DEVELOPMENT OF ENVIRONMENTAL BASED BIODIVERSITY BOOKLET AS A LEARNING RESOURCE FOR GRADE X SMA NEGERI 1 BERASTAGI

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ABSTRACT

This research aimed to produce a Booklet based on environmental Biodiversity topic that valid and effective to be used learning. This research was designed using 4-D development model consisting define, design, development and disseminate. The Booklet was validated by Material Expert, Media Expert, then the response from teacher and students were obtained. The result of feasibility of Booklet from Material Expert was 84 % with very good category, Media Expert was 81,33 % with good category, Biology Teacher was 94,66 % with very good category and percentage of students responses were 90,27 % with good category. Then the result of effectiveness from the paired t-test obtained tcount > ttable = 40,093 > 2, 042, significantly the Post test score higher than Pre test score. While t-test obtained 0,621 > 0,05 there was differences in Mean value that significant. Then result of t-test was proceed with N-Gain score and then the result N-Gain score obatined at interval > 0,3 with effective category.

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INTRODUCTION

Environmental education is an effort to change behavior and attitudes carried out by the community which aims to increase knowledge, skills, and public awareness of environmental values and issues for the benefit of the present and future generations. Students as a subject of education have a role in maintaining, preserving and solving environmental problems. So students must be educated to know, realize, and believe in environmental education and this education has an impact on increasing knowledge and skills in forming positive attitudes and behaviors (Ardianti, 2017).The environment consisting of school parks and school fields has potential as a source of biodiversity because there are several diverse forms of genes, types, and ecosystems. However, at present, the school environment has not been utilized as a media and learning resource.

One of the biological materials that have a lot to do with nature is the material on biodiversity, so it is more appropriate if the learning process is environmentally based. The use of the environment around the school as a learning resource of Biology especially material on Biodiversity can make it easier for students in absorbing learning material and to know more and to closer the environment. Biodiversity is one of the most important topics of discussion. In accordance with the 2013 curriculum, the basic competencies to be achieved are that students are able to apply the understanding of the importance of diversity and classification of plants, and are able to apply the principles of grouping living things to study biodiversity for life.

Biodiversity is the diversity of organisms that shows the overall variation of genes, types and ecosystems in an area (Campbell et al, 2010). This material is taught in the odd semester of class X, even though students have not yet gained knowledge about genes and ecosystems. Material on ecosystems was delivered in the even semester of class X. This ecosystem material has also been obtained at the junior high school level, but at the junior high school level, the new ecosystem material is limited to the food chain and material on genetics is delivered in the even semester of class XII.

Therefore, many students feel less interested to understand the concept of biodiversity The available learning resources are not yet feasible and in accordance with the 2013 Curriculum. Thus, appropriate teaching materials are needed in order to guide students in understanding the concept of biodiversity. In these learning resources, it is necessary to provide introductory material about genes and ecosystems so that students do not experience difficulties in studying biodiversity material. Therefore students expect interesting learning resources, with concise and easy-to-understand material that can be used as learning resources. One of the learning resources that can be used as a learning resource for students is a booklet.

Booklet is a small book that has a function as a leaflet to convey messages or information (Pribadi, 2017). The booklet is one of the printed media used to convey messages in the form of summaries or interesting images. The booklet it self is a small and thin book, no more than 30 pages back and forth containing text and images. According to Imtihana (2014), shows that the use of booklets is very effective for improving student learning outcomes. This is evidenced based on research that has been done in which obtained learning outcomes in students on biodiversity materials achieve learning completeness ≥80%. With a value of ≥80, as well as feasible to use with an average validation of material and media research results of 91.5%. The design component of the booklet learning has the advantage of being able to be student-centered, in accordance with the subject and able to stimulate the depth of student thinking.

Development of learning resources in learning biodiversity materials utilizing the environment to overcome the student learning difuclties. The booklet learning resource is prepared using pictures taken around SMAN 1 Berastagi. With a display that can attract students' interest in reading and the contents of the material that can be easily understood by students. The development of learning resources is expected to increase the collection of learning media and improve student learning outcomes.

METHOD

This research was conducted in the Department of Biology Education, State University Medan and SMA Negeri 1 Berastagi, Berastagi Kabupaten Karo. The research was conducted from Februari to March 2022.

The subjects in this research will be two expert lecturers considered as one material expert validators and another one was considered as media expert validators, Biology teachers, and student of SMA Negeri 1 Berastagi as many as 48 students with specifications of Individual trials as many as 3 students from class X IPA 1, Small group trial as many as 9 students from clas X IPA 6 and Test field trials limited as many as 36 from class X IPA 7. Object in this research is Environmental-

based biodiversity booklet of SMA Negeri 1 Berastagi.

This research begins by determining the assessment criteria, the next stage is the planning and implementation stages. And then at the product assessment stage, an assessment is carried out by material experts and media experts represented by biology lecturers to know the quality of the booklet. biology teachers and students will respond to the developed booklet.

The research design used in the study consist of 4 stages as described in the problem limitation. The booklet development process consists of define stage, design stage, development stage, and the disseminate stage. At the development stage, a pre-experimental design will be tested with one group pretest and posttest to test the effectiveness of the product that has been developed. (Sugiyono, 2016).

The process of developing this Enviromental-Based Biodiversity Booklet as a Learning resource, will a follow the 4D development model which turther is described below :

a) Define

This stage is the first stage to arrange the Booklet to set and define learning conditions. This stage is carried out to determine the development of learning resources and the limits of the material developed.The actions taken at this stage are:

a.1. Curiculum Analysis

This stage aims to find out the basic problems that occur in biology learning activities for class X SMA Negeri 1 Berastagi. in this stage, the researcher will conduct interviews and discuss with the biology teacher Class X SMA Negeri 1 Berastagi and make observations to students. in this stage the researcher will also conduct an analysis of the curriculum set in the school..

a.2. Student Analysis

Stage to know the characteristic of student SMA Negeri 1 Berastagi as research subject to use booklet that involved the ability and knowledge background of students and also to know the learning motivation in learn biology.

a.3. Concept Analysis

Concept analysis according to Thiagarajan et al (1974) will conducted to identify the main concepts being taught. Concept analysis is an important step in constructing the concept of the materials used. The topics analyzed about various levels of biodiversity (genes, species and ecosystems) in Indonesia.

a.4. Learning Objectives Analysis

Learning objectives formulated based on Basic Competence 3.2 Describe the concept of gene variation, type, ecosystem, through observation activities. and Basic Competence 3.2 Communicating Indonesia biodiversity, and efforts to conserve and utilize natural resources.

b) Design

This design stage includes:

b.1. Format Selection

Format selection in development stage of this learning tool is intended to design the contents of a booklet. The format choosen is one meets the criteria of attracting, facilitating and assisting in learning, which includes relevant layout desgins, drawings, and writing.

b.2. Preparation of Research Document

At this stage, te researcher tries to determine the questionnaire instrument that will be given to validator team, teachers and students as a tool used to obatin accurate data in determining the eligibility criteria.

b.3. Review by Thesis Supervisor

At this stage the researcher has made student booklet based on the material and format chosen and researcher makes draft of teaching material which is then given input by the guiding lecturer. Input from lecturers will be used to improve teaching materials student booklet before validating to the validator and producing.

b.4. Draft 1

After the researcher finishes revising student work literature with input and suggestions given by the guiding lecturer, draft 1 of student booklet developed by the researcher.

c) Develop

At this development stage, draft 1 of the product will be developed and will be given to the supervisor and experts or validators that have been determined. after validation to the experts, the booklet that has been repaired is then used in trials before the product is used.

d) Disseminate

After the product has been validated and revised repeatedly to produce a product that conforms to the specifications set at the development stage, the product is ready to continue at the disseminate stage. the disseminate stage is the stage of using the product that has been developed and aims to test the effectiveness of using the product in teaching and learning activities.

Research Instrument

The data obtained in this research are quantitative and qualitative data. Quantitative data obtained in the form of assessment scores by material experts, media experts, teacher responses and student responses. while the qualitative data obtained in the form of responses and suggestions given by the validator. The data analysis in this research is descriptive and the data obtained is in the form of a check list which is summarized in a Likert scale table for material experts, media experts and teachers. while for students using the Guttman scale (Sudijono, 1987).

RESULTS AND DISCUSSION

The assessment was carried out by a material expert lecturer, namely Dr. Mufti Sudibyo, M.Sc. The results of the assessment are in the form of scores that are useful as data, which are then converted into percent and then adjusted according to the criteria. The assessment criteria of expert lecturers are used to improve product quality. Based on the results of the assessment of material experts, the learning resources developed were stated with an average score percentage of 87%. If it is matched with the criteria very good.

After the material expert lecture giving the opinion about student worksheet, when giving an assessment of the product, in addition to providing an assessment score, expert lecturers also provide input or suggestions for improvement.

The assessment of the media expert was carried out by the media expert, Drs. Hasruddin, M. Pd. The results of the assessment of media experts are in the form of scores that are useful as data, which can then be converted into percentages as criteria for determining the eligibility of Booklet to be used to improve the quality of Booklet products. Based on assesment Media expet obtained score 81,33 % with Good criteria.

After the product has been validated and has been declared valid then the product is given to the teacher to provide responses to Booklet that are developed. The response of the biology teacher was carried out to obtain information that would be used to improve the quality of the Booklet that was developed. Based on the results of teacher responses, the teaching material developed gets an

The The development of an environment-based booklet for the topic of biodiversity has three

average percentage score of 94,66% with a very good category.

And then to know the responses of student. The first product trials with individual were carried out at SMA Negeri 1 Berastagi as many as 3 people with different levels of ability, namely high, medium and low abilities. Student responses to individual group trials are included in the good criteria with total score 35 and percentage 83,33 %. The second Produk trials with small group were carried out at SMA Negeri 1 Berastagi as many as 9 people with different levels of ability, namely high, medium and low abilities. Student responses to small group trials are included in the good criteria with total score 110 and percentage 87,30 % and then The limited group trial was conducted at SMA Negeri 1 Berastagi as many as 36 people, namely students of class X IPA 7 with different levels of ability different ,from high, medium and low ability levels.

After getting input and suggestions from some expert lecturers, and questionnaire on the responses of students and biology teachers, a percentage was obtained with good category. Then the product developed has been obtained which can be continued to the next stage, namely the effectiveness test.

To know the improvement between pre-test and post-test, hypothesis testing was carried out using normalitas test and homogenitas test. To know the normalitas test and homogenitas test using the SPSS version 20.

The use of booklets in student teaching and learning activities affects the learning outcomes of students in class X IPA 7 SMA Negeri 1 Berastagi, the increase in the average pretest and posttest scores is analyzed using the N-Gain score formula of 0.57. it can be seen a total of 36 students, all students experienced an increase in learning outcomes. as many as 5 students get an increase in learning outcomes on the high criteria seen from the N-gain value at intervals > 0.7, then it is in a very effective criteria. for the other 31 students, getting an increase in learning outcomes on the moderate criteria seen from the N-Gain value at an interval of $0.3 \leq \text{N-Gain} \geq 0,7$, So that it is in the criteria that are effective enough.

parts, the first part consists of the cover, introduction, table of contents, the second part is

the content of the worksheet which consists of core competencies and basic competencies, learning objectives, summary of the material and the third part is the closing section consisting of a bibliography and supporting materials.

The feasibility of the booklet is assessed based on predetermined aspects, namely the feasibility of the content, the feasibility of presentation, the components of theeach of which consists of several indicators. The booklet feasibility assessment involves 2 validators, namely the material expert validator and the media expert. The assessment of the booklet by the material expert got a very decent category, which reached an average score of 84%, the assessment of the booklet by the media expert got a very good category with a percentage score of 81.33%. The booklet also received an assessment response by teachers and students.

Responses by students get a good category from getting an average percentage score of 90,27 % in limited group trials. Achievement of each category The assessment of Booklet above obtained good results because it has gone through several improvements from each Expert team. Some improvements that have been made include the suitability of the contents of the Booklet with indicators, language, display, format, design, accuracy, and learning components of the Booklet.

The teacher's response to the biodiversity worksheet is included in the very good category with the percentage score obtained that is 94,66 %. The purpose of giving an assessment of the teacher's response is to adjust of the Booklet students with the material that has been presented. The results of the responses of students to the Booklet from individual group trials, small group and limited group tests are included in the worthy category with 15 indicators provided by the researcher.

The responses obtained in the individual group trials obtained a percentage score of 83,33 %, small group trials obtained a percentage score of 87,30 % and limited group trials obtained a percentage score of 90,27 % and from the results of the N-Gain score by 36 students obtained all students experienced an increase in learning outcomes. as many as 5 students get an increase in learning outcomes on the high criteria seen from the N-gain value at intervals > 0.7, then it is in a very effective criteria. for the other 31 students, getting an increase in learning outcomes on the moderate criteria seen from the N-Gain value at an interval of $0.3 \leq$ N-Gain $\geq 0,7$, So that it is in the criteria that are effective enough.

This study aims to look at the effectiveness of the use of Booklet that includes tests of initial ability (pre-test) and final ability (post test) on diversity topic and Tests use multiple choice question.

CONCLUSION

Based on result and discussion of doing research can be conclude as follows :

1. The result from validation of material expert is included in "Very feasible" category with percentage 83,33 %
2. The result from validation of educational expert are included in "feasible" category with percentage 81,33 %.
3. The result from teachers are included in "feasible" category with percentage 94,66 %.
4. According to student responses to individual trials, small group trials and large group trials, it was stated that the biodiversity booklet was included in the "feasible" to be used as a student learning resource.
5. The results of the study indicate that the product developed in the form of a biodiversity booklet is effective in improving student learning outcomes.

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