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Computer Based Multimedia Development on Geometry Teaching

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Abstract **– The purpose of this research was to develope computer-based multimedia learning with more contextual materials in teaching geometry for Middle School. This research was a developmental research. The research design in this study was Borg and Gall's design, which consits of: (1) Research and information collecting, (2) Planning, (3) Develop preliminary form of the product, (4) Preliminary field testing, (5) Main product revision, (6) Main field testing, (7) Operational product revision, (8) Operational field testing, (9) Final product revision, and (10) Dissemination and implementation. The products produced in this development research were Multimedia Learning that were packaged in CD form, consisting of; (a) the main menu, (b) Instructions for use, (c) learning material which was divided into two, they were sflat building material and building material. The response of the test subjects was obtained as follows: (1) the easeness of operating a multimedia CD based on usage instructions, stated as good = 16.67% and very good = 83,33%. (2) Display of images, animation, and color in multimedia, expressed as good = 8,33% and very good = 91,67%. (3) Systematics and clarity of material description, expressed as good = 16,67% and very good = 83,33%. After the results of the development in Multimedia Learning were packaged in CD form, this multimedia could be directly used by the teacher using computer. As for the total score analysis of the three aspects above the average score = 4.65 was categorized as very well. Thus, this research concluded that geometry products in multimedia learning were very easy to operate, systematic and needed by teachers and students.**

Keywords **– Multimedia, Learning, Interactive.**

I. INTRODUCTION

Mathematics is a universal science that underlies the development of modern technology, it has an important role in various disciplines in developing the power of human thinking. Thus, mathematics subjects need to be given to all students from Elementary School to equip students with the ability to think logically, analytically, systematically, critically and creatively and the ability to cooperate.

In reality each individual has different interests and views about mathematics. There are those who view mathematics as a fun lesson so they are very interested in learning mathematics and there are also those who view mathematics as a difficult lesson that causes them to be less interested in learning it.

Based on information from Middle School Mathematics Teachers in Kolaka District who participated in the MGMP in 2016, researchers found that students had the most difficulty in solving mathematical problems for geometry material, in this case the geometry material in junior high school comprises of; a triangle, rectangle, circle, and construct space. To overcome this problem, it was necessary to use a more creative and innovative multimedia learning that leads to Active, Creative and Fun Learning (PAKEM), so that the learning atmosphere in classroom were alive, fun and not boring. Therefore, the researcher overed a computer-based learning media with more contextual material that could be used to improve students learning outcomes in junior high school, especially on geometry material. However, this was still questionable. To implement geometry learning that utilizes computer-based learning media with more contextual material, it was necessary to prepare the Multimedia Learning that currently was not widely publicized.

II. LITERATURE REVIEW

A. *Definition of Learning Media*

The word “media" comes from Latin which is the plural form of "medium", literally means intermediary or introduction (Nurseto, 2011: 20). Association for Education and Communication Technology (AECT) (in Nurseto, 20: 2011), defines media as all forms and channels used for information processing.

In general, learning media in education are called media that is various types of components in the student environment which can stimulate them to think (Gagne, in Budi 2011). Briggs (in Tryanto, 299: 2013) stated that media are all physical tools that can present messages and stimulate students to learn. According to Antero (2016) the media is an intermediary for channeling messages / information that can stimulate students to find a sense of interesting to learn. Media is a tool that is used by teachers with design that are adapted to improve the quality of learning (Musfiqon, 2012: 28).

According to Latuheru (in Istiyanto 2011) stated that learning media are materials, tools, or techniques used in teaching and learning activities with the intention that the process of educational communication interactions between teachers and students can take place in an effective and efficient manner.

Based on the explanation that have been given, the researcher concluded that learning media is everything that is used in learning activities that function as channeling messages / information that can stimulate the thoughts, feelings, interests and attention of students so that the process of educational communication between teachers and students can take place effective and efficient.

B. *The benefit of Learning Media*

Learning media has several practical benefits in the learning process as stated by Arsyad (in Antika, 2016), they are:

1. By using learning media, it can be able to clarify the presentation of message and information to accelerate the process of learning and the learning outcomes.
2. Learning media is able to improve and attract students’ attention, which affecting to their learning motivation.
3. Learning Media can overcome the limitation of sense, space, and time.
4. Learning Media provides students with similar experiences about events in their environment.

In line with Arsyad, Nurseto (2011) stated four benefit of learning media, they are;

1. Equating Students’ Perception Menyamakan Persepsi Siswa. It means that by seeing the similar and consistent objects, students will have the same perception on describing the objects.
2. Concreting the abstract concepts. It means that when students want to explain the system of government, the economy, the blowing of the wind, etc. They may use media images, graphics or simple charts to present it.
3. Presenting objects that are too dangerous or difficult to obtain into the learning environment. In this case, the teacher can present the material by using pictures or films about wild animals, volcanic eruptions, ocea-

-ns, northern pole, etc.

4. Showing small or big objects. Here to present small or big objects that can not bring to the classroom, teacher may use media to display it. Such as; airplane, plane, bacteria, viruses, etc.

In addition, learning media can display slow or fast motion of some objects. By operating a slow motion in a film thing that can't be seen at glance might be captured, likes; the trajectory of the bullet, the darting of an arrow, or showing an explosion. Likewise a very slow movement of things such as sprout growth, blossoming of my wijaya flower, and so on.

C. *Computer Based Learning*

Around in the middle of the 20th century visual use began to be equipped with audio, so that audio visual aids were created, in line with the development of science and technology, currently the use of assistive devices, especially in the field of education is becoming more widespread and interactive, such as the use of computers and the internet (Triyanto, 230:2013).

According to Wena in Purwanto, 2015 learning that related to TI is currently becoming a concern in Education field that is a Computer-Based Learning model. Computer-based learning is learning that uses computers as a tool to deliver the materials in classroom. Through this learning media, materials are presented through computer therefore the learning process activities become more interesting and challenging for students.

According to Hick and Hyde (in Purwanto, 2015) said that with computer-based learning students will interact and deal directly with computers individually, thus, what is experienced by one student will be differ from what is experienced by other students. One of the most interesting characteristics of computer-based learning lies in the ability to interact directly with students.

So based on the explanation above, it can be concluded that computer-based learning is a teaching and learning activity carried out by teachers / lecturers with computers as a tool in delivering learning materials to make students interested and motivated in participating the learning process. In addition, by using a media to teach the students will not get bore with the classroom atmosphere.

III. METHOD OF THE RESEARCH

A. *Type and Design of the Study*

This study is a development research to create a product in the form of computer-based Multimedia Learning for geometry material that will be used at the level of junior high school. The research design used in this study was the design of Borg and Gall where there were 10 steps in implementing the research and its development strategy (Sukmadinata, 2008: 169):

1. Research and information collecting
2. Planning
3. Develop preliminary form of product
4. Preliminary field testing
5. Main product revision

6. Main field testing
7. Operasional product revision
8. Operasional field testing
9. Final product revision
10. Dissemination and implementation

B. *Setting and Research Subject*

This research carried out in Kolaka Regency. The subjects of this study were junior high school students in Kolaka Regency.

C. *Research Steps*

In this study, the researcher only conducting eight steps from ten steps provided in the Borg and Gall design, steps 7 and 8 were not carried out due to the time constraints. Referring to the development model of Borg and Gall, the results of the implementation of each stage were as follows.

At the Research and information collecting stage, researcher interviewed mathematic teachers who were participating in Mathematics Subject Teacher Discussion (MGMP). Interview activity was conducted to obtain clear information about the students' difficulties found by the teacher at the school. From the result of interviewing, researcher noted several important information such as; students' mathematics learning outcomes were still low, students had low understanding in geometry material, teaching geometry material took a lot of time especially when drawing something, students often look bored in class, so that, students needed an interesting presentation on mathematical material.

At the Planning stage, researcher designed Multimedia Learning to teach geometry, here the researcher made the presentation more interesting, that's why students were eager to learn geometry. In the Developing phase of the preliminary form of product, researchers and the team began to make the innovation in Multimedia Learning for teaching geometry from the materials that had been collected by collaborating several computer software such as; adobe flash, power point, photoshop and others.

At the Preliminary field testing stage, the subjects of the study were two teachers in one school. In this stage, the researchers found that the presentation of material was not appropriate, the animation did not assit the students to understand the materials, etc. Then, it revised at the main product revision stage.

The revised results were then re-tested at the Main field testing stage. At this stage the research subjects were 12 teachers in 12 junior high schools which spreaded out in 6 sub-districts in Kolaka district. The findings at this stage were then refined at the Final stage of Product revision.

In the Dissemination and implementation stage, researchers implemented the use of multimedia learning geometry in the classroom. During this stage, researchers also observe students during teaching and learning process. The students as the subject of this research seemed enthusiastic when the teacher presenting the geometry material through multimedia learning. Then, at the last meeting a test and filling out the questionnaire were held.

IV. RESULT

This research was conducted in two years. In the first year, several activities had been carried out, it covered; the initial survey, planning and preparation the material, collecting the data related to the material used, construction of multimedia learning, construction of research instruments, observation sheets, initial field trials, and revising multimedia based on the trial results. In the second year, wider field trials were carried out, final product improvements, and implementation.

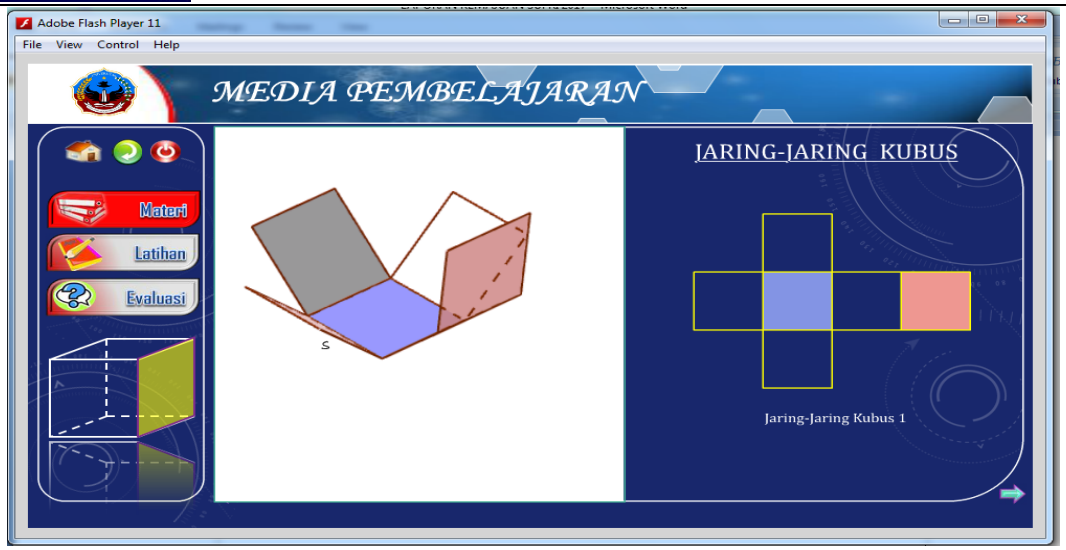
The assessment of the trial subjects obtained by using a questionnaire consisted of three things: (1) The easeness of operating a multimedia CD based on the instructions usage, (2) Display of images, animation, and colors in multimedia, (3) Systematics and clarity of material descriptions. The response of the test subjects were presented in the following table:

Table 1. Results of the assessment questionnaire.

	The percentage of response				
	1	2	3	4	5
The easeness of operating a multimedia CD based on the instructions usage	0	0	0	16,67	83,33
Display of images, animation, and colors in multimedia	0	0	0	8,33	91,67
Systematics and clarity of material descriptions.	0	0	0	16,67	83,33
response	1 : Very poor 2 : Poor 3 : Fair 4 : Good 5 : Verry good				

From the table, it could be seen that the majority of subjects assessment gave a "Very Good" to each aspect of assessment, none of the subjects claimed “poor” or “very poor” for each aspect. The total score analysis of the three aspects above was 4.65 which was indicated as very well. It means that multimedia learning applied in geometry material were very easy to operate, systematic and needed by teachers and students.

The display image of the multimedia learning outcomes could be seen in the following picture.



To see the effectiveness of using multimedia learning in geometry, researchers also compared the learning outcomes of students who were taught using multimedia learning (experimental class) with students who were not taught by using Multimedia Learning (control class). The average value of students in the experimental class = 80.58, while the average value of students in the control class = 78.24. The results of the t-test using SPSS obtained the value of Sig. (2-tailed) = 0.00 <= 0.05, it concluded that student learning outcomes were taught using multimedia learning significantly better than the learning outcomes of students who were not taught using multimedia learning.

The use of Multimedia in learning geometry gave a good stimulus to the students' main which made them more interesting to learn the material. Thus, the teacher should support the students in the learning process. This is in line with what was stated by Wahyuni, Rusmiyati, and Malik

Wahyudi (2014) suggested that interactive Multimedia Learning improved student achievement. Rusmiyati I. (2014) stated that the use of Multimedia in learning process has a Positive Impact on the quality of learning outcomes and learning quality. Malik (2012) stated that multimedia has enormous potential to provide flexible, multi-modal, lifelong education for heterogeneous learners.

V. CONCLUSION

The results of this research contributed to the mathematics learning especially in geometry material. The results of this research provided an alternative for teachers in teaching geometry using an interactive media that was computer-based learning media. In addition, not only using by the teachers when teaching, the results of this study could also be used by the students to study independently / outside the school environment.

The use of computer-based multimedia learning had a positive impact on the learning quality in the classroom along with the improvement of students learning outcomes.

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AUTHOR'S PROFILE

Sufri Mashuri was born on 13 November 1979 in Soppeng. He completed the bachelor at Universitas Negeri Makassar on 2004 on the Mathematic Education. On 2008 he continue at Post Graduate Program at Universitas Negeri Makassar at Mathematica Education and finished on 2010 and now he is one of the Mathematic Educational Lecturer at Sembilanbelas Nov ember University of Kolaka, South East of Sulawesi – Indonesia. The author also active in several research, some of the author are the effectiveness of cooperative learning STAD type by applying Van Hiele theory in geometry teaching and the iimproving of learning result of calculus course through visual media student's of Sembilanbelas November University of Kolaka, The effectiveness of using computer-based multimedia in teaching geometry at junior high school.