

Development of Multimedia Animation Brake System

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Abstract—This study is based on the lack of variation in the use of instructional media, the lecturer uses only classical method with whiteboard as the media in brake system learning process. To overcome the above problems, will try to develop multimedia animation brake system. The aim of study is to develop a brake system that is validated by an expert, so it is worthy to be used as a learning media on the brake system. The research method used is research design base research method. The results of research by involving media experts and material experts and test respondents, produce a decent animation media to be used as a learning media on the brake system.

Keywords—*multimedia animation; brake system; design base research*

I. INTRODUCTION

Developing animated multimedia as a learning media is a challenging activity. Multimedia animation that is made poorly, will not be effectively used in the learning process. The thing to note in developing multimedia animation is how a programmer has the ability in terms of memory processing, knowing the students' initial knowledge, and how animation is made according to the needs of students. There are three types of animation formats, namely animations without control systems, animations with control systems, and direct manipulation animations [1]. Good animation multimedia is one that can support students to form a mental picture of the process that occurs and requires learning effort. The decision to use assistance in the form of multimedia animation should be based on pedagogical considerations and not on technological competence or ability. The importance of cognitive effort in learning must be considered. In order to learn effectively with multimedia animation, students must have enough time and mental resources to receive and comprehend functional relationships between system components. The user-centered design also has an important role in building effective multimedia animation learning, for example, the location of the button, the slider must be consistent to reduce cognitive load. Animation is an instructional aid, as with other tools, its use is very dependent on the desired result.

The selection of appropriate and appropriate learning media will make students not saturated and motivated to learn. Learning media are very good benefits for students because it adds knowledge and can foster the spirit of learning for students [2]. The use of well-designed learning media can generate motivation and stimulation of student learning, as well

as improve understanding of learning materials so that it will have an impact on improving the quality of education [3].

Animation is the movement of objects and texts that are arranged in a way that looks attractive and looks more alive. Animation is a series of images that form a movement [1]. One of the advantages of animation is its ability to systematically explain an event in each time of change. This is very helpful in explaining procedures and sequence of events. Animation media in learning aims to maximize visual effects and provide continuous interaction so that understanding of teaching materials increases [4]. Animation media in learning have the ability to be able to explain complex or complex things to be explained with only images and words. Multimedia is a melody sung in harmony with multi-channel and multi-modal bits of knowledge and creation [5]. Multimedia has overcome the barriers of time and space and provides evidence to be accepted as an anytime and anywhere tool for educating multi-disciplinary masses. The process of knowledge acquisition becomes more efficient when the learners experience an event through a multimedia simulation. Multimedia technology empowers the educational process by means of increased interaction between teachers and the students. The effectiveness of the learning by using multimedia depends on how far the learning style is accommodated in the learning strategy [6].

The animation in multimedia interactive learning gave a positive effect in improving students' learning outcomes, particularly in applying the concepts, procedures, and principles of Java programming [7]. The choice of instructional media must be truly appropriate and can facilitate the delivery of material, so that all messages that the teacher wants to convey can be received in their entirety by students. Multimedia animation is a means of communicating messages from the message source to the recipient of the message to support the learning process. Multimedia animation makes teaching more attractive to students, the subject matter will be more clearly defined, so that it will be more easily understood by students [8]. Multimedia animation also makes the method of educating more varied, not merely verbal communication through the words of the teacher, so that students are not bored and the teacher is not exhausted. A strategy is needed to improve student learning outcomes in the form of multimedia utilization. Through this multimedia it is expected that the sense of sight and hearing play a full role in capturing all learning information, and can improve student learning

outcomes so that the concentration in the learning process is more focused and strives to achieve maximum performance. Multimedia is a medium that consists of visual media that is synchronized with audio media, which greatly allows the establishment of two-way communication between teacher and students in the teaching and learning process [9].

The brake system discusses the understanding of the brake system, the working principle of the brake system, the types of brake systems, the components of the brake system, the way it works and the repair of the brake system. The brake system material is designed so that students who have graduated can have the ability to repair the brake system. Some of the skills students must master on the brake system are as follows: Maintain the brake system, repair the brake system and overhaul the brake system. In the brake system consists of various components in a single system, serves to slow down the vehicle. The brake system learning media is still using images and videos. But the two media are still not optimal. To optimize the marketing media, multimedia animation will be designed that can explain how the brakes work.

II. METHODS

This study uses the Design Based Research (DBR) approach. The stages of approach with DBR can be seen in figure 1. By adopting and modifying the design of this research is divided into 4 stages, namely: analysis of practical problems, development of solutions, testing and implementation of multimedia animation, and reflection to get the expected design principles and overcome various problems that arise.

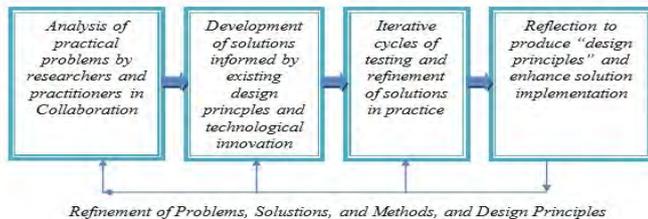


Fig. 1. DBR approach.

The research procedure that will be carried out is

A. Analysis of Practical Problems

The analysis of practical problems phase is to analyze the needs of multimedia users, the hardware requirements used and the software used.

B. Development of Solutions Phase

This development of solutions stage, created a multimedia flowchart that serves as a guide in creating multimedia, storyboards that serve as clues to multimedia contents, multimedia screen interface design and multimedia development.

C. Trial and Implementation Phase

Trial phase, test the multimedia that has been made. Multimedia will be given a judgment feasibility by material

experts and media experts. Multimedia will be carried out a second development process based on advice from media experts and material experts. Multimedia results of the second development process will apply to the research subject. Research subjects will be asked to fill out the respondent's sheet to get the response from media users.

D. Reflection Phase

Describe the shortcomings of multimedia that have been made at this reflection stage. Weaknesses can also be obtained from material expert suggestions, media experts and multimedia user responses

III. RESULT

A. Analysis of Practical Problems

The analysis of practical problems phase includes three stages: user needs analysis, software needs analysis and hardware requirements analysis (hardware). As for what will be done at each stage are as follows:

Analysis of user needs obtained from observation is the use of learning media is felt by students so that it causes a response from students who are less attractive. This animated multimedia user is a student of the Department Pendidikan Teknik Mesin. The material contained in this multimedia learning is a flash-based percentage.

The software used in making multimedia is Adobe Animate CC, Adobe Photoshop CC and Media Encoder CC. Adobe Animate CC was chosen because the operation is the same as Adobe Flash, the resulting multimedia can be in the form of .exe so as to facilitate the operation and use Actions Scripts 3 as a script language. Adobe Photoshop CC is used to create or edit images that will be used in multimedia. The CC Media Encoder is used to convert the video format to be used. All software used comes from Adobe so that software can be integrated with each other.

The required hardware requirements are obtained from the minimum system requirements of the software used. The required hardware can be seen in table 1.

TABLE I. HARDWARE REQUIREMENTS

Processor	Intel Core 2
Operating System	Microsoft Windows 7 with Service Pack 1
RAM	2 GB
Hardisk	2.6 GB more of available hard-disk for 32bit installation or 3,1 GB more of available for 64bit installation

B. Development of Solutions

The development of solutions stage, designed for multimedia animation based on the results of analysis of practical problems. This stage is designed multimedia flowchart, multimedia storyboard, screen interface design and multimedia development

The design of the multimedia animation flowchart developed is described in figure 2.

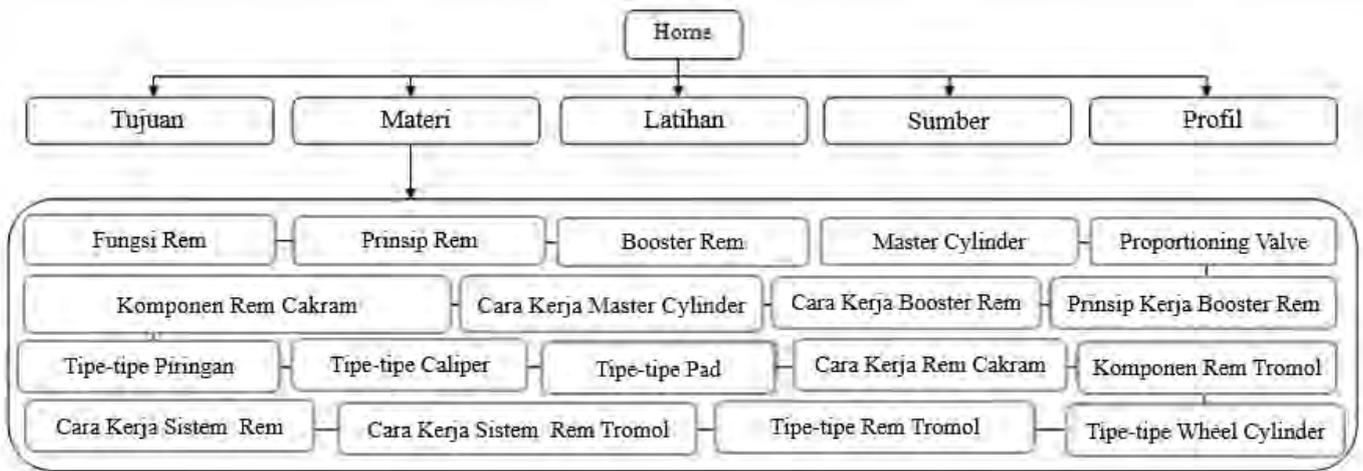


Fig. 2. Multimedia flowchart.

The parts on each screen will be mentioned on the storyboard. For example the function of navigation buttons, images, videos, materials, and so on figure 3.

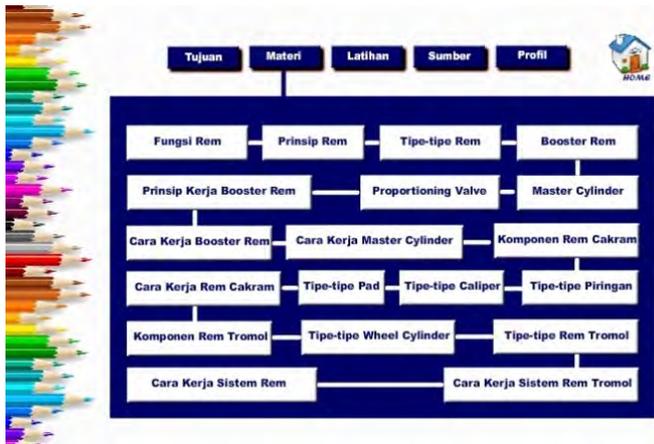


Fig. 3. Multimedia storyboard.

The development stage determines the creation of an interface or screen as a reference for component layout, reference story board as a reference for animation and multimedia navigation that moves from one frame to another figure 4.



Fig. 4. Main menu screen interface.

C. Trial and Implementation

The trial and implementation phase consisted of two activities, namely the feasibility assessment of material experts, the judgment of media expert feasibility, and application to students.

Material expert judgment, media expert judgment and student's response is presented in table 2, tabel 3, and tabel 4.

TABLE II. MATERIAL EXPERT JUDGMENT

Result	Assessment					Total
	4 (SL)	3 (L)	2 (KL)	1 (TL)	0 (STL)	
Total	1	16	0	0	0	17
Skor	4	48	0	0	0	54
	Max score					68
	Percentage					79,41%

TABLE III. MEDIA EXPERT JUDGMENT

Result	Assessment					Total
	4 (SL)	3 (L)	2 (KL)	1 (TL)	0 (STL)	
Total	4	0	0	0	0	6
score	24	0	0	0	0	24
	Max score					24
	Percentage					100%

TABLE IV. STUDEN'ST RESPONS

Result	Assessment					Total
	4 (SL)	3 (L)	2 (KL)	1 (TL)	0 (STL)	
Total	91	107	30	2	0	230
score	364	321	60	2	0	747
	Max score					920
	Percentage					81.2%

D. Reflection Phase

shortcomings of multimedia animation at the reflection stage. Weaknesses are obtained from the advice of material experts, media experts and student responses. Advice from media experts and material experts applied to multimedia before applying to students. Suggestions from multimedia users are as follows:

- Lack of use of animation in describing material.
- Animations that cannot be controlled.

IV. CONCLUSION

Judgment results from media experts showed the feasibility of multimedia animation reached 79,41%. This shows that the animation media is suitable for use. The judgment result of the

material expert is 100%. The results of the respondents' validation also have a good feasibility value of 81,2%.

From the results of expert judgment and student response, it can be said that the multimedia developed is suitable for use as a learning media.

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