PENGEMBANGAN MEDIA PEMBELAJARAN MATEMATIKA INTERAKTIF MATERI PYTHAGORAS DENGAN PENDEKATAN KONTEKSTUAL UNTUK KELAS VIII SMP

Jurnal

Diajukan kepada Fakultas Matematika dan Ilmu Pengetahuan Alam
Universitas Negeri Yogyakarta
untuk Memenuhi Sebagian Persyaratan
guna Memperoleh Gelar Sarjana Sains

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PERSETUJUAN

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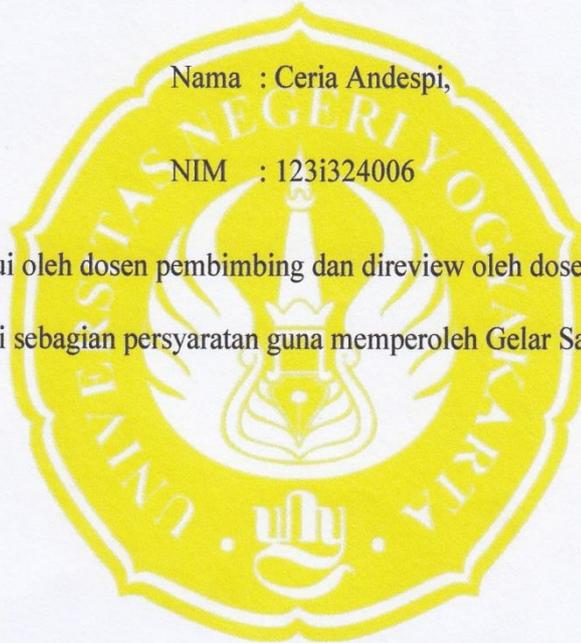
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DEVELOPING INTERACTIVE MEDIA FOR LEARNING MATHEMATICS PYTHAGORAS MATERIALS WITH CONTEXTUAL APPROACH FOR GRADE 8th JUNIOR HIGH SCHOOL

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Abstract

This research aims to develop interactive learning media using contextual approach for Pythagoras Theorem material for grade VIII students of Junior High School. This developed media was using ADDIE method which consist of the following steps: analyze, design, development, implement and evaluation. The data from this research were in the form of quantitative data through learning media evaluation questionnaire by mathematics teacher of junior high school, students responses questionnaire and test results and were in the form of qualitativ data through feedback and suggestions on the developed learning media product appropriate with developing procedure according to media and materials from expert judgment. Overall, the developed media was suitable media because it fulfilled valid and practical criteria as follows: (1) the materials on the quality of content and the goal aspect got the final score 91.75% and 86.25% for instructional quality, (2) the materials on the technical quality aspects got 89% so it is categorized as valid media, (3) the trial result got final score 93.33% and the media is categorized as a very practical media.

Keywords: interactive learning media, pythagoras theorem

INTRODUCTION

Mathematics is a science dealing with shapes or abstract structures and the relationships between them, and in order to understand its relationship and its structure requires an understanding of the concept in mathematics. Thus, according to Hudojo (2005: 160) to facilitate the teaching of a definition/concept are using objects, pictures and concrete or semi-concrete things, in this case it is needed to have a media/prop which helped bringing the material from concrete to abstract.

Learning media is one of components in educational process. Murdanu (2005: 4) explained that a learning media is everything which can be used to deliver a message (learning content) from the source to the receiver so it can stimulate brain, feeling, attention and learning interest of the learner in such a way the learning process occurs. Besides, media has some advantages which are: assisting teacher in presenting the materials, a media is also seen as a communication tool which linked between the abstract idea and the real word, a learning media also helps in making interaction process,

communication and materials delivery among teacher and students run accurately and efficiently. Deni Darmawan (2012: 55-56) explained that computer-based interactive learning program has more values than using usual print learning media. Interactive learning can activate the students to learn with a highly motivation because of their interest in multimedia system which can serve texts, pictures, video, sound, and animation. Adobe Flash CS3 was choosen as a main program to develop interactive learning media in the form of application which can be easily accessed and understood by students.

Learning mathematics on pythagoras theorem materials requires an approach which can construct students thought, since with such an approach students can easily in understand the concept given. One of which is contextual approach which has seven main pillars namely: (a) constructivism, (b) inquiry, (c) questioning, (d) learning community, (e) modelling, (f) authentic assessment, (g). reflection so students are more active in teaching and learning process.

This study is a research and development which aims to develop product of interactive

learning media on pythagoras theorem for students grade VIII of junior high school.

RESEARCH METHOD

This research is a research and development that aims to develop a certain product and to test the product feasibility. The developed product is in the form of interactive mathematics learning media for pythagoras theorem material with contextual approach.

Media product is validated by material expert and media expert. The validated aspects were content and goal quality, instructional quality and technical quality. The type of data which had been obtained from validation result and try-out were quantitative and qualitative data. Qualitative data were obtained from feedback and suggestions on the developed product of appropriate learning media with the developing procedure according to media and material experts and quantitative data were obtained from learning media evaluation questionaire by mathematics teacher of junior high school, students responses questionaire and achievement test.

The try-out of the product conducted at SMP Negeri 2 Mlati with the subjects of 31 students of grade VIIIC and a mathematics teacher.

Type of the Research

This study was Research and Development (R&D) which applied ADDIE model of development. This study used ADDIE model which consists of five steps which were analyze, design, development, implement and evaluation.

Time and Place of the Research

This study was conducted at SMP Negeri 2 Mlati on January 5th 2016 up to Febuary 6th 2016.

Target/Subjects of the Research

The subjects of the research were students of SMP N 2 Mlati with sample of 31 students of grade VIIIC and a mathematic teacher.

Procedure

This study was conducted through 5 developing steps of ADDIE which consist of:

1. Analyze
   Things had been done:

   a. Analysing the characteristics and students' need of grade VIII.

   Analysing the characteristics and students' need function to know students' need of junior high school students and to know cognitive capability of junior high school students.

   b. Analysing curriculum

   Analysing curriculum of mathematics in junior high school grade VIII on Pythagoras theorem topic, are analysing about standar of competence, basic competence, and indicators.

   c. Analysing Technology

   Analysing technology is used for determining tools and product that will be developed. The main program was using *Adobe Flash* and supporter programs were using: *Corel Draw, Photoshop, Microsoft Word, and Paint*. Besides, it functions to know the technology available at school, tools and infrastructure, and program mastered by students.

   d. Analysing situation

   Analysing situation is intended to know school situation and condition as a research place like students characteristics, communication, area, achievement and tools and infrastructure of SMP N 2 Mlati.

2. Design

   On design phase, learning media design is made based on the analysis had been done, including arranging instruments, making storyboard and flowchart, and designing material.

3. Development

   Development consists of 2 phases:

   a. Production

   Developing media starts from designing media plot, making navigation, writing text, providing sounds effect. After media has already completed, media created in the form of CD. In this phase, the writer also made lesson plan, research instrument to assess developed media whether it was appropriate or not, and test items for assessment test.

   b. Post production

   In this step, the media that had been made is validated by material and media experts to get revision. The revision was carried out according to the evaluation results by media and material expert.

4. Implementation

After the media was validated and said to be valid by the two experts, the media then was tried out to the students of grade VIII. The try out was done to know students feedback toward the developed learning media. After the try out had been done, the students filled out students' response questionnaire related to the developed learning media and there would be the assessment test. In this step, mathematics teacher gave feedback toward the media being trial.

5. Evaluation.

Evaluation step aims to know the effectiveness of the media had been made to be implemented on the learning process. The evaluation result was carried out by analysing students response questionnaire, achievement test and feedback from teacher.

Data, Intsrumen, and Data Collection Techniques

The data used in this research and development are as follows.

1) Qualitative data

Qualitative data was obtained from the feedback and suggestion about the developed learning media product appropriate with the developing procedure according to media and material experts.

2) Quantitative data

Quantitative data was obtained from the evaluation questionnaire by mathematics teacher of junior high school, students response questionnaire and avhievement test.

Instrument

The instruments used in this research and development are : validation questionnaire by material and media experts, students opinion questionnaire, media evaluation questionnaire for teacher and learning conduct sheet.

Data Collection Techniques

1. Literature

Literature is used to obtain the data related to the technical term or definition used in this media, whether it was used as reference or as the reinforcement of research data. Literature technic was done to analyse students' characteristics and curriculum. Analysing curriculum can make reference to literature related to standard of content including standard of competence and basic competence to obtain the appropriate material.

2. Questionnaire

Questionnaire is used to evaluate the developed media, to validate and to try out. Those questionnaire would be given to media and material experts to determine media feasibility and media evaluation as revision reference before the try out.

Data Analysis Techniques

Qualitative data which is in the form of suggestion/comments on evaluation sheet by validator, analysed descriptively. The data analysis is used as developed media revision as follows.

1) The average score of product assesment, using the following formula:

$\bar{X} = \frac{\sum x}{n}$, where $\bar{X}$ is the average score, n is number of items, and $\sum x$ is the total of score items.

2) The average score obtained of each aspects converted to the form of qualitative data in the form of product reliability level presented on table 1.

Table1. Convertion of Actual Score to Qualitative Category from interval 1 to 5 (adapted from Sukarjo, 2006)

No	Interval	Scor	Category
1	$\bar{X} > 4{,}2$	A	Very good/high
2	$3{,}4 < \bar{X} \leq 4{,}2$	B	Good/high
3	$2{,}6 < \bar{X} \leq 3{,}4$	C	Enough
4	$1{,}8 < \bar{X} \leq 2{,}6$	D	Less/Low
5	$\bar{X} \leq 1{,}8$	E	Very less/ lower

nformation:

$\bar{X}$: Actual score

$\bar{X}_i$: ideal mean score = ½ (ideal maximum score + ideal minimal score) = ½ (5+1) = 3

SBi :ideal standard deviation = 1/6 (ideal maximum score-ideal minimal score) = 1/6 (5-1) = 0,67

FINDINGS AND DISCUSSIONS

FINDINGS

The developed interactive learning media then was tested to know the validity and reability by some experts and students as the media users. Below is shown menu page media.

On the media there were 8 menus which are writer and supervisor profile, basic competence including standard competence and basic competence used in developing media, the whole materials about Pythagoras, Apperception, user instruction for use that shows how to use instructional media, quiz for try out and acievemnet test.

Picture 1. Menu Media
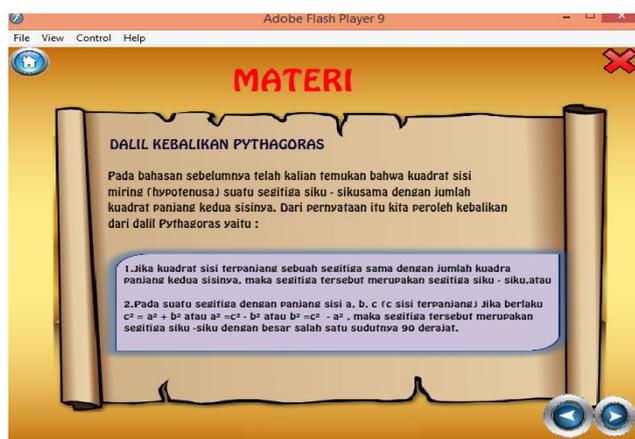
Picture 2. Material page

Developing interactive learning media has been done using *Adobe Flash CS3* and developing ADDIE model. Those learning media consist of 3 main parts which were material, quiz, and interactive test. The material was about pythagoras theorem appropriate with the standard of competence and basic competence. This media was also completed with interactive test items (evaluation). Materials, quiz and achievement test designed appropriate with contextual approach so the students can construct their own thought and they can easily understand the concept given. The learning media was also completed with instrumental music which attract the students. It was expected that students will be encouraged and motivated to learn.

DISCUSSIONS

The developed interactive learning media was validated by material and media experts. Validaty aims to know the the quality of learning media and reliabilty field trials. The validity result from material and media experts are fully shown on Table 2.

Table.2 The result of media validity

No	Aspects	Score	Categorized
Material Expert			
1.	The materials on the quality of content and the goal	91,75%	Very Good
2.	instructional quality	86,25%	Very Good
Media Expert			
3.	Technical quality	89,%	Very Good
Average		**89%**	**Very Good**

Material and media experts were also giving some suggestions for revision before field trial. After revision had been done and learning media was said to be reliable to be implemented then the next step was implementation. On implementation, every students was given a right to be responsible to learn by themselves. So, every students can choose the materials going to be learnt. After the implementation, every students was given a questionnaire to know their few about the media. Students' responses on implementation was categorized very good with the range score 83.53%. The results of students response are fully shown on table 3.

Tabel.3 The results of students responses

No	Aspects	Score	Criteria
1.	Help the activities of student learning	88,35%	Very Positive
2.	Give a positive imoact for student	79,95%	Very Positive
3.	The use of the media	82,3%	Very Positive
Average		**83,53%**	**Very Positive**

Some comments of the students which were written on the questionnaire or told directly show that they were very minded and motivated to learn. This is also supported from the test results which shows 93.33% students are pass the exam with the range score 86.7.

CONCLUSIONS AND SUGGESTIONS

Conclusions

From designing, evaluating and discussing above, so it can be concluded as follows:

1. The developed interactive learning media fulfilled very good criteria according to learning media expert judgment which measured based on the content and objective quality, instructional quality and technical quality with range score 89% and categorized as very good.

2. Students' response toward the developed interactive learning media were very good with range score 83.53%.

Suggestions

Suggestions from the writer in developing interactive mathematics learning media are as follow.

1. There should be other deveoping interactive mathematics learning media for other materials such as circle, geometry, SPLDV so students are encouraged in learning mathematics.

2. There shoud be other research and development related to learning media such as quiz or game which are more creative and innovative to attract students' learning interest.

REFERENCES

Deni Darmawan. (2012). *Inovasi Penidikan.*Bandung: PT Remaja Rosdakarya.

Murdanu.(2004). Analisis Kesulitan Siswa-Siswa SLTP dalam menyelesaikan Persoalan Geometri.*Tesis.*Universitas Negeri Surabaya.

Suherman, dkk. 2003. *Strategi Pembelajaran Matematika Kontemporer*. Bandung: JICA.