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Media development effectiveness of geography 3d muckups

S P Prasetya[1*], Daryono[2], and E Budiyanto[3]

[1,2,3,] Department of Geography Education, Faculty of Social Sciences and Law, Universitas Negeri Surabaya , Ketintang Street, Surabaya, 60231, Indonesia.

*email: sukmaperdana@unesa.ac.id

Abstract: Geography examines geosphere phenomena that occurs in a space associated with humans on earth's surface. Media 3D models are an important visual media in presenting spatial objects on the earth's surface.This study aims to develop a decent 3D mockups media used for learning materials and test the effectiveness of media geography 3D mockups on learning outcomes. The study involved 90 students of Geography Education, *Faculty of Social Sciences and Law,* State University of Surabaya. Method development using a model of the Borg and Gall (1989) which has been modified into three stages, namely the introduction, development, and testing. The study produced instructional media 3D Muckups eligible to be used as a learning medium for the material hydrosphere geography, geology, and geomorphology. 3D mockups media use in learning geography materials can increase the activity of students, student interest and a positive response to raise the student learning outcomes as the material can be delivered more concrete geography. Based on observations conducted student activity occurs continuously increase in the use of 3D models for learning geography material.

1. Introduction

Geography examines geosphere phenomena that occurs in a space associated with humans on Earth's surface. Learning geography will be interesting and meaningful if the submitted materials can be brought into the classroom with instructional media can manipulate the symptoms geosphere is the object of study of geography.

Media developments determined the birth of some new concepts and learning process [1]. Similarly, in the learning process on the material contained Geography identifies several ways in Geography material: The first way, the teacher tells the story of volcanic rock, landform mountains, symptoms volcanism or other types of eruption. Teachers can tell probably because of the experience, read books, other people's stories or seen those objects. When the students at the school did not know, had never seen such objects on the television or look at the pictures in the book, then how hard the teachers explain only with words about those objects.

The second way, teachers take students to field work see the objects. Teachers take students to Mount Bromo, Mount Semeru to, or assigns his students to make observations and field measurements. This method is more effective than the other way. But the problem is how much it costs to be borne, and how long it takes. This method is effective even if not efficient. Not perhaps all students can experience due to various constraints such as distance, space, and cost.

The third way, teachers bring drawings, paintings, photographs, slides, three-dimensional animation, film, video-VCD, about symptoms such volcanism. This will help teachers to give an explanation. Besides saving the world, save time, explanations teachers-would be more easily understood by students, attract, arouse the motivation to learn, eliminate errors of understanding, as well as the information presented to be consistent.

Of the problems mentioned above, in fact, there is one major issue that needs attention, namely the ability of teachers to motivate students in the subject. According to Phosuwan et al., [2] In applying methods of learning, teachers need to improve the skills of using the most effective learning style to provide the best benefits for students. Whatever method is used in teaching geography, without the use of the media, it will not be successful. In a geography lesson, the symptoms and natural processes is a real situation that can not always be provided by the teacher both in the classroom and in their environment. It is necessary for media that can provide a picture or an example of a real situation or example of an artificial situation in serving real impressions.

One of the media that can be applied weeks to improve learning outcomes of Geography is a 3D mock media. Media selection models provide a three-dimensional illustration that makes a real appearance with a smaller size in order to be able to understand easily the shape and characteristics - characteristics and change something abstract or real estate.

(2) Lecture (1) Field trip (3)Learning with media 3D

Figure 1 . Three ways teachers to teach Geography materials

Media 3D models are an important visual media in presenting spatial objects on the Earths surface.According to Bhatia et al., [3] the media visuals important to process information about the spatial location of the object and the object characteristics such as shape, size, weight, and texture. According to Natarajan [4], the planning of the construction appeared theoretical knowledge in visual media about the interaction between place and space (spatial) was built. Media 3D models can be applied in the form of method demonstration to enable the students. The application of learning methods as demonstrated by active media have significant advantages compared to conventional teaching methods [5].

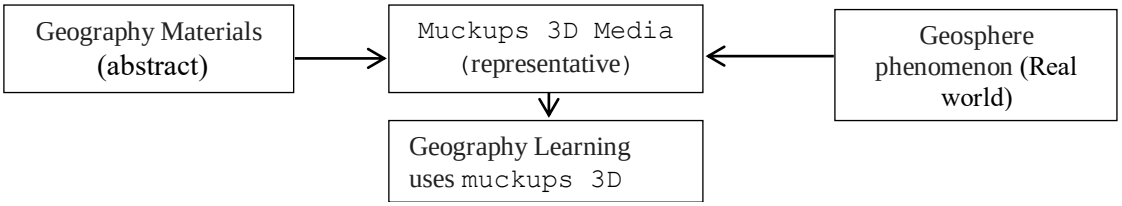

Figure 2. 3D Muckup combines an abstract geographic material with a real geosphere phenomenon on the surface of the earth.

2. Methods

Subjects in this study were 90 students who programmed even semester 2016/2017 on Education courses Geography, Faculty of Social Sciences and Law (FISH), State University of Surabaya. This type of research is the development of research, the development of teaching materials in the form of 3D Media mockups. Model development in this study refers to measures of research and development

Borg and Gall [6], modified to simplify it into three main stages, namely the introduction, development, and testing.

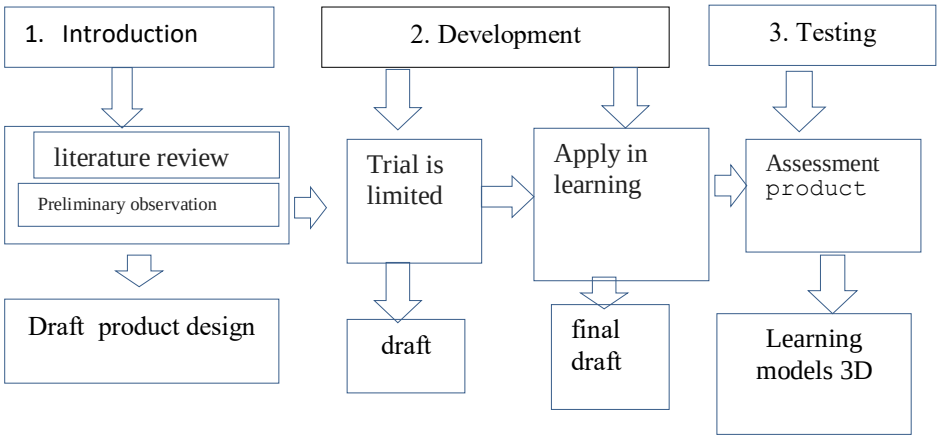

Figure 3. Groove scheme research and development (adapted from Borg and Gall, 1989)

2.1. Introduction

The drafting of media begins from the literature and the early observation about learning geography. The draft begins with determining the course objectives, materials, and methods contained within Semester Program Plan (SPP). Some of the courses that will be using 3D media, among others: Hydrology, Geology, and Geomorphology

2.2. Development

Products generated in research and development of instructional media in the form of 3D models. After development continued with 3D Media apply in lectures Hydrology, Geology, and Geomorphology

1. Hydrologic Cycle
2. Seabed Relief

3.River flow pattern
4. Soil profile

Figure 4. Various 3D Muckups Media

2.3. **Testing Models**

Testing conducted after the model of learning activities take place by deploying an instrument to determine the response of students to apply 3D media in teaching geography. This test uses *a one-shot design* (Tuckman, 1999 [7]). In this design, after an experiment conducted classes in the form of learning in later phases were observed through a questionnaire. Such designs as illustrated below:

$X \longrightarrow O$

where: X = the treatment of learning geography by using 3D media

O = observations through questionnaire responses of students

3. Results and Discussion

3.1. Results

of this development has resulted in a product in the form of instructional media using mockups 3D in Lectures in Geography at the material hydrology, geology, and geomorphology. Media 3D models expected to provide facilities for students to understand the concept and increase their interest in learning.

At the preliminary stage researcher observation to determine performance gaps, set goals, analyze learners, resources available, and work plans. At the stage of design (design), researchers hold or make things that are needed, develop formative evaluation design, and produce a testing strategy.

At this stage of development of the media that have been validated by a second person and first person media validator developed material to the media declared eligible to be tested in the individual testing, piloting a small group and large group trial. This stage researchers get feedback and advice from some expert media and materials, as for input and suggestions as follows:

Table 1. Suggestions and Feedback from Learning and Matter Expert

Validator	Advice
Media	Media 3D study model tailored to the material, looking for a good reference book or latest
Material	Notingsuitability media with the material being taught

After getting advice and input then done for product improvement then progressed to the validation stage. Validation results as follows:

Table 2. Summary of Results ValidationExpert

Validation	Percentage (%)	
Media	86%	Very decent
Expert Content	92%	Very decent

Table 2 shows that in the media that was developed 3D models are very suitable as teaching materials. During the implementation phase medium that has been tested in the individual testing, piloting a small group and large group trial subsequently applied to the real learning situation. Application of 3D mock media held for 8 sessions on the material hydrology, geology, and geomorphology.

For the media testing phase assessed by carrying out tests to determine the effectiveness. The unknown effectiveness of instructional media learning outcomes of students who take learning to use the medium of learning using 3D models in geography learning. Student learning outcomes on average reached 84 with the highest score of 98 and the lowest score 66. Assessment in the following study activities of students with learning media using 3D models in lectures geography. Observation aims to determine the activities undertaken by students during the learning process using 3D mockups media. Student activity observation results are presented in the following table:

Table 3. Observations of Student Activities

Meeting	1	2	3	4	5	6	7
Students Activity	68%	72%	76%	86%	88%	88%	90%

Table 3 shows that the average value of student activity which uses 3D mockups media in the learning process is 68% and 90% based on the interpretation of student activities included in the category of "active enough" and "very active". Activities of students have increased from one meeting to meeting to 7 which shows the enforceability of their lessons is good. The results obtained indicate the average percentage of 86% of activity is included in the excellent category or students' perceptions of learning media are very positive.

The results of student responses obtained from the analysis of the questionnaire given to students after conducting learning by using 3D models that have been developed. Here is the result of the analysis of the questionnaire responses of students to learning using 3D mockups:

Table 4. Results of student responses to the 3D Mockups

Aspect Rate	Percentage(%)
Design and 3D mockups look attractive	86.45
Mockups 3 D can be more concrete material	83.87
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Media 3D models can be operated by students and lecturers	81.29

Based on table 3 above is known to the average results of students' questionnaire responses learning to use the media as whole mockups 3 D get a percentage of 83.21%. This suggests that the response of students study using 3 D mockups media very well.

3.2. Discussion

Effective use of the media3 D models can be seen from the results of student learning. Improved learning outcomes by using 3D mockups media show that the development of the 3D mock media can assist students in learning to a better direction.

Based on the results of the tests conducted on the students get the excellent response ie with a percentage of 83.21%. This shows that the students gave a positive response and greatly assisted by the use of 3 D mockups media in learning activities. Media were able to increase student interest in learning will support the effectiveness of learning. Findings Huang et al., [8] states that the media can bring exploration and attract students will improve learning outcomes. According to Prasetya [9], the existence of media 3D models can be used to increase the interest, clarify and facilitate students' understanding of the material that has a field of study geography earth surface area.Temuan Sahasrabudhe and Kanungo [10], confirms the selection of appropriate media to the domain of learning and student characteristics can improve the effectiveness of learning.

Based on observations conducted student activity occurs continuously increase in the use of 3D models for learning geography material. Selection of media models provides a three-dimensional illustration that makes a real appearance with a smaller size in order to be able to understand easily the shape and characteristics and change something abstract become real. In this case, the student can see, touch, and feel directly the phenomenon of surface geosphere through media representations of 3D models.

4. Conclusion

Based on the development of instructional media through 3D models in a matter of geography, the study obtained as follows: (1) Revised product is improvement obtained from analysis of both the media experts, subject matter experts and students on validated products. Media that has been validated 3D models can be used for learning. (2) 3D mockups decent media can be used successfully to increase interest, activity, and student learning outcomes; (3) media 3D models equipped with the instructions for use can achieve the learning objectives namely the achievement indicators geography materials such as geology, geomorphology, and hydrology.

5. Acknowledgment

The author would like to thank University State of Surabaya for their support and assistance with this project and for their appreciation of the benefits to be gained from policy research of Faculty programs. The Dean of Social sciences and Law Faculty, Prof. Dr. Sarmini, M.Hum, for her contribution and attention.

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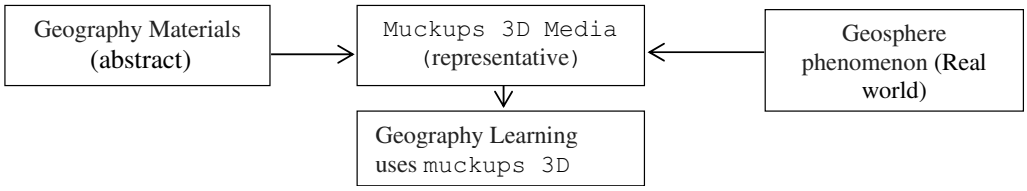

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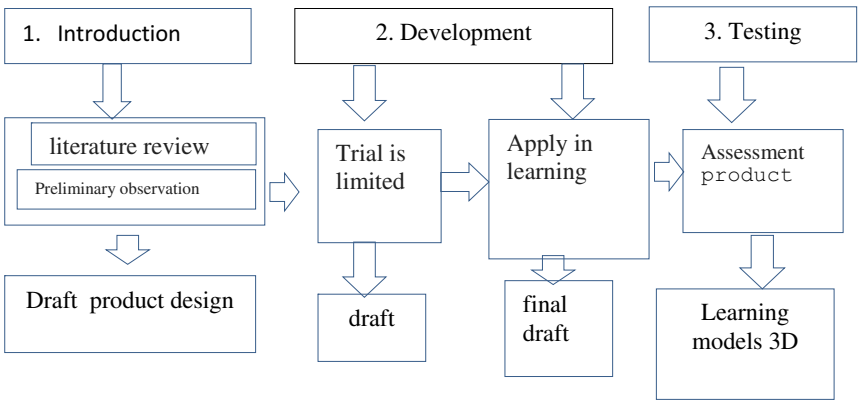

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