Others…	2.17
2	Understanding about presentation in learning materials	Yes	75
		No	25
3	Learning materials which students love the most	Module	29.35
		Handout	0
		Worksheets	51.08
		Textbook	18.48
		Others…	2.17
4	Biology materials which are the most difficult to understand for students	Scope ofBiology	3.26
		Bio-diversity	4.35
		Virus	46.74
		Archaebacteria and Eubacteria	67.39
		Protista	42.39
		Fungi	33.69
		Plantae	60.87
		Animalia	58.69
		Ecology	15.22
		Environmental changes	4.35
5	Causes of the materials are difficult to understand	Too much material	60.87
		Materials are abstractand cannot be observed directly	29.35
		Many confusing terms	85.87
		It used difficult language	23.91
		Books and learning materials are not interesting (colorless)	16.30
		No pictures to support learning materials	21.74
		Other reasons…	2.17
6	Interesting learning media	It is followed by pictures	72.83
		Colorful in every page	36.96
		Fonts can be read	39.13
		Different fonts for each chapter title, sub-chapter and explanation	20.65

		Language is easy to understand	70.65
		Learning materials are short, comprehensive and clear	72.83
		There is summary at the end of each chapter	57.61
		Exercises are provided in each topic	31.52
		There is manuals in each learning activity	33.69
		There is questions and key answers	39.13
		The size is small and practical	16.30
		There is an additional information related to learning materials	43.48
		There is an explanation about difficult terms	52.17
		It has conceptual frameworks	32.61

A. Discussion

a. Problem and need analysis

Problem analysis in learning process is done to know what problems faced by teacher and students in Biology learning process and to find appropriate solution of the problems. Based on the interview with a Biology teacher, it is revealed that school has implemented the 2013 Curriculum for 5 years since 2014. She uses lecturing and discussion method and jigsaw model in learning process. Learning materials used are textbook and worksheets. Some students have their own learning material and others only use textbook from library.

Teacher says that students have difficulty in understanding Animalia learning material, especially in Invertebrate because it is not familiar for them and scope of the material is too large. To solve the problem, teacher instructs them to make summary and teacher makes worksheets for the Basic Competence. However, the worksheets are colorless so that the pictures are not clear.

Next, based on the questionnaires administered to students, it reveals some information as follows: (1) 67.39% students feel difficulty in learning Archaebacteria and eubacteria, 60.87% students feel difficulty in learning Plantae, and 58.69% students feel difficulty in learning animalia; (2) the difficulty in understanding these biology learning materials is caused by some factors, such as learning materials are abstract and cannot be observed directly, there are many confusing terms, textbooks use difficult language, large scope of learning material, uninteresting learning material, and no clear picture to support understanding; (3) according to students, interesting learning media should be colorful, have clear pictures, use understandable language, have summary at the end of each chapter, have key answers, have additional information related to the learning material, use white paper, be practical, and have conceptual framework and important terms list.

Based on the result of the problem and need analysis, learning materials which can facilitate students in learning are developed based on the 2013 Curriculum. The learning material is in form of guided inquiry based learning module. The module is designed as interesting as possible, has pictures, conceptual framework and colorful. The interesting display of module is expected to be able to motivate students not to be bored in doing every activities provided in it so that it can improve students' learning outcomes.

b. Curriculum analysis

The curriculum analysis is done by looking at what are taught, core competence and students' learning outcomes [4]. It is to produce learning module which refers to the curriculum and fulfills the set competence. The result of this analysis is learning indicators which are developed from core competence and basic competence in the 2013 Curriculum.

The compiled guided inquiry based learning module includes two learning materials, which are Basic Competence (KD) 3.8 and Basic Competence (KD) 3.9 about Plantae and Animalia. The appropriate result of analysis can be used to arrange learning materials in the developed module to make them appropriate with the formulated indicators. Materials in module which are arranged based on the 2013 Curriculum can improve module validity to be used in learning process.

The 2013 Curriculum has basic view that knowledge cannot just be transferred from teacher to students. Students are subjects who have ability to find, process, construct, and use knowledge actively. In order to understand and able to implement knowledge, they need to be encouraged to solve problems, find anything for themselves, and try to realize their ideas [8]. Learning process in the 2013 Curriculum uses scientific approach or science process based approach. One of learning model recommended in the 2013 Curriculum is guided inquiry model [1],[9].

The guided inquiry learning model demands students to find their knowledge by themselves. According to Barron, inquiry based learning is an active learning approach which is students-centered and focuses on questions, critical thinking, and problem solving [5]. Anderson says that inquiry is a core of learning [3]. So that through the guided inquiry based learning, students would not be in 'telling science 'but in 'doing science' [2].

c. Students analysis

The guided inquiry based learning module is designed for X grade Senior High School students, who are about 15-17 years old. According to learning theory proposed by Piaget (1980), children who are 11-18 years old are in formal operational stage. In this stage, they can think abstractly and logically, draw conclusion, interpret and develop hypothesis, and prefer to study by giving them a chance to work independently [6].

It is in line with Howe (1999), who state that formal operational stage is the highest stage of children development to be adultery[7]. Students might use their thinking structure to handle problems, find answers, interpret hypothesis, and draw conclusion. Result of this analysis is X grade Senior High School students are included to the age range and able to implement guided inquiry based learning stages in classroom.

d. Learning materials analysis

Learning materials used by students are a textbook published by X publisher and worksheets made by teacher. Based on the analysis, there is some information found. They are first, some learning materials in textbook or worksheets are too much (not appropriate with demands of Basic Competence), like in plant classification. It is explained in detail until familiar level, while Basic Competence only demands until division. It is similar to animalia classification. It is explained until sub-class level. It should not be explained too deeply.

Second, examples cannot explain concept clearly. For instance, in picture of *Tubefix* an example of oligochaeta on page 339, the picture is small and not enough. Third, learning materials used by students focus on science as product, not on science as process so that it cannot facilitate them to find their own knowledge. Fourth, learning materials are colorless so that some examples cannot be understood easily. Fifth, learning materials do not use model which can improve students' scientific attitudes during learning. The weaknesses found in textbook analysis will be a reference in developing the learning module.

IV. CONCLUSION

Based on the data analysis above, it can be concluded that: first, learning materials used by students focus on science as a product, not on process. Material presentation does not lead students to actively involved in discovery learning. Second, material presentation is not based on one of learning models recommended by the 2013 Curriculum. Third, material presentation cannot motivate students in learning because it is not colorful, pictures are not clear, and examples are not familiar for students. Fourth, material presentation is not systematic and not appropriate with demands of basic competence in the 2013 Curriculum.

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