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## THE DEVELOPMENT OF INTERACTIVE MATHEMATICS INSTRUCTIONAL MEDIA FOR APPLICATION OF INTEGRAL MATERIALS

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### *Abstract*

This paper discussed about the process of developing initial product for interactive media of teaching and learning maths on volume of a solid of revolution.

**Keyword:** learning and teaching media, macromedia flash, the volume of a solid of revolution

### INTRODUCTION

Specifically, the material of Integral application in sub-chapter volume of the solid of revolution is included the difficult material for a part of senior high school students, it was revealed when conducted interviewing with some students of SMA Pertiwi 1 Padang. They said that it was difficult to determine the region which was purposed of a given function and it was difficult to determine the direction of rotation of the areas that have been obtained. Based on the description it is assumed that students are having difficulty because they learn the material of the solid of revolution is less meaningful, it is presented and studied only through the study and analysis of matter alone without any clear visualization.

Based on the explanation above, it needs an attempt to make mathematics material be meaningful and affordable by the children or students' thought by designing an instructional media. Accordance with the use of instructional media delivered by Sadiman (2005) which states that, one of the use of instructional media is "to clarify the presentation of the message in order not to be verbalistis" (P.17). The media which will be designed is an interactive math instructional media by using macro media flash program.

Formulation of the problem of this research is how the form of the first product for the development of the interactive math instructional media on material of integral applications while purpose of the research is designing the first product for the development of the interactive math instructional media on the material of integral application.

### *Instructional Media*

Instructional media is media that is used in learning, which consists of teaching aids of teachers and the facility of messenger from learning sources to the message recipient (student). According to Gagne and Briggs, implicitly state that the instructional media provides the tools which is used physically to present the content of teaching material, which consists of books, tape recorders, cassettes, video camera, graphics, movies, photos, TV, and computer (in Arsyad, , 2002, p. 4). Thus, generally instructional media can be defined as a teaching and learning tool. Everything that

can be used to stimulate students' thoughts, feelings, concerns, and ability or skills so it can facilitate the learning process.

Meanwhile, Hamalik states that the function of instructional media is the "use of instructional media in teaching and learning process which can foster new desires and interests, motivation and learning stimulation, and even gives psychological effects on students (in Arsyad, 2002, p.15 )".

### ***Macromedia Flash***

Macromedia Flash is a program that has an ability to create animations ranging from simple to complex animation. Flash can combine images, sound, and video into animation that we design. According to MADCOM (2005) "Macromedia Flash is an animation program that has been widely used by animators to produce professional animation (p.1). Among the animation program of Macromedia Flash, it is the most flexible program in making instructional media such as interactive animations, games, company profiles, presentations, movies and other animated display.

Flash has several advantages as stated by Ananda (2008) that the advantage of flash is "1) It is a technology of website animation which is the most popular 2) having small file size with good quality. 3) It can make website. 4) It can make interactive CD. 5) It can make website animation and animated cartoons. 6) It can make the game (p.1) "

### ***Research Methods***

Research procedures which are used in this study is the procedures of research development, according to Borg and Gall in Soenarto (2006:8) which involves several main steps, as follows:

1. Developed products Analysis,
2. Developing the initial product
3. Having product trials which consist of:
  - a. Expert validation and revision
  - b. Small-scale field trials and product revision
  - c. Large-scale field trials and the final product.

## **RESULTS AND DISCUSSION**

In accordance with the procedures of the research development, so it was conducted with the following steps.

### ***Analysis on the developed products***

In this step, It is conducted the analysis on the various things that are needed in developing the product, i.e the curriculum analysis, material analysis and designing of instructional media design.

Analysis on the needs required in the design of instructional media.

#### ***a) Concept***

This step is the developing step of product concept, namely:

#### **(1) Identification of the problem**

- Students' difficulty in understanding the integral subject matter on the sub-chapter of the volume of a solid of revolution
- There is no an instructional media that is used in explaining the material.
- The low students' interest in participating in the learning process.

(2) The purpose

Facilitating the students in understanding the integral subject matter on sub- chapter of the volume of a solid of revolution.

Enhancing students’ interest in participating in the learning process.

Creating an interactive math instructional media.

(3) Analysis on learning needs

In this case, a guide book of making the interactive instructional media and book of of the volume of a solid of revolution are needed.

(4) Planning software

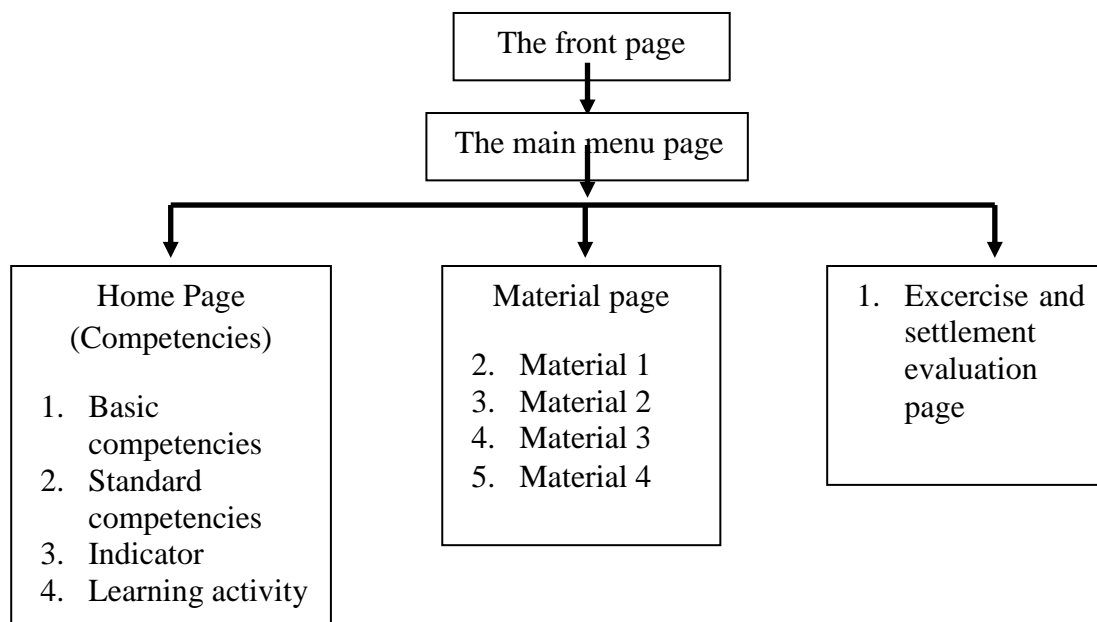
Macromedia Flash MX 2004 is the software which is used.

b) Design

The writer created and developed Instructional media, and then she conducted product design. The products design was conducted through two stages, the first stage of making the general structure of the software that will be developed in the form of tutorials (presentation of the subject matter in stages).

The form of general structure which is presented in the instructional media as the chart follows:

Scheme I: General Structure of Learning Media



Furthermore, from the general structure of the products made storyboards.

No	Page	Visual	Audio	Explanations
1	Opening	The design of oppening pages consist of: a. The pictures are related with maths which run like a running text. b. The button to go to the main page. c. The picture of maths text book	The opening music	a. The pictures on the top runs as running text b. If the button is clicked, it will be connected with the main page. c. The words “play” which is on the



- d. The words of Math Education Department in the side bottom corner.
- e. The words “ I Love Maths” in left side of the bottom corner.

under of button made glittering lights

2 The main page

- a. The letterhead which is at the top, there are logo of Bung Hatta University on the life side, the words “SMA”, “ realistic maths and The Volume of a Solid of Revolution” on the right side.
- b. There are the button of HOME, MATERIAL, EXERCISE, and QUIT
- c.

Back sound music

a. There is words “ MATHS EDUCATION DEPARTMENT THE FACULTY OF TEACHER TRAINING AND EDUCATION BUNG HATTA UNIVERSITY” which is designed as running text at the bottom.



b. There are 4 buttons connected with the pages which have hyperlink with the name of buttons as follows:

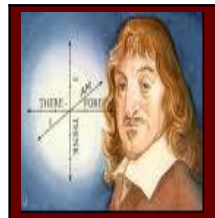
- HOME button
- MATERIAL button
- EXERCISE Button
- QUIT button



e. The words “MATHS EDUCATION DEPARTMENT THE FACULTY OF TEACHER TRAINING AND EDUCATION BUNG HATTA UNIVERSITY” run are like running text.

3 HOME

- a. The letterhead which is at the top, there are logo of Bung Hatta University on the left side, the words “SMA”, “realistic maths and The Volume of a Solid of Revolution” on the right side.
- b. There are the button of HOME, MATERIAL, EXERCISE, and QUIT
- c. There are the button of standard competencies, basic competencies, indicators and teaching and learning procedures
- d.



- e. The words “MATHS EDUCATION DEPARTMENT THE FACULTY OF TEACHER TRAINING AND EDUCATION BUNG HATTA UNIVERSITY” run are like running text.

- a. If the arrow key is clicked, it will appear the button of standard competencies, basic competencies, indicators and teaching and learning procedures which consist of the steps of learning activity that will be held.

4 Material 1



Back sound Music

There are 4 material that will be discussed, they are as follows:

- a. Material 1, it is about the volume of a solid of revolution bounded by  $y = f(x)$  and an interval  $(a, b)$ .
- b. Material 2, it is about the volume of a solid of revolution bounded by  $x = f(y)$  and the interval  $(c, d)$ .

5 Materi 1 1



Back sound Music

- c. Material 3, it is about the volume of a solid of revolution between the two graphs are rotated on the x-axis.
- d. Material 4, it is about the volume of a solid of revolution between the two graphs are rotated on the y-axis

The material is presented in a stage with the button to continue the step 1 until 5

Similarly, for materials 2,3 and 4.

6 The main page of exercise



Back sound Music

It consists of 4 questions with the explanation of the answer

- a. Exercise 1 in accordance with the material 1.
- b. Exercise 2 in accordance with the materials 2.
- c. Exercise 3 in accordance with the material 3.
- d. Exercise 4 in accordance with the material 4.

Exercise 4



It is done in stages

The final stages of exercise 4

After the final stage of the area obtained in step 3 animated

If the button of quit is clicked it will go back to the opening page

Table 1. Storyboard of the interactive instructional media for the material of the volume of a solid of revolution.

c) *Collecting materials*

After doing product design, then the writer did Collecting materials. In this stage, she collected of the necessary materials to make products, such as the material of the volume of a solid of revolution. She also conducted other aspects needed to make products such as music and images that relate to the product material that is made.

**Developing the initial product**

After conducting an analysis on the product that will be developed, it will be continued by developing the initial product. In this stage the material texts that had been designed in the previous stage put on any existing frames within Macromedia Flash MX 2004 software. After developing the initial product, it was conducted the editing, the result of editing is called as Draft I.

The next development stage will be supposed expert testing and field testing, but it is not implemented until this paper was written and presented at the SEA-DR Conference. Based on suggestions in the presentation section at the conference (Ratu Ilma Indra Putri), the writer feels that the given comment such as the expert test so it was decided that it will do some improvements on the first draft, namely:

No	Initial Condition	Planning Improvement
1	It has not associated with one of learning approach	Product design will be based on constructivism approach
2	The interactivity is not clearly visible in other it just the button to continue the process	Product design will be completed with questions in form of optional and each of options will be connected with comment page which is appropriate with the option made by the students

Table 2. Planning Improvement based on experts' advice

As a result of initial design, the draft I was adequate good especially if all stages of research development have been completed with several improvements as it has been conducted as the description of in Table 2 above. Thus, the writer is optimistic that this media will be able to overcome the problems described earlier.

## CONCLUSION

The result of Initial design that has been done will be the forerunner products of instructional media about the volume of a solid of revolution if the improvement is done and all stages of development undertaken.

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