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## **Interactive Computer-Based Learning Media for Teaching Transformation Topic at Mathematics Class of Senior High School**

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### **ABSTRACT**

This research aims to produce interactive computer based learning media for transformation topic on to be used students of class XI Senior High School. This research uses a development model by Borg and Gall that has been modified by Sugiyono. The research steps starting by information collection formulated in needs analysis. Next step is the design of product storyboard in the form of paper based and followed by computer based design. At this stage of computer-based product was designed by using Microsoft Power Point application, Adobe Photoshop application and Front Page application. Learning media is further validated by the experts which then revised based on feedback and suggestions from the the experts. Learning media that have been validated and revised were tested through small group trials and large group trials on students of MAN 1 Pekanbaru. Based on the results of data analysis and discussion can be concluded that computer based learning media interactive multimedia model for transformation topic is considered valid (3.52) and had good practicality (3.71). This application is recommended to be used by teachers for teaching Transformation topics at Senior High School if the school provided computer facilities for their learning.

**Key word:** *Development Research, Interactive Multimedia, Computer-Based Learning Media*

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### **Introduction**

The rapid technological development makes technology an important necessity in today's life, the use of technology has played an important role in various fields such as industry, economics, politics, social, resilience, security and education. In the world of technology utilization education becomes one of the demands in the 2013 curriculum, where the learning process is expected to utilize available technologies such as computers and projectors. In principle, the use of technology must meet the qualifications in the 2013 curriculum where the learning process is centered on students and able to create fun and challenging conditions and able

to make students as independent learners. One means to realize all that is with the media-based learning technology. In general, instructional media has a usefulness: (1) Clarify the message (2) Overcome the limitations of space, time, and energy. (3) Fostering the passion of learning, more direct interaction between pupils and learning resources. (4) Enabling children to study independently according to their talents and visual, auditory & kinesthetic abilities. (5) Provide the same stimulus, equate experience and generate the same perception (Rudi Susilana, 2007). In addition, the media has the benefit of making abstract concepts into concrete concepts. The perceived concept is still abstract and difficult to explain directly to

the students can be concretized or simplified through the use of instructional media

Mathematics is one of the subjects in which there are many abstract concepts and it is difficult to explain directly to the students, where a tool is needed in explaining the abstract concepts. Utilization of instructional media can also provide variation in the learning process that has been mostly using conventional methods in the learning process, as well as with the utilization of this learning media can maximize the learning time.

Material transformation is one material that contains abstract concept and has many picture presentations especially cartesian coordinates which in the process of drawing there are fields or dots that change the position or size..

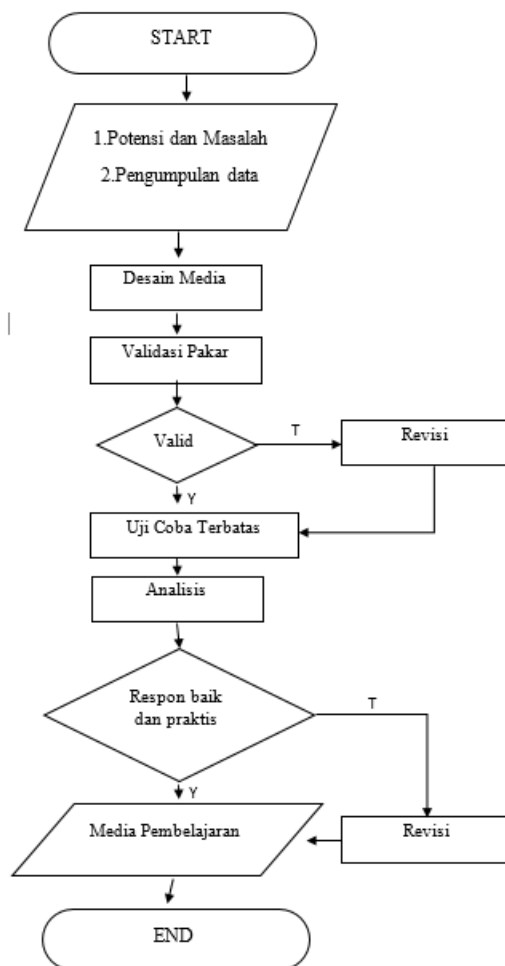
This is required of the presentation of learning that is able to visualize the process of field transformation or point so that students more easily understand the concept and more interested in learning it.

Based on the above description, the authors are interested to conduct research entitled "*Development Computer-Based Learning Media Interactive Multimedia Model For Transformation Topic Of Class XI Senior High School*"

**Methodology**

In the study of computer-based learning media interactive multimedia model on the transformation material of class XI SMA, the implementation of development research followed on Borg & Gall procedures that have been modified by Sugiyono. According sugiyono (2010) R & D cycle with modifications arranged in several research steps as follows (1) potentials and problems; (2) data collection; (3) product design; (4) design validation; (5) design revisions; (6) product trial; (7) product revisions; (8) trial

usage; (9) product revisions; and (10) mass production. However, the researcher only came to stage 7 because of time, energy, and cost limitations and this research was just to see whether the mathematics learning media that had been developed was valid and qualified for practicality was used. The stages



of research development in this study can be clarified through the following chart:

Learning media that have been developed next done 2 times testing. The first test on the subject of limited trials is the study group that will be randomly selected and consists of 5 students of class XI MAN 1 Pekanbaru. The second test on the subject of a large group that is all students in one class XI MAN 1 Pekanbaru.

Data collection on testing of instructional media using 2 instrument that is:

1. Media Learning Validation Sheet

The validation sheet Learning media will be filled or assessed by the experts used to find out the media feasibility in learning. The research instrument is validated theoretically, that is by consultation with research supervisor. The validation result is a ready-to-use instrument for collecting research data. Validation data from experts aimed to know the validity of the validity of learning devices of mathematics that will be developed. The validation sheet uses a Likert scale consisting of 4 alternative answers, namely 1, 2, 3, and 4 which states are very unsuitable, inappropriate, appropriate, and highly compliant.

2. Questionnaire Response Students

Questionnaire is a sheet that contains a number of statements to be answered by learners. This instrument is used to determine the response of learners to the learning media that will be used. Questionnaire response learners aimed to know the practicality of learning media that will be developed. Questionnaire response students using Guttman scale which consists of 2 alternative answers, namely Yes and No.

Data processing result of validation to learning media using formulation as follows:

$$\bar{M}_v = \frac{\sum_{i=1}^n \bar{V}_i}{n}$$

(Adapted from AnasSudijono, 2011)

Information :

$\bar{M}_v$  : Average total validation

$\bar{V}_i$  : Average validation of the *i*-th validator

*n* : Amountvalidator

The determination of the range can be known through the highest score minus the lowest

score divided by the highest score. Based on the determination of the range obtained a range of 0.75. The validation criteria of the average analysis used can be seen in the following table:

Interval	Category
$3,25 \leq \bar{M} < 4$	Very Valid
$2,50 \leq \bar{M} < 3,25$	Valid
$1,75 \leq \bar{M} < 2,50$	Less Valid
$1,00 \leq \bar{M} < 1,75$	Invalid

Source: Suharsimi Arikunto, 2004

Data processing result questionnaire of student response to learning media using formulation as follows:

$$P = \frac{f}{N} \times 100\%$$

Information :

P : the desired percentage

*f* : the frequency of learners who rated

*N* : number of statement items and questions on questionnaire response of learners

The criteria of questionnaire response of learners to the implementation of instructional media can be seen in the following table:

Interval	Category
81 – 100%	Very Practical
61 – 80%	Practical
41 – 60%	Practical enough
21 – 40%	Less Practical
<21%	Not Practical

Source: Sugiyono, 2008

**Result and Discussion**

In the first stage the researcher again performs the problem analysis in the transformation learning. The analysis is done on the syllabus of the curriculum in 2013 so that the learning media fulfill the purpose, the direction and the target in the learning process based on the curriculum of 2013, then on the analysis of transformation material problems encountered is the presentation of drawings that the process is not illustrated so that students difficult to distinguish the types of

transformation that happened, it is the number of images that should be presented when the teacher explains that it takes a lot of time to describe the process of the tape transformation so as to reduce the efficiency of the learning time. Another problem is the availability of transformation learning media that is still rarely found to make teachers still monotonous using whiteboard as a tool in learning so that there is no variation in the learning process.

Based on the above analysis to support and facilitate the learning process required instructional media as a tool to achieve the goal, direction and target of learning maximally and realize the learning more variation, interesting and efficient on learning material transformation.

In the next stage is the design of instructional media, this stage is divided into 2 stages of Paper Based Desing, at this stage the researchers create a sketch of learning media display starting from the initial display, main menu, materials, exercises, and display instructions, then realized at the stage of Computer Based Desing where sketches of display media are visualized using computer, on computer based using main program microsoft power point and assisted other program such as Adobe Photoshop, Adobe Illustrator, and Adobe premier, in making design and video animation.

In paper based desing The initial view is planned to have an interesting display to build the spirit and interest of students in learning, on the initial display is only presented 1 navigation button is the "Start" button to start and go to the main menu display. In the Main Menu will be presented 5 navigation buttons that are Materials, Exercises, Instructions, Media Information, and exit button. The material is divided into 6 sub-material that is the introduction to explain the supporting material and the basic material which must be

remembered before the start of learning, then Translational Material, Reflection, rotation, dilation and composition of transformation, the material is presented with video tutorial model while on the exercise display will be presented more interactive with the quiz model is divided into 3 ie Quiz 1, Quiz 2 and Final Exam. The instructions contain information on the use of media, media usage rules and learning objectives of KI and KD. While on the media information contains brief information about the background of making the media.

In computer based desing, the reasliation of media design begins with the creation of animated transformation material and some of the required images on display using adobe photoshop, adobe illustrator and microsoft power point. Then prepare the audio used to fill the video tutorial, this audio is obtained from the internet and the recording using voice record. Next animation and audio are put together into a video tutorial using the premier adobe app. Lastly all tutorial videos and other materials will be compiled into a program using microsoft power point application.

Learning media that has been designed is then entered ketahap validation by three validators based on validation instrument that has been prepared, then researchers analyze the validation results. the average validation results can be from the table below.

No	Rated aspect	Average	Validation Categories
1.	Material	3,17	Valid
2.	Media	3,30	Valid
<b>Average total</b>		3,24	Valid

Based on the above table it is known that the developed learning media is considered to meet the criteria very valid. Validators also provide suggestions for improvements to learning media.

The next step is to test the learning media. Testing conducted through two stages of testing in small groups and testing in large groups. In this small group was tested to 5 students of class XI MAN 1 Pekanbaru. The results of small groups tested for learning media that have been developed can be seen in the Table below.

No	Rated aspect	Percentage	Categories
1.	View	96,7%	Very Practical
2.	Presentation of Material	100%	Very Practical
3	Program	100%	Very Practical
<b>Average</b>		98.89%	Very Practical

Based on the above table it can be seen that the media that have been developed to score 98.89% with very practical criteria. The questionnaire results for each indicator is over 90%. This indicates that the media that has been developed can be used by students who have heterogeneous capabilities. Based on the results of interview researchers to students, they say that they understand learning by using media that has been developed. after the researcher improve the instructional media as recommended by the students is tested in large group tested on 35 students of class XI MAN 1 Pekanbaru consisting of 5 students who have followed testing in small group and 38 students who have not follow testing in small group. The results of large group trials can be seen in table below.

No	Rated aspect	Percentage	Categories
1.	View	98,33%	Very Practical
2.	Presentation of Material	100%	Very Practical
3	Program	99,16%	Very Practical
<b>Average</b>		99.17%	Very

**Practical**

Based on the above table it can be seen that the results of trials in large groups on media that has been developed to score 99.17% with very practical criteria based on the response of students. The questionnaire results for each indicator is over 90%. This shows that the media that has been developed has met the standard of practice and can be used by students who have heterogeneous capabilities. Based on the results of the interviews of the researchers to students, they said that they understood the learning by using the media that had been developed and it was new for them to learn math and make them more interested in learning mathematics than using explanations on the blackboard.

Based on the results of validation and response students developed this learning media has been valid and meets the requirements of practice and can be used by heterogeneous students. And can be a tool of teachers and students in learning material transformation class XI.

**Conclusion**

The development research conducted is the development of computer-based interactive learning media on the transformation of class XI SMA. Based on the validation and testing that has been done, it can be concluded that the learning media that has been developed is declared valid and meet the practical requirements for use by students of class XI. This medium was developed to facilitate the study and understanding of transformation concepts especially on the visualization of the transformation process. This media also become one of the variation of learning process that can be utilized by teacher to make learning process more interesting and efficient in studying material of class XI transformation.

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