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Digital Multimedia in the form of an Android-based e-module

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ABSTRACT

In general, the purpose of this e-module is to limit the use of paper in making learning modules that are appropriate to the teaching material, and the specific goal is how to make learning material packaged in an attractive form. The most fundamental problem is that students are not interested in learning by using modules in text form, plus they prefer applications on smartphones, especially Android. However, most books and modules can be read through the gadget in pdf or epub format. However, from the children's point of view, it would be more interesting if it was packaged in digital multimedia that involved animation and sound. This research was built using the Luther Sutopo method, which involved six stages. The results of the research are digital module applications based on Android. Testing of this e-module application was conducted on several elementary school children, with 90% results being able to do the quiz correctly.

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1. INTRODUCTION

One of the innovative technologies from the development of computer technology is Digital Multimedia (Xu et al., 2022). Several studies on the development of digital multimedia in learning have been carried out, such as the Music Education Curriculum in Colleges and Universities (Xiao, 2022), research (Qizi & Bahadirovna, 2000) also invited to utilize Digital Multimedia in educational content. Digital Multimedia is an effective learning tool (Anam et al., 2021), especially during the last pandemic (Sartika, 2021). Training activities for making multimedia-based teaching materials are also starting to bloom, targeting teachers and teaching staff, of course, the purpose of these activities is to increase digital literacy (Rahmawati & Suharyati, 2022) So big is the role of Digital Multimedia in the world of education.

The use of digital multimedia technology in transforming printed learning media in the form of modules is converted into electronic modules or e-modules, E-modules which are defined as learning materials that use computer technology and involve media elements such as text, images, graphics, audio, animation, or videos (Winatha et al., 2018). To facilitate access, an Android-based smartphone is used. Smartphones are chosen because Indonesia is the largest smartphone user in the world. Based on data from Newzoo, Indonesia is the 4th country with the most smartphone users in the world. In 2022, there will be 192.15 million smartphone users in Indonesia (Sadya,

2023). And Android was chosen because the rapid growth of the Android operating system market encourages developers to create Android-based applications (Ikhsan & Irwato, 2017) Likewise with a module that runs on the Android operating system. As a new kid, the Android system, which just started in 2008, has become a wonderful operating system, not only capable of running on smartphones and tablet computers, but also has implemented digital cameras, watches, TVs, vehicles, and other devices (Isnardi et al., 2021).

The advantages of using e-modules in the learning process lie in learning patterns that allow students to learn independently and the teacher is no longer the only source of learning for students. (Widiastuti, 2021). E-module is an electronic version of what was previously a printed module that can be read on a computer or other gadget and is designed with supporting software (Elvarita et al., 2020). E-modules have the goal of making it easier for students to learn each learning material and improve learning outcomes in each subject (Erdi & Padwa, 2021). The format of the E-module must be more interactive, not just relying on text. Many applications can be used in making this module, such as 3D Pageflip(Shahrial et al., 2019), Android Studio (Laili et al., 2019), Sigil(Fitriana et al., 2021), flip pdf (Rama et al., 2022), adobe animate CC, kvisoft, flipbook maker, exe-Learning (Saprudin et al., 2021), Canvas (Puspita* et al., 2021), Anyflip (Haeriyah & Pujiastuti, 2022)

Some of the roles of e-modules are mostly still focused on delivering material, so in this study, a quiz menu will be added to measure the extent to which elementary school students understand the material presented in the e-module, especially Mathematics material. This e-module is very useful because it can be installed on an Android-based smartphone, and can be downloaded by anyone via the internet. You know, the existence of the internet makes it easier for multimedia file providers to be accessed users (Son, 2020).

Apart from that, indirectly, the presence of e-modules will limit the use of paper, which so far has had a massive effect on the internetdeforestation. Although several paper companies claim to be involved in rejuvenating forests by planting trees. In general, the main raw material for paper production is cellulose, which comes from wood. It is estimated that 70% of the raw material for pulp and paper production comes from natural forests. The increasing need for pulp and paper production capacity means more and more illegal logging of trees through illegal practices by exploiting natural forests that can cause damage. This has a negative impact on the preservation of forest resources and threatens the living things in it (Supriyono, 2022).

2. RESEARCH METHOD

The Luther-Sutopo method consists of 6 basic steps starting with Concept, Design, Material Collection, Assembly, Testing, and Distribution. The concept step is the first step to developing a multimedia product. This step is very fundamental for developing a multimedia application because the purpose of the application, the target users, and all the ground rules are defined. The second step is Design, the process of designing by implementing ideas that are by the objectives of the application to be achieved. The developer step defines the specifications for multimedia products which include architectural styles, appearance, materials, and storyboards as the main guidelines. The next step is Obtaining Material Content to create and collect materials to be used in the product. These materials can be in the form of images, sound, animation, video, text, Or bought. The fourth step is Assembly where all materials will be combined based on the steps in the storyboard. The assembly stage includes making illustrations, making audio, and programming. The Fifth Stage of Testing is to ensure the eligibility of the product when it is delivered to the user. The final step is Distribution, for creating master files such as product documentation and user guides (Satwika et al., 2019).

The purpose of this study is to propose the Luther-Sutopo method in designing e-modules in the form of digital multimedia. Figure 1 shows the six steps of the Luther-Sutopo Method, consisting of Concept, Design, Content, Assembly, Testing, and Distribution (Nanda, 2020).

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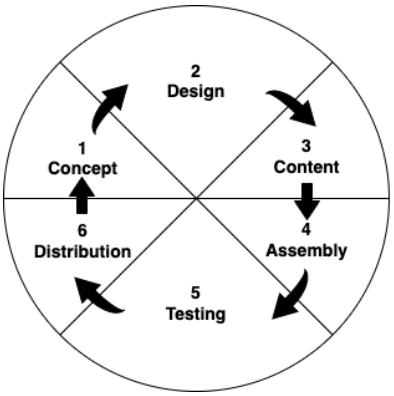

Figure 1. Luther-sutopo multimedia development method

3. RESULTS AND DISCUSSIONS

Concept

The concept is the basis for the development of a product. The concept will determine the purpose of making the application and the target users to be targeted (Susilo et al., 2021). In addition to the objectives, the basic rules in the application are also specified. Determination of the concept The e-module application is made for use on Android. The concept of this application contains basic material for operational mathematics, specifically to test students' understanding of learning in addition and subtraction operations. To make the e-module guide application more attractive, the design on the application platform was made using Corel and Photoshop software. Apart from that, it is also worth noting the idea of determining animation and sound models that would make elementary school students interested in using them.

Design

At the design/design stage, each scene will be made in the form of a simulation model, storyboard, navigation structure, and modeling (Nanda, 2020).

Table 1. *Storyboard* e-module simulation

Scene	Description	Link
Home page	As a welcome page, which contains pictures or animations that attract children's attention, on this page, 4 buttons will be directed to go to the profile page, materials page, and Quiz page.	Scene 1.0
Profile Page	The About page aims to license who made this application	Scene 2.0
Material Page	This is the main page of the e-module, which contains material, explanations, and examples of questions. Where on this page there are also two buttons the next button to continue the material, and the back button to return to the previous material	Scene 3.0
Next page Material	This is a continuation of the material page for examples of questions and how to answer questions	Scene 3.1
Quiz page	This is a page for testing skills and understanding existing material, on this page, the user will be asked to answer several questions, where each question is given a score, and at the end, you can see how much the score is.	Scene 4.0

From the storyboard above, we can make links between pages using the navigation structure model and modeling which can be seen in Figure 2. The navigation structure starts on the Home page which will have links to several other pages.

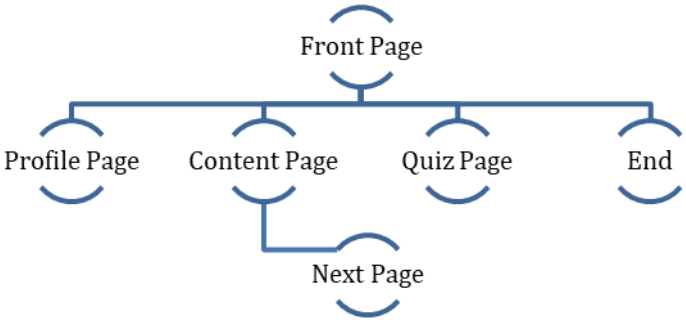

Figure 2. E-Module navigation structure

Content

To attract children's attention to this application later, several materials are collected that will be used as content in this application. First, look for cartoon images that children like but still reflect the material content presented. Second, finding a suitable and appropriate sound from this teaching media, so that later when students use this e-module they don't get bored because it is accompanied by cheerful music.

Assembly

The creation of this e-module uses Adobe Flash Professional CS 6 with Adobe Air features that can run on an Android OS-based platform (Anggraini & Silalahi, 2020; Anita Adesti & Siti Nurkholimah, 2020; Pratama et al., 2021). The working appearance of Adobe Flash Professional is shown in Figure 3.

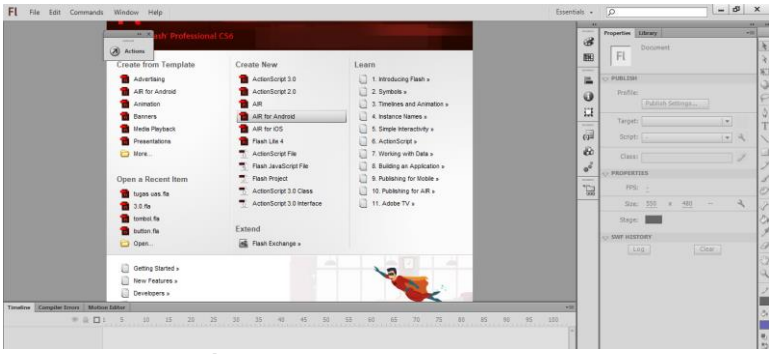

Figure 3. Adobe flash profesioanal CS6

On the Adobe Flash Professional worksheet, everything is built, the images that have been edited using the Corel or Photoshop applications will be inserted into the scenes according to the previous storyboard. Everything is by the navigation structure that has been defined using the action script 3.0 scripting language.

Testing

The testing stage is carried out aiming to check the suitability of the e-module that is made. Starting from checking the sound, and image to program debugging. Likewise, it was tested when it was installed on an Android Smartphone as shown in Figure 4. Likewise, each test was carried out as shown in Table 2.

Figure 4. E-module testing results

Table 2. Testing results

Content	Description	Result
Installation	Files can be installed on an Android-based Smartphone	√
Initial View	Displays an Image with a background sound	√
Scene Links	When the Button is pressed, it will enter the scene according to the navigation structure	√
Quiz Score	Able to display the final score after the Quiz process	√

Distribution

The distribution process is carried out in school groups, as well as sharing the .exe file with each participant. This e-module was also tried out by 10 children at random, to see how far this e-module could facilitate students' learning. After they have learned the material from the e-module, they are asked to do a quiz as shown in Figure 5. Out of 10 children, the results of the quiz from this e-module are as shown in the graph in Figure 6.

Figure 5. Quiz on E-module

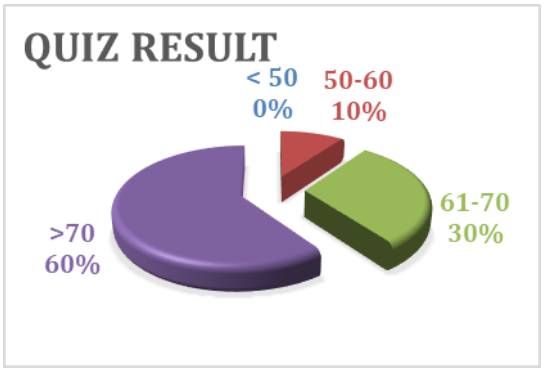

Figure 6. Comprehension results from the E-module

4. CONCLUSION

Multimedia can change the learning model for the better, and it is proven that if it is implemented in Android applications in the form of E-modules, it can help better understand the material provided. As a trial application distribution, it was found that no students got points <50%, only 10% got points 50-60, 30% got points 61-70, and 60% got points> 70%. These results prove that E-module with Android-based Digital Multimedia can be a fun new learning media. For future suggestions to develop this application better, First, there must be a question bank so that the questions that appear in the quiz application can be random and diverse. Second, discuss the material more broadly, for example, mathematics subject matter for grade 1 one year ahead.

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