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Development of Dioramas Using 3D Media on Class X Mangrove Forest Ecosystem Materials in Ma Darul Muta'allimin Patianrowo Nganjuk

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ABSTRACT
The development of diorama media aims to increase teachers' creativity and optimize media use skills in the learning process. The purpose of this study is to describe the results of 3D diorama media validation on mangrove forest ecosystem materials according to material experts and media experts. The method used is RnD by not carrying out the dissemination stage. This is due to limited time and cost. The instruments used are material validation questionnaires and learning media. This development research uses a combination of quantitative data analysis and qualitative data analysis techniques where the scores of validation results by material experts, media experts and response scores from students are analyzed descriptively. The results of the discussion and based on the results of the analysis, it can be concluded that the Results of the Validation of 3D Diorama Media on Mangrove Forest Ecosystem Materials from the results of the validation of material experts received very valid criteria with a percentage of 92.5% each. The results of the validation of 3D Diorama Media on Mangrove Forest Ecosystem Materials from the results of the validation of the Material Expert received very valid criteria with a percentage of 95.45%.

***Keywords**: Diorama; Ecosystem; Mangrove Forest; 3D Media*

INTRODUCTION
Learning is two things that are continuous in educational activities as an interaction that occurs between teachers and students that is deliberately created to improve students' abilities both cognitively, affectively, and psychomotor (Zaifullah et al:2021). Learning media is the suggestion of the distributor or learning information that is conveyed or conveys a message from the sender to the recipient. In the process that is carried out is to stimulate students' thoughts, feelings, attention, and, interests and attention so that the learning process can be intertwined. Learning media is a tool to convey material to students so that it is easier to receive and make students more motivated and active in learning. (Sanjaya:2019), Learning media is very important in the learning process because teachers can convey material to students to be more meaningful, teachers not only convey material in the form of words with lectures but can bring students to understand in real terms the material conveyed.

Education is a very important thing for human life. A quality education can help a person to develop his potential and achieve success in his life. In addition, education can also help a person to become better and contribute to society. Education is basically the development and coaching of human personality, both physical and spiritual health. With this education, human personality is more easily formed such as increasing skills, and mental abilities etc. Law No. 20 of 2003 explains that education is a conscious and systematic effort to create an environment and learning process, where students have a religious spirit, self-control, personality, intelligence, noble personality and self-desire of the community, nation, and state, developing the potential to have the ability (Nirwanto et al., 2021). There are many ways to optimize the learning process, one of which is by using learning media to motivate students, and can attract students' attention during learning. Context-based learning media is one example of media that can be used to see a real physical form. For example, context learning media is a diorama that can improve student learning (Aris & Afina, 2022).

Through the results of observations and interviews with class X teachers of MA Darul Muta'allimin, in the learning process of Biology of Mangrove Forest Ecosystem material, teachers only use the lecture method and do not use learning media during the learning process, even though it takes a long time to convey this material so that students feel bored quickly and lack interest so that it causes understanding and learning outcomes to be less than optimal. Hereby, context-based diorama research for Mangrove Forest Ecosystem material is based on the subject of Biology class X MA Darul Muta'allimin. The development of diorama media aims to increase teachers' creativity and optimize media use skills in the learning process.

METHOD

Learning is two things that are continuous in educational activities as an interaction that occurs between teachers and students that is deliberately created to improve students' abilities both cognitively, affectively, and psychomotor (Zaifullah et al:2021). Learning media is the suggestion of the distributor or learning information that is conveyed or conveys a message from the sender to the recipient. In the process that is carried out is to stimulate students' thoughts, feelings, attention, and, interests and attention so that the learning process can be intertwined. Learning media is a tool to convey material to students so that it is easier to receive and make students more motivated and active in learning. (Sanjaya:2019), Learning media is very important in the learning process because teachers can convey material to students to be more meaningful, teachers not only convey material in the form of words with lectures but can bring students to understand in real terms the material conveyed.

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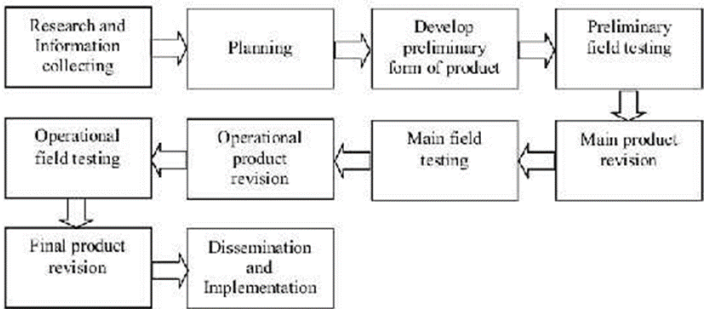

Figure 1. Metode R&D Model Borg and Gall (Sugiono , 2019)

1. Test design

In this study, the boba test was shown to media and material experts. Media experts and material experts validate the learning media to determine the feasibility of the learning media.

2. Test subjects

The subject of validation of validation activities was carried out by 2 validators, namely one media expert from a Biology Education lecturer and a material expert, namely a biology education lecturer.

3. Data types

The data used in this study are qualitative data and quantitative data in accordance with the needs of development research, quantitative questionnaires combined with qualitative. Quantitative data is data that can be measured in the form of numbers or quantities such as measurement scales. Meanwhile, qualitative data is data that is descriptive and cannot be measured in the form of numbers in the form of comments and suggestions given. Qualitative data is usually obtained through interviews, observations, or analysis of documents and can be in the form of text quotes or narratives.

4. Data collection instruments

The instruments carried out in the research and development of 3D diorama media on mangrove forest ecosystem materials are as follows:

5. Questionnaire Instrument

Questionnaires are used to find out a person's response to a problem. "Questionnaire (quisionair) is also known as questionnaire. Basically, a questionnaire is a list of questions that must be filled in by the person to be measured (respondent)". The questionnaire as a product assessment sheet is used to obtain data on the learning media of the teaching module in the feasibility test on the learning media and the results of the development of the questionnaire are shown to: Learning Media Expert and Material Expert

- Data analysis techniques

Technical data analysis is a way of analyzing research data including relevant things to be used in research. The results of data analysis were used to determine the feasibility of the learning media developed. This development research uses a combination of quantitative data analysis and qualitative data analysis techniques where the scores of validation results by material experts, media experts and response scores from students are analyzed descriptively.

Table 1. Likert Scale Assessment Categories

No	Score	Description
1	Score 4	Very Valid
2	Score 3	Valid
3	Score 2	Invalid
4	Score 1	Very Valid

So that to determine the average assessment score, it can be calculated using the following formula (Sugiono, 2017).

$$P = X\ 100\%$$

Information:
P : large percentage (sought)
$\sum$ x : the total number of validator answer scores
$\sum$ XI : the highest total number of answer scores (ideal scores)
100 % : constant number

Then the percentage of validation criteria is sought. The validation criteria used can be seen in the following table:

Table 2. Validity Interpretation Criteria

Interval	Kriteria
0% - 25%	Very Invalid
26% - 50%	Less Valid
51% - 75%	Valid
76% - 100%	Very Valid

(Sugiyono, 2013).

In the table above, it shows that the value of interpretation is increasing, the validity of the 3D diorama media of mangrove forest ecosystem material.

RESULT AND DISCUSSION

- Product Trial Results

The trial data carried out in the research on the development of 3D dioramas in the Mangrove Forest Ecosystem is in the form of validated data from lecturers who are experts in learning media. This validation activity was carried out by one lecturer of the Biology Education Study Program, namely Mrs. Fatikhatun Nikmatus Sholihah, M,Pd. And as an expert on learning materials, this learning material was carried out by one lecturer of the Biology Education Study Program, namely Rossanita Truelovin Hadi Putri, M.Pd.

- Data on Material Validation Results by Material Experts

The data on the validation results of learning design experts was obtained from the results of a questionnaire given to lecturers of Biology Education at KH University. A. Wahab Hasbullah Jombang Rice Pond, namely Mrs. Rossanita Truelovin Hadi Putri, M.Pd. Validation questionnaire for the development of 3D diorama media on Mangrove Forest Ecosystem material. 10 criteria by including a suggestion sheet and comments (attachment 2). The suggestions and comments given by material experts are used as considerations to improve the 3D diorama media of the Mangrove Forest Ecosystem material. The following results of validation by material experts are shown in Table 4.1 below.

Table 3. Data on the Results of Validation of Material Experts by Material Experts

No	Category	Score	Result (%)	Description
1	The definition of material concepts according to the level of student development	4	100	Very Valid
2	This medium helps students learn actively	4	100	Very Valid
3	Easy-to-understand media usage guidelines	4	100	Very Valid
4	Design an attractive media usage guide	4	100	Very Valid
5	Dioramas support ecosystem materials well	3	75	Valid
6	Media can be used on all curricula	4	100	Very Valid
7	Media in accordance with core competencies/ basic competencies/ learning objectives	3	75	Valid
8	The media presented in the diorama supports the material being discussed	3	75	Valid
9	Suitability of the diorama and the material presented	4	100	Very Valid
10	The sentences used are easy to understand	4	100	Very Valid
Sum			925	
Rata-Rata			92,5%	
Criterion			Very Valid	

The percentage obtained was 92.5% with very valid criteria, material expert data from 7 categories got a result of 100% with very valid criteria, 3 other categories got a result of 75% with a valid category. The results illustrate that the 3D diorama media of the mangrove forest ecosystem is ready to be used as a learning medium. The suggestions and comments of material experts on 3D Diorama Media are the description of the concept of mangrove forest ecosystems according to the context, which is not in accordance according to material experts is in the description of animals, the description at the end of the sentence mentions mangrove plants that are less in sync with the title of animals. Material experts have not been able to assess the whole well because they are not given KD directions along with the learning objectives that students will do, it is better to convey them through a pamphlet behind the description of the material, so that the assessor and students who use it understand the purpose of the diorama observation. And the animals are small and can be multiplied so that the mutual relationship between animals and the mangrove ecosystem can be seen.

- Media Validation Results Data by Alhi Media

The data on the validation results of material experts was obtained from the results of a questionnaire given to lecturers of Biology education at KH University. A. Wahab Hasbullah Rice Pond Jombang, namely Mrs. Fatikhatun Nikmatus Sholihah, M.Pd. Validation questionnaire for the development of 3D diorama media for ecosystem materials contains 11 criteria by including suggestion

sheets and comments (attachment 3). The suggestions and comments given by media experts are used as considerations to improve the 3D diorama media of ecosystem materials. The data of the validation results by material experts is shown in.

Table 4. Media Expert validation results

No	Category	Score	Result (%)	Description
1	The diorama media has a beautiful and neat appearance	4	100	Very Valid
2	Strong, durable, reusable media	4	100	Very Valid
3	Interesting diorama media display	4	100	Very Valid
4	Practicality of Diorama Learning Media	3	75	Valid
5	Theme compatibility with diorama media	3	75	Valid
6	Miniature layout according to the original	4	100	Very Valid
7	Medium size is simple and not too large	4	100	Very Valid
8	The right size of media makes it easy to carry the media anywhere	4	100	Very Valid
9	Easy-to-understand media usage guidelines	4	100	Very Valid
10	Media can attract students' attention	4	100	Very Valid
11	Easy-to-use media for teachers and students	4	100	Very Valid
Sum			1050	
Rata-Rata			95,45%	
Kreteria			Sangat Valid	

The percentage obtained was 95.45% with very valid criteria. Material expert data from 9 categories got a result of 100% with very valid criteria, the other 2 categories got a result of 75% with a valid category. The results illustrate that the 3D diorama media of the mangrove forest ecosystem is ready to be used as a learning medium. The suggestions and comments of media experts on 3D Diorama Media are Good, the size of the animal (miniature) is larger so that it is easily visible to students/teachers.

Product revisions are carried out taking into account the suggestions and comments that have been given by material experts and media experts. Small animals can be multiplied so that the mutual relationship between animals and the mangrove ecosystem can be seen.

Figure 2. Revised Media

Discussion

Data analysis was carried out after data collection from the results of 3D diorama media, namely Biology Education Lecturers as material experts, lecturers of the Faculty of Biology Education as media experts.

- Analysis of media validation results by Material Experts

The analysis of material expert validation data is an elaboration of the data from the validation results of media experts. This assessment aims to determine the level of feasibility of the material from the learning. The analysis of data results in criteria no. 1-4 received a percentage of 100% which means it was very valid, while the analysis of data results in criteria no. 5, 7, and 8 received a percentage of 75% which means it was valid, while in criteria no. 9-10 obtained a percentage of 100%. The percentage result obtained from the material expert validation questionnaire was 92.5%. This shows that 3D diorama media is very valid and can be used as a learning medium. The data obtained from the material expert validation questionnaire is a 3D diorama media of ecosystem materials containing 10 criteria. Based on the results of the validation of the 10 criteria assessed, the statements in all aspects get scores of 3 and 4 so that it can be ensured that the 3D diorama media gets the Valid category. According to Mustika (2021:12) stated that material validation is carried out to see the suitability of the material used by the researcher, the accuracy and clarity of the material, and the evaluation or use. Material analysis is carried out to find out the material that will be developed into learning media. The material chosen in the development of learning media is an ecosystem in accordance with Permendikbud Number 37 of 2018, namely KD 3.10 analyzes ecosystem components and interactions between these components and KD 4.10 presents works that show interactions between ecosystem components (food webs, biogeochemical cycles)

- Analysis of Media Validation results from Media Experts

Media expert validation data analysis is an elaboration of the data from the validation of learning material experts. According to Pambudi, media validation is the first stage carried out to obtain the results of the validity of the product developed. In media validation, the researcher conducted an assessment with media experts (Pambudi, 2015). This assessment aims to determine the feasibility level of the 3D diorama media. The analysis of data results in criteria no. 1-3 received a percentage of 100%, which means it was very valid, while the analysis of data results in criteria no. 4 and 5 received a percentage of 75%, which means it was valid, while in criteria no. 6-11, it obtained a percentage of 100%. The percentage results obtained from the media expert validation questionnaire were 95.45%. This shows that the media is a 3D diorama and can be used as a learning medium, but it still needs to be revised based on suggestions and comments from media experts. Data was obtained from a validation questionnaire of media experts, namely 3D diorama media of Mangrove Forest Ecosystem material which contains 11 criteria.

CONCLUSIONS

The results of the discussion and based on the results of the analysis, it can be concluded that the Results of the Validation of 3D Diorama Media on Mangrove Forest Ecosystem Materials from the results of the validation of material experts received very valid criteria with a percentage of 92.5% each. The results of the validation of 3D Diorama Media on Mangrove Forest Ecosystem Materials from the results of the validation of the Material Expert received very valid criteria with a percentage of 95.45%.

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