Construction Ethnoscience-Based Learning Environment Material in Scientific Knowledge

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Abstract. The Indonesian 2013 curriculum does not specifically provide ethnoscience material in student handbooks. Therefore, the purpose of this study is to develop ethnoscience learning modules that are feasible and practical for use. The research method uses the Borg & Gall development model which consists of 8 stages, namely a preliminary study stage, a research planning stage, a design development stage, an initial trial phase, an initial product revision, a limited field test, a revised stage of the results of a limited field test, and a product stage end. This research is limited to the limited field trial stage namely the feasibility and practicality of the module. Data from the analysis of the questionnaire by calculating the percentage of achievement in each component of the percentage of achievement criteria of eligibility and practicality of science learning modules based on ethics that was developed. Ethnographic-based science learning modules developed were declared feasible to be used with a percentage of 92.00% (linguists), 76.25% (material experts), 86.25% (design/media experts) with the very feasible, feasible, and very feasible and the percentage of eligibility of 3 colleagues is 89.46%. From the results of these data, it can be concluded that the module has been feasible and practical to be used as teaching material in supporting the teaching and learning process on the material interaction of living things with their environment in junior high school 7th grade.
Keywords: Environment learning; Ethnoscience based learning; Learning construction.

1. Introduction

Learning in schools is a formal civilizing process/acculturation process [1]. Education serves to preserve positive cultures, and education also functions to create changes in a more innovative direction, so that the original education system in an area has an important role in the development of education and culture [2]. Education can be interpreted as one form of the embodiment of a human culture that is dynamic and full of development [3]. The success of education based on the curriculum that is in school, the curriculum is several subjects that must be taken and studied by students to obtain some knowledge [4]. In the 2013 curriculum, KD science subjects have integrated concepts from aspects of physics, biology, chemistry, and space so that the learning process emphasizes providing direct experience to students

Science is very close to students' daily lives and can be learned in all aspects of local and national culture [5]. The model of learning science-based on local wisdom/ethnoscience is done by reconstructing

original science [6] Original science is generally still in the form of concrete experiential knowledge gained through community interaction with the environment and traditional education which is passed on orally from generation to the next generation [7]. Local wisdom in South Bengkulu can be defined as the ability/competency of the community that has proven to be preserved to date. These abilities can be knowledge, skills, attitudes, and values that are operationalized in everyday life [8] The process of reconstructing science or the formation of scientific knowledge derived from public knowledge consists of several stages, namely identification, verification, and formulation [9].

One of the supporting components in the learning process is learning resources. Examples of learning resources are teaching materials. Teaching materials can be defined as all materials (both information, tools, and texts) that are arranged systematically, which displays a complete figure of competencies that will be mastered by students and used in the learning process with the aim of planning and studying learning implementation [10], one of them is a module. Modules contain a minimum of learning objectives, learning material/substance of evaluation [11]. Modules play a role in training students to learn actively and can also support the effectiveness of learning objectives achievement [12,13]. Modules should also meet the rules of user friendly with the user [14]. The preparation of a module can be done by the steps: 1) formulating BC, 2) determining the assessment tools, 3) compiling the material, 4) module structure.

Science learning is the interaction between learning components in the form of a learning process to achieve goals in the form of determining competition [15]. Ethnoscience research aims to find out which material phenomena are considered important by the citizens of a culture and how to organize these experiences in the knowledge system [16]. Ethnoscience learning influences learning, namely; 1) a positive influence in the form of regional cultural appreciation will emerge if the learning at school that is learned is in harmony with students' daily cultural knowledge. This learning process is called incubation; 2) student-centered learning will run effectively, due to the process of assimilation and student learning accommodation [17]. Students are required to learn independently, independent learning is a way of active and participatory learning to develop each individual who is not bound by the presence of teachers, lecturers, face-to-face meetings in class, and the presence of school friends [18]. Education is more focused on the formation and development of personality, so it contains a broader understanding while training emphasizes the formation of skills [4]. This is following 21st-century education which emphasizes students to have skills.

The material of the interaction of living things with their environment that matches the ethnocentric approach. Every living thing needs a certain environment as a place to live. A place to live is called a habitat. In a habitat, there are various types of living things (biotic) and non-living things (abiotic) [19]. Based on its role in the ecosystem, biotic components can be divided into producers, consumers, and decomposers. Interactions between biotic components namely, neutral, predation, and symbiosis [20]. The scientific method has now closed the eyes of science teachers to traditional knowledge and expertise [21].

In of 21st century, education transformation is a flow of change in which teachers and students will both play an important role in learning activities [22]. The module to be developed is also equipped with images that support the planting of conservation characters for students. Education and learning must be meaningful as a process of empowering the ability to think critically and think creatively, the ability to solve problems, the ability to work with a good work ethic, the ability to research and develop science and technology, and to cultivate an independent, responsible, democratic, honest, and moral [23,24]. Considering the challenges of learning in the 21st century, the use of Modules is very suitable when used in learning in high schools, the characteristics of Modules are systematic, sequential, and able to make complex biological material simple. Ethnoscience-based modules are very suitable for use in junior high schools where the learning activities are with an introduction to authentic science and scientific science.

Science learning by using ethnoscience-based modules, students will be more interested and enthusiastic about learning. Students will feel that learning with ethnoscience is based on recognition of the culture of the community [25]. The scope of ethnoscience in the fields of science, agriculture,

ecology, medicine, and about the benefits of flora and fauna. With one of these lessons, it is expected that students will be able to achieve the specified competencies and be able to gain a meaningful learning experience [26].

Based on the results of researchers' interviews with several Biology teachers in junior high schools, there are various obstacles experienced by teachers in the learning process, including the use of books that are still fixated on the thick textbooks provided by the school, the textbooks that teachers use in learning are the book packages provided purchased from the publisher is not the result of innovation from the teacher himself. This situation makes the learning process unbalanced because it tends to neglect the realm of skills and effectiveness. With this research, it is expected that students can understand the learning of interactions of living things with their environment easily. The ethnoscience approach used can make students know the customs/habits of the local community that have been trusted, and with students can understand it is hoped that the culture will not disappear, and will continue to be done.

In various junior high schools in Bengkulu, there are still no teaching materials in the form of modules that are interesting and have a character. Based on the results of interviews with science subjects' teachers also said that schools have not used modules developed by the teachers themselves such as ethnoscience modules where the learning activities are with an introduction to original science and scientific science.

Therefore the researcher wants to develop a Module teaching material that is based on the needs of the students. Modules that can support the learning process are modules that are following the objectives of achieving basic competencies and can reflect students' scientific process skills following a scientific approach so that in developing these modules need to be prepared taking into account the use of relevant learning resources. Therefore, researchers are interested in Developing Ethnographic Science-Based Science Learning Modules on the interaction of living things with their environment to instill the spirit of conservation of 7^{th}-grade students of junior high school.

2. Methods

This research is a type of research and development. Understanding research and development according to Borg and Gall is a process used to develop and validate educational products. The development model used refers to the development model Borg & Gall which consists of 10 stages [27,28], but in this study, it is limited to 7 stages because of there is no large dissemination research product (book), namely the preliminary study stage, the planning stage of the research, the stage of design development, the stage limited field test, the revised stage of the results of the limited field test results, and the final product stage. Figure 1 shows the research design in this study.

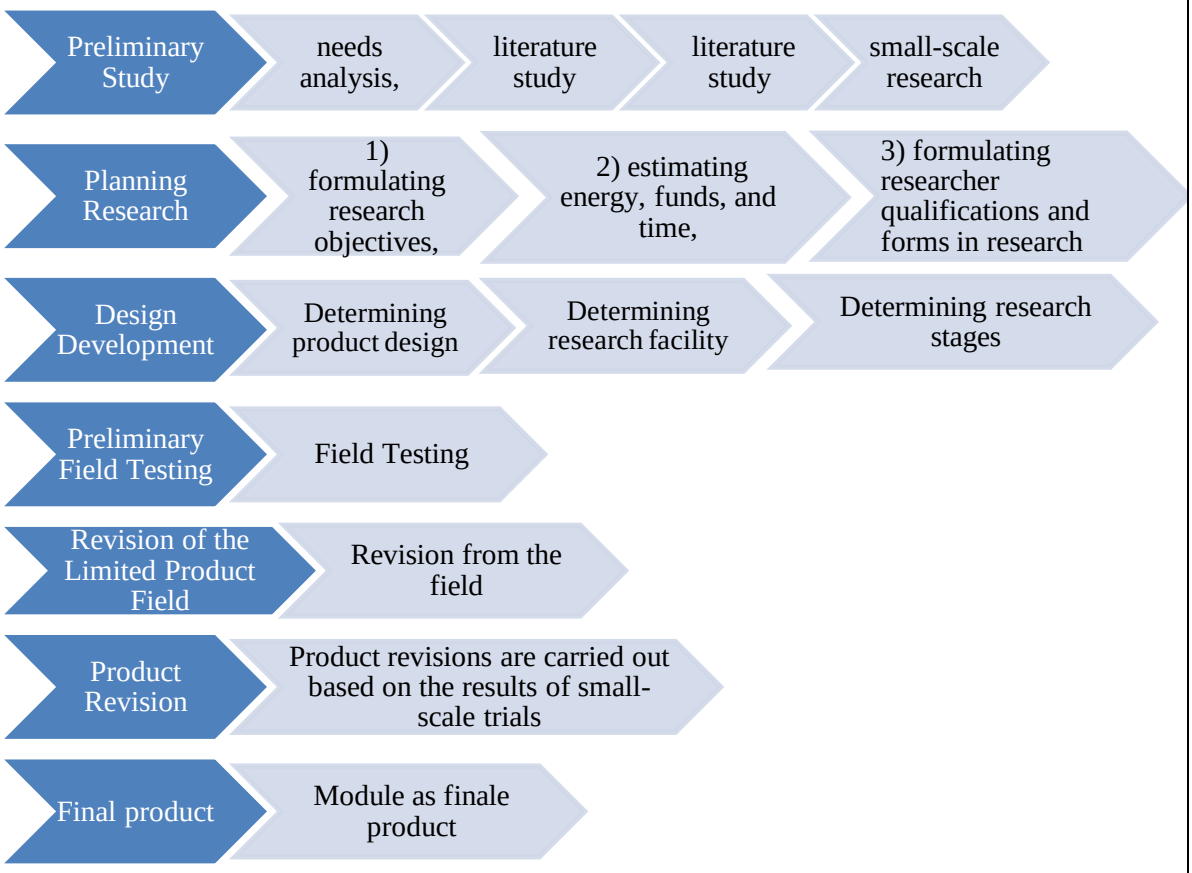

Figure 1. Research Design

The instrument used in this study was a module eligibility questionnaire to get validation data from 3 validators. The language validation questionnaire consisted of 15 statement components with a score of 1-5. The material validation questionnaire consisted of 16 statement components with a score of 1-5. Whereas the media validation questionnaire consisted of 16 statement components with a score of 1-5.

The researcher makes a validation sheet that contains the statements. Then the validator fills in the questionnaire by giving a checkmark to the categories provided by the researcher based on a Likert scale consisting of 5 rating scores. Furthermore, the percentage of eligibility obtained is then interpreted into categories based on table 1: The module teaching materials are declared theoretically feasible if the percentage of eligibility is ≥ 51%.

3. Results and Discussions

To see the module's feasibility, module validation has been carried out on 3 lecturers at Bengkulu State Islamic Institute. 1 language validation lecturer, 1 material validation lecturer, and 1 media validation lecturer, and 3 colleagues. Before calculating the percentage of expert validation assessment scores, the eligibility will be calculated according to the criteria in table 2. Categorization can found in table 1 and the eligibility criteria can be seen in table 2

Table 1. Expert Judgement Rating Score Criteria

Remarks	Score
Very good (SB)	5
Good (B)	4
Enough (C)	3
Less (K)	2
Very pool (SK)	1

Table 2. Eligibility Criteria

Assessment	Interpretation Criteria
$81 \leq P \leq 100\%$	Highly feasible
$61 \leq P < 81\%$	Feasible
$41 \leq P < 61\%$	Quite Feasible
$21 \leq P < 41\%$	Not Feasible
$0 \leq P < 21\%$	Very Not Feasible

Based on the results of the development that has been done, it is known that the results of the validator of the Ethnographic-based Science learning module obtained 92.00% results. So that the results of the validator refer to the conversion table, it can be concluded that the Ethnoscience-based Science learning module developed is feasible to use or can already be tested on students in the learning process and no longer needs to be revised by researchers. The suggestions and comments of the validator towards the development of Ethnographic-based science learning modules are as follows:

Based on the results of the development that has been done, it is known that the results of the validator of Ethnoscience-based science learning modules obtained 76.25% results. So that the results of the validator refer to the conversion table, it can be concluded that the learning module based on Ethnoscience-based science is feasible to use or can already be tested on students in the learning process and no longer needs to be revised by researchers. The suggestions and comments of the validator on the development of Ethnographic-based science learning modules as follows:

The percentage of the validation results conducted by the media expert validator on the development of Ethnoscience-based science learning modules is 86.25% consisting of 16 indicators. So that the results of the validation refer to the conversion table, then it can be concluded that the learning module based on Ethnoscience-based science is feasible to use or can already be tested on students in the learning process and no longer needs to be revised by researchers. The suggestions and comments of the validator on the development of Ethnographic-based science learning modules as follows:

The appointed colleagues are 3 students of the Natural Sciences Tadris Study Program, Bengkulu State Islamic Institute. The results of the peer validation phase can be seen in table 3.

Table 3. Validation Results by Peers

Validator	Score obtained	Percentage
Peers 1	54	90,00 %
Peers 2	55	91,70 %
Peers 3	52	86,70 %
Percentage		89,46%
Category		Very good

The percentage of validation results done by a colleague validator on the development of Ethnoscience-based science learning modules was 89.46% consisting of 12 indicators. So that the results of the validation refer to the conversion table, then it can be concluded that the learning module based on Ethnoscience-based science is feasible to use or can already be tested on students in the learning process and no longer needs to be revised by researchers. The suggestions and comments of the validator on the development of Ethnographic-Based Science learning modules are as follows:

Based on the results of data tables 3, it can be seen that the percentage of achievement of the eligibility criteria for each component is in the very feasible criteria. From the validation, results obtained it can be concluded that the module has been feasible to be used as teaching material. After being revised by the researchers, the results obtained are the Science Learning Module Based on Ethnoscience Materials of Interaction of Living Things with Their Environment For 7th grade Middle School Students, they are declared to be very suitable to be used with the percentage of 92.00% (language), 76.25% (material), and 86, 25% (media) and 89.46% (peers).

Based on the results of the analysis of the student practical response sheet assessment on a limited test, the practicality of teaching materials can be seen in the table below:

Learning materials in the limited group test Ethnographic-based Science Learning Module can be said to be included in the category of very practical with a total average of 10 students namely 84.83% are in the interval of 80% ≤ PRM ≤ 100%. And based on the teacher's questionnaire response that is 93.40% which is included in the category of very practical. The final product of this research is an ethnoscience module based on the environment. This module can be seen in Figure 2

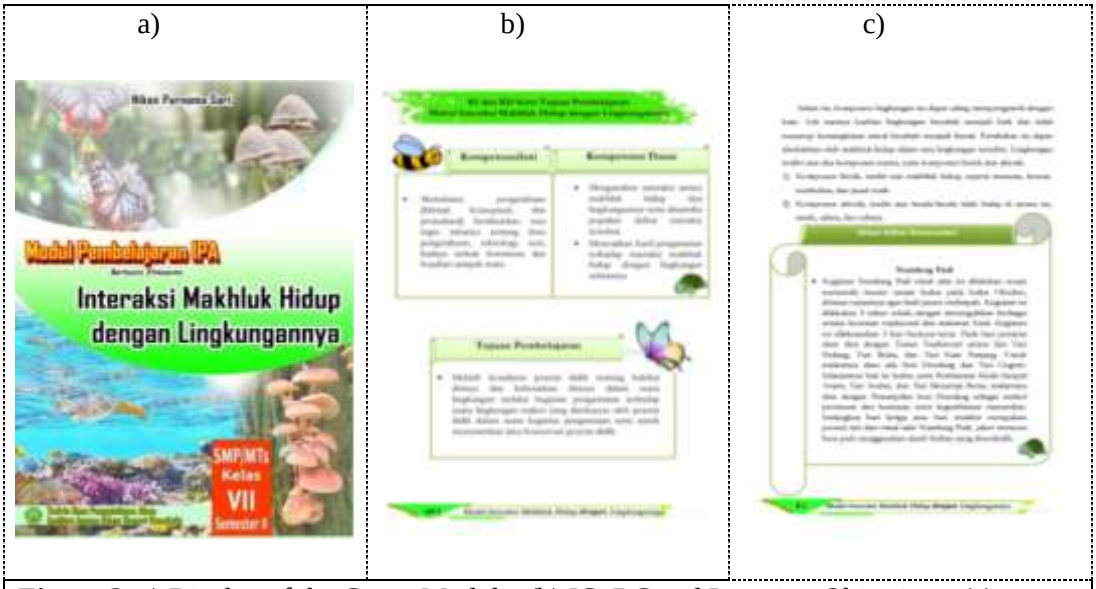

Figure 2. a) Display of the Cover Module, (b) IC, BC and Learning Objectives, (c) Ethnographic Values

4. Conclusion

Based on the results of data analysis and discussion that has been carried out it can be concluded that Ethnographic Science-based learning modules Material Interaction of Living Things with their Environment was developed by referring to the 10 stages of the Research And Development method by Borg & Gall which were then limited to 8 stages and adapted to produce the stages of developing science learning modules namely: preliminary study stages, planning, format development initial product, initial trial, product revision, small-scale trial, product revision, and final product. Ethnography-Based Science learning modules Material of Interaction of Living Creatures with their Environments developed was assessed by linguists, material experts, and design experts with a percentage of 92.00%, 76.25%, 86.25% (very feasible, feasible, and very feasible) and rated by 3 colleagues with a percentage of 89.46% the category are very feasible. Ethnographic Science-based learning modules Material Interaction of Living

Things with the Environment after being tested is limited and declared practical with the responses of 10 students and 2 teachers of SMP Negeri 20 Bengkulu City with a percentage of 84.83% very practical categories, and 93.40% categories very practical.

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