Development of Interactive Multimedia for Learning of Isometry in Course of Geometry Transformation

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ABSTRACT

Researchers are keen to develop interactive multimedia of web-based learning for topics advance isometry on courses of geometry transformation. Development of interactive multimedia learning using Microsoft Power Point, Adobe Reader, paint, and mobirise.net. Products that can be generated in this research are interactive multimedia to Students who follow courses of geometry transformations. The specifications of products packaged in Compact Disk (CD). Instruments for data collection form validation sheets about Learning Media and questionnaire for students. The results of the analysis of interactive multimedia learning validation shows very valid. The results of the analysis of responses shows that the practicalities of students well categorized. Aspects category to see a very good, well categorized presentation of the material aspects, and aspects of the program is very good category. The results of data analysis questionnaire for students found that the use of interactive multimedia web-based learning has been eligible practicalities so that it can be used in learning. Display interactive multimedia learning with animations very attractive, making the students easily understand the learning materials. In this development research, producing instructional CD which can then be used researchers to examine other aspects of learning and research.

Keywords; *Development of Interactive Multimedia, isometry, practicalities of media*

Introduction

Learning should be able to create fun and challenging conditions so that students become independent students. One of the efforts to realize it needs a technology-based learning media.

Mastery of mathematics students on the concept of transformation in the course of transformasi geometry is still weak. Among others; students are less able to apply the theorem in problem solving, less able to sketch the graph to solve the problem.

In relation to the problem, the researcher develops computer-based learning media that is interactive multimedia for material of advances isometry in the course of transformation geometry.

The formulation of the problem in this research is what is the interactive multimedia product for material of advances isometry in the course of transformation geometry that is valid and meets the requirement of the practicable for students?

This study aims to create a product of an interactive multimedia in material of advances isometry in the course of transformation geometry that is valid and meets the requirement for practicality.

Interactive multimedia web-based packaged in Compact Disk (CD) with the following details:

1. Mobirise.

In this software there are 4 (four) menu buttons are: 1) Home, 2) Main Menu, 3) video, 4) About Me

2. Microsoft Power Point,

In this file contains learning document on Advanced Isometry

Sadiman Arif, et al. (2012) states that the media are the various types of components in the environment of students that can be stimulating to learn. Arsyad Azhar, (2012) explains that learning media is a tool that is physically used to deliver learning materials. Learning media can be books, tape recorders, videotapes, movies, slides, photos, pictures, television, and computers.

The summary of the description, that is meant by instructional media is the various types of components and resources in an intermediate environment in a learning activity, involving a person in an effort to gain knowledge, skills and positive values.

Arsyad Azhar, (2009) states that the benefits of instructional media; (a) Make concrete concepts abstract, (b) Overcome the limitations of the senses, space and time. (c) Displays objects that are too large or small, (d) Show movements that are too fast or slow.

Rusman, (2011) states that multimedia is the use of computers to create and combine texts, graphics, audio, moving images (video and animation) by combining links and tools that allow users to navigate, interact, create, and communicate. Interactive is the most important characteristic in the media, that students not only pay attention to the media or objects, but also required to interact during the learning.

Yudhi Munadi (2008) stated that the advantages of using interactive multimedia in learning are: (a) interactive because interactive multimedia is designed to be used by individual users; (b) provide individualized climate because it is specially designed for self-study; (c) the needs of individual users can be accommodated, including those who are slow in the recipients of the lesson; (d) improve students' learning motivation, (e) provide feedback, (f) the source control is available in the user.

Methodology

Researcher refers to Sugiyono (2010) cycle, with the modification of several steps of the study as follows:

1) Potentials and Problems

Students as prospective teachers are required to have adequate knowledge of the transformation and have insight into computer-based learning. The problem is the difficulty in describing the transformation process and has not found the multimedia for learning of this transformation other than vidio.

2) Data Collection

Data that needs to be collected are various information and literature studies as material for specific product planning that is expected to solve the problem.

3) Interactive Multimedia Design

The design of this learning medium begins by designing paper based. The next media is designed using microsoft power point as the main application, using Adobe reader

application, adobe creator in making animation, and using mobirise.net application to create web based display.

4) Multimedia Validation

Design validation is an activity process to assess whether the product design will be valid and feasible to use (qualify for practicality). This multimedia validation is done by requesting the willingness of three experienced experts to assess multimedia.

5) Interactive Multimedia Revision

Interactive multimedia that has been validated is then analyzed and used as a basis for revising the design.

6) Test Design

Interactive multimedia that has been revision then tested the product. Product trials are conducted on students who take the Geometry Transformation course in odd semester 2016-2017 in Mathematics Education FKIP of University Riau

7) Product Revision

This product revision is done after field trial and if there are still deficiencies and weaknesses so that it is obtained by interactive multimedia on material of advanced isometry in the course of transformation geometry.

Data Collection Instruments is: a) Learning Media Validation Sheets, that developed with validation indicators: 1) Aspects of Learning, 2) Program Aspects, 3) Aspects of Display. b) Questionnaire of Students Response. This instrument is based on 3 aspects of multi-media practice grid.

Data collection technique:

(a) Interactive Multimedia Validation Sheet The lesson is filled using a Likert scale consisting of 4 alternative answers, namely 1, 2, 3, and 4 which states highly inappropriate, inappropriate, appropriate, and highly appropriate.

(b) Questionnaire of Student's Response, using Guttman scale consisting of 2 alternative answers, ie Yes and No. Questionnaire The response of this students contains several statements consisting of positive and negative statements.

Data analysis technique:

(a) Analysis of validation of multimedia

This analisition uses the formula;

$$\bar{M}_v = \frac{\sum_{i=1}^{n} \bar{V}_i}{n} \quad \text{(Anas Sudijono, 2011)}$$

Description::

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

$\bar{V}_i$: the average of the i-th validator

n : number of validators

The average validation criteria used can be seen in table 1.

Table 1. Criteria for multimedia validity

Interval	Category
$3,25 \le \bar{M} < 4$	Very Valid
$2,50 \le \bar{M} < 3,25$	Valid
$1,75 \le \bar{M} < 2,50$	Less Valid
$1,00 \le \bar{M} < 1,75$	Not Valid

Source: Suharsimi Arikunto, 2004

(b). Questionnaire analysis of students' responses

Values on the guttman scale (Sugiyono, 2010) are used to analyze the students's responses; ie for positive statements with scores of 1 and 0, and for negative statements with scores of 0 and 1. Next use the following formula:

$$\bar{R} = \frac{\sum_{i=1}^{n} \bar{x}_i}{n}$$ (Anas Sudijono, 2011)

Description:

$\bar{R}$: the average value of the students's response

$\bar{x}_i$: the average value of the i-th students's response

n : number of students

The respondents questionnaire criterion responses to the performance of learning media are presented in Table 2.

Table 2 Criteria for Student Response

Scale	Score Range	Criteria
4	$\bar{x} > 0,8$	Excellent
3	$0,6 < \bar{x} \leq 0,8$	Good
2	$0,4 < \bar{x} \leq 0,6$	Not so good
1	$\bar{x} \leq 0,4$	Very bad

Source: *Sugiyono, 2010*

In this research, multimedia learning is practical when it meets the "Good" or "excellent" criteria of the student's assessment.

Result and Discussion

The research and development of this research is the steps (Sugiyono, 2008) as follows:

a. Potentials and Problems

Potential and problem solved through need analysis. There is no advanced interactive multimedia learning multimedia yet. Based on that need analysis, researchers have the idea of developing interactive multimedia

based web-based learning. This learning media is developed so as to facilitate the learning activities of students independently.

b. Collecting Information

Various information can be used as material for product planning. Software used is some microsoft power point program with animation and hyperlink display. Mobirise.net application software for web view. Application paint, adobe reader, adobe creator, and microsoft word as well as video learning to create display accessories that can be used as interactive buttons and documents and video learning.

c. Product Design

This paper based design is used to design the display of material of advanced Isometry in the course of Transformation Geometry on web-based learning use computer.

Validation on interactive multimedia web-based learning on the topic of Advanced geometry transformation geometry course was conducted by research on the validation of construction by using expert opinion (judgment expert). This interactive multimedia learning was assessed by 3 validators, an experienced lecturer in computer application.

Validation for interactive multimedia web based learning by assessing 3 aspects ie learning aspect, program aspect and display aspect. The results of interactive multimedia-based validation validation can be seen in Table 3.

Table 3. Validation Results of Multimedia Learning

No	Validator	Total	avereg	Categori
1.	Validator 1	115	3.59	Very Valid

| 2. | Validator 2 | 108 | 3.47 | Very Valid |
| 3. | Validator 3 | 102 | 3.28 | Very Valid |

The result of interactive multimedia validation of web-based learning is very valid. Validation data are described as follows:

a. Results of the Validation of Learning Aspects. The entire item for the learning aspect is considered very valid. Data validation results from 3 validators with an average of 3.57 is categorized very valid.

b. Results of Program Aspect Validation

The results of interactive multimedia validation of web-based learning for aspects of the curriculum are very valid. Data validation results from 3 validators with an average of 3.48 is categorized very valid.

c. Display Aspect Validation Results

The result of interactive multimedia validation of web based learning on Display aspect is good. The entire statement item for the Display aspect is considered valid by the validator with an average of 3.17 valid categories.

Comments and suggestions from validators for media development are as follows;

1). There needs to be a menu of instructions for the use of interactive multimedia learning which is made a separate menu. The hint menu focuses on the home file that will be first opened by the user.

2). "Links" that have been created need to be checked again. This is because the validator found no links for learning purposes.

3). Need to add description instructions on the learning menu.

4). In the aspect of the display should also be given color marks vary for the menu buttons that are different from those contained in the main menu. And check the function of the button to work immediately.

Researchers revised interactive multimedia web-based learning from three aspects. Revisions made by researchers on the opening file and learning aspects.

Interactive multimedia web-based learning trials conducted as much as 1 time; As long as students learn to use interactive multimedia, the researcher acts as a companion. If students experience difficulties or need help then the researcher will provide help or direction.

In the trial process, students have to ask about material explanations and about the use of buttons contained in interactive multimedia. Researcher see the good enthusiasm of students. This is seen during the learning process, students eager and interested to follow the lesson.

After the students use interactive multimedia, the researchers conducted question and answer and questionnaire to know the response of students about used interactive multimedia in web-based learning. The results of the response analysis of students described that the average of practice 0.77 good category. The display aspect with an average of 0.86 is very good, the presentation aspect of the material with an average of 0.65 is categorized well, and the program aspect with an average of 0.82 is very good category.

The comments presented obtained from the questionnaire of the students' responses the following;

1) Advantages of Interactive Multimedia Learning. Students who have used interactive multimedia web-based learning are very happy when learning to use this interactive multimedia learning. The existence of animation on interactive multimedia makes the display not boring. Thus the learning process becomes more fun. Students write comments and suggestions that they can operate this media easily. This media comes with clear instructions for use.

2) Disadvantages of Interactive Multimedia Learning. Students suggest that this interactive multimedia web-based learning can be using the Indonesian language only, learning videos should be equipped with loudspeakers.

Learning materials contained in this media is made by using animations that allow students to understand the learning materials. The existence of the navigation buttons on every page in this media makes this media very flexible.

Based on the results of the trial, the researcher revised this medium. Revisions made by researcher by examining all components of interactive multimedia learning, then packaged in Compact Disk (CD).

Figure a) is "Startup (HOME)" and picture b) is "Main menu view".

picture b) is "Main menu

Analysis of data validation results on interactive multimedia, indicating that the medium has been at a very valid level with an overall average value of 3.45. According to the validator assessment, interactive multimedia computer-based with learning of interactive tutorial model on the subject matter of Advanced Isometry can already be used by students with some improvements.

In the experiments of web-based learning using interactive multimedia obtained the results that the level of legibility is good seen from the response of students very well. Students judge that learning of interactive multimedia web-based can make learning more fun and interesting.

The analysis of questionnaire data of students' responses in interactive multimedia experiments shows that the medium has been fulfilled the requirements of practicality so that they can be used in the learning process. Display interactive multimedia learning with animation is very interesting, making students easy to understand learning materials.

Conclusion

This research produces the product of CD on learning using interactive multimedia of

web-based at topic of Advanced Isometry in Courses of Transformation Geometry. This multimedia is very valid, after going through the validation process. This multimedia has been fulfilled the requirements of practicality so that it can be used in the learning process.

Recommendations by researchers, focused on researchers who wish to conduct further research as follows:

1. to be forwarded to other topics in the course of Transformation Geometry or other courses.

2. to be used by researchers to examine other aspects of learning, such as the linkage of this learning media with the effectiveness of learning.

References

Anas Sudijono. 2011. *Pengantar Statistik Pendidikan.* Jakarta: Rajawali Press

Arsyad Azhar. 2009. *Media Pembelajaran*.Jakarta: Raja Grafindo Persada Rineka Cipta

Azhar Arsyad. 2012. *Media Pembelajaran*. Jakarta.PT. Raja Grafindo Persada..

Rusman. 2011. *Model-model Multimedia Interaktif Berbasis Komputer*. P3MP UPI. Bandung.

Sadiman arif S, dkk. 2012. *Media Pendidikan*. Depok . Rajawali Pres

Sugiyono. 2008. *Metode Penelitian Kuantitatif, Kualitatif, dan R&D.* Bandung. Penerbit Alfabeta.

Sugiyono. 2010. *Statistika untuk Penelitian*. Alfabeta. Bandung.

Sugiyono. 2012. *Metode Penelitian Pendidikan Pendekatan Kuantitatif, Kualitatif dan R&D*. Alfabeta. Bandung.

Suharsimi Arikunto. 2004. *Evaluasi Program Pendidikan.* Jakarta: Bumi

Yudhi Munadi. 2008. *Media Pembelajaran.* Jakarta.Gaung Persada (CP) Press Aksara.