

ARITHMETIC APPLICATION DEVELOPMENT FOR ANDROID BASED CHILDREN

Evi Angelina Br Turnip^{*}, Afdhol Dzikri, S.ST.M.T^{**}
Informatics Engineering^{*}, Batam State Polytechnic
Multimedia and Network Engineering^{**}, Batam State Polytechnic²

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ABSTRACT

The development of information technology at this time can usually be utilized for the advancement of children in the world of education, in the form of interactive media. The use of interactive multimedia technology as a learning media is one alternative to help overcome student learning problems, because by using interactive multimedia students can learn independently, more easily, comfortably and learn according to their abilities. Mathematical learning that is taught monotonously by the teacher can make students feel bored and finally lazy to learn. The presence of multimedia technology can help student learning to be more interesting and petrifying for students' understanding of arithmetic learning to recognize numbers in advance for children in learning to add, subtract, multiply, and share simple ones.

The results of this research are interactive media that are very helpful for students and parents to provide arithmetic teaching in a relaxed, interesting and entertaining format. It is expected that the existence of this arithmetic application can provide convenience to the public, especially children in learning to count, such as addition, subtraction, multiplication, and division.

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Corresponding Author:

First Author,
Multimedia and Network Engineering,
Batam State Polytechnic,
Jl Ahmad Yani Batam Kota, Kota Batam Kepulauan Riau Indonesia .
Email: eviangelina82@gmail.com¹, afdhol@polibatam.ac.id²

I. PENDAHULUAN

The educational world of one of the technology users is growing and very rapidly, but not balanced by the knowledge of society that only utilizes technology. Among the wider community the advancement of technology is still often viewed by the eye or only seen from the downside. In fact, behind the downside of technological developments there are many positive side that can be utilized for many things, one of them is like computer that can be used as aids in teaching learning process that has function as a media tutorial for example based on the magnitude of the role of computer or technology in education, computer can also be used as a

media that appeals so attractive to students especially children.

For that the author performs the development of arithmetic applications for Android-based children using Adobe Flash as an interactive medium to perform animation techniques and methods. If you want to deepen the use of animations should first understand the techniques and methods of animation, because the two are interrelated. The problem that will be discussed in this research is this interactive media application is mobile based.

Therefore here authors do the development of arithmetic applications to help students to better understand the lessons that have been delivered by the teacher. On the creation of this arithmetic application development

authors added several features to create a pleasant atmosphere so that the students do not quickly feel bored. The features mentioned are:

1. Video, the addition of the video itself has a very strong reason, because the children of elementary school I and II from ages 7 to 8 years before learning should understand a material, but different from the interactive media that the author made. Because children can simply watch the video to understand how to solve a problem.
2. Sound, the addition of the sound itself referred to the author so that students can feel the atmosphere is not boring.

II. METODE PENELITIAN

The development of arithmetic applications for this Android-based child uses the Godfrey method by going through the stages in order to be structured and neat. A methodology of software development has the advantages and disadvantages of each^[4]. On this Methodologi Godfrey is easy to understand and implement, it is clear and easy to follow, structured and logically ordered, and can be used for small developers such as students who are working on the final task.

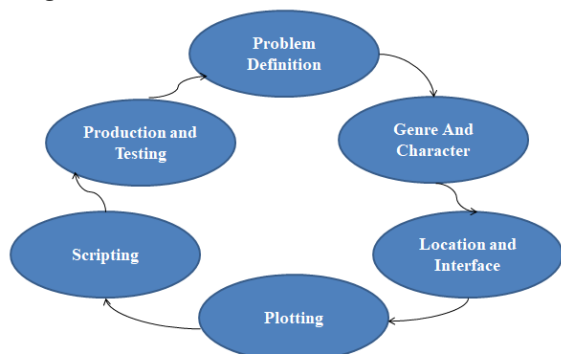


Figura 1. Godfrey methods

1. Problem Definition

Problem definition should be the first stage of each design cycle. There are four issues Basic problem definition, namely:

- a. Identifying the target user.
- b. Generate user Wishes
- c. Identify the scope of a project
- d. Understand the limitations of existing resources.

2. Genre and Character

This interactive Multimedia learning arithmetic is played individually (individually) with a type of simulation genre. The characters created in this learning multimedia use a cartoon character that depicts the

children's character named Ani as shown in Figure 3. 3 below.

3. Location and Interface

The site design and the interface of arithmetic application for this child are designed in storyboard form. The use of products is depicted in a top-down form of navigational structures.

The top-down design of the arithmetic application development for this Android-based child can be seen in the image below.

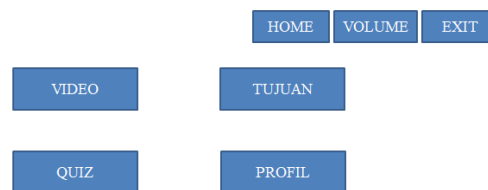


Figure 2 Navigation structure planning

In the picture above navigation structure displays the menus contained in the application. Starting from the main menu that has the main menu branches, videos, profiles, 1st Class Quiz, Class 2 quiz, volume and exit. The media menu of arithmetic learning is the menu to display interactive media in the media of arithmetic learning.

4. Plotting

Once you've compiled your location and interface, it's time to connect it with actions and events to show different storyline, replies, and interactivity.

5. Scripting

Scripting in the development of arithmetic applications for children based on Android, using Action Script 3.0. One of the scripts representing the whole script that is implemented is to display the information that is in the main menu.

6. Production and Testing

At this stage, an interactive multimedia creation process is based on the design in steps 1-5. Next perform the functionally-based tests already described in the storyboard.



Figure 3 Scripting Implementation Results

III. RESULTS AND ANALYSIS

At this stage will be explained the result of arithmetic application development for Android-based children implemented using Adobe Flash CS6 software with the source code Action Script 3.0, with the addition of software used in Adobe Air 3.2 for Android. The result of the developed product is an application that can be used on smartphones using the Android operating system with Godfrey method.

3.1. Problem Definition

At this stage specified user target, user needs, product scope and resource limitation, among others:

- a. The intended Target for the use of this Learning media application is the child elementary school I and II (age 7 to 8) years.
- b. Based on the results of interviews with teachers who teach at SD 018 School in Batam City says that learning media used at ELEMENTARY level to know the numbers and can count plus, less, divide, and times. So through this interactive multimedia is expected to increase the attractiveness of students as well as understanding of the material that has been given. Product content consists of a combination of text, image, sound, and animation.
- c. Scope in multimedia learning arithmetic development for children based on Android is:
 - The environmental character used is a tool that is in the vicinity of schools.
 - The described arithmetic is addition, subtraction, multiplication and addition in the presence of animation.
 - Once the user finishes exploring the main menu and sub menus on the system it will show the option for the quiz.

3.2. Genre And Character

The *Genre* on the development of arithmetic applications for children based on Android using simulated models. And the character used in the development of this Learning media application uses a card type character named Ani. Characters can be seen in Figure 4.



Figure 4 Karakter Ani

3.3. Location And Interface

The site design and the interface of arithmetic application for this child are designed in storyboard form. The use of products is depicted in a top-down form of navigational structures.

3.4. Plotting

After crafting your location and interface, it's time to connect it with actions and events to show different storyline, replies and interactivity.

3.5. Scripting

Scripting in the development of arithmetic applications for Android-based children, using Action Script 3.0. One representing the whole script that is implemented is to show how to learn while playing as shown in the following table.

Table 1 Scripting Menu Main Page

```
import flash.display.StageScaleMode;
stage.displayState = StageDisplayState.FULL_SCREEN;
stop();
```

Table 2 Scripting scene Menu

```
stop();
video.addEventListener(MouseEvent.CLICK, ke_video);
profil.addEventListener(MouseEvent.CLICK, ke_profil);
quiz1.addEventListener(MouseEvent.CLICK, ke_quiz1);
quiz2.addEventListener(MouseEvent.CLICK, ke_quiz2);
```

```
function ke_video(event:MouseEvent):void{
    gotoAndStop("video");
}

function ke_profil(event:MouseEvent):void{
    gotoAndStop("profil");
}

function ke_quiz1(event:MouseEvent):void{
    gotoAndStop("quiz1");
}

function ke_quiz2(event:MouseEvent):void{
    gotoAndStop("quiz2");
}
```

Table 3 Scripting Menu Quiz Class 1 & Grade 2

```
import flash.events.MouseEvent;
stop();

kesoal.addEventListener(MouseEvent.CLICK, lanjut);

function lanjut(event:MouseEvent):void{
    nextFrame();
}
```

3.6. Production and Testing



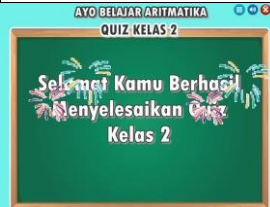
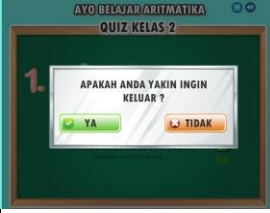
Phase testing or application development testing arithmetic for Android-based children is done directly by the Kuisoner testers that are done directly to the target child elementary school.

Functional testing shows the functional development of the arithmetic application for the child when it is run, i.e. when the system receives input, the system will issue a large outout. Testing is done with a scene (functional) that has been implemented, as in table 4.

Table 4 Product and Testing

NO	Application	Description
1		The initial display is the FirstTime Login menu appears, when the user Open this app.
2		The main Menu display Appears after the menu display Early.The original Menu consisted of Video menu, Profile, Class 1 quiz, Class 2 Quiz.

3		When the user clicks on the Video menu, there will be an arithmetic learning video of the summation, multiplication, and division.
4		When the user clicks the menu Profile, it will appear profile in Developer.
5		When the user clicks the menu 1st Class Quiz, then the user Will go into the questions been given.
6		When the user enters a Class 1 quiz, the user is obliged to fill in the questions that have been available addition and subtraction. If the correct answer there will be a reading of your answer correctly, please continue.
7		When the user enters a Class 1 quiz, the user is obliged to fill in the questions that have been available addition and subtraction. If the wrong answer will be read Your answer is wrong, please repeat. This quiz can not proceed to the following question if the answer is wrong.
8		When the user has completed all the problems that are available until the end there will be a reading "Congraulations to complete the Class 1 Quiz"
9		When the user clicks the menu 2 class Quiz, then the user Will go into the questions been given.

10		<p>When the user enters into a Class 1 quiz, the user is required to fill in the questions that have available multiplication, division, addition and subtraction. If the correct answer there will be a reading of your answer correctly, please continue.</p>
11		<p>When the user enters a Class 2 quiz, the user is required to fill in the questions that have available multiplication, division, addition and the Pengurangan. If the answer is wrong there will be an incorrect reading of your answer, please repeat. This quiz can not proceed to the following question if the answer is wrong.</p>
12		<p>When the user has completed all the problems that are available until the end there will be a reading "Congratulations to complete the Class 2 Quiz"</p>
13		<p>When the user clicks the Exit button It will appear the text "Do Are you sure you want to quit? "</p>

3.7. Alpha Testing Results

Based on the results of software testing conducted by 2 experts in the field of multimedia, namely Silvia Forensia, S.Sn and Chris Gultom. A.md. Then it can be concluded that the built-in application is running as expected.

3.8. Beta Testing

Beta testing is performed directly by a user or respondent using a questionnaire on satisfaction with the application that has been built. Respondents will do the test by filling out a questionnaire whether the application can help the child in arithmetic lessons i.e. add, less, divide, and times with the Godfrey method. The questionnaire contains about 5 questions regarding the application that were then deployed to 30 people based on the theory from Roscoe (1975). In the Book

of Uma Sekaram (2003). The testing method uses a Likert scale. A Likert scale is a scale used to measure perception. The attitude or opinions of a person or group regarding an event or social phenomenon. Based on the operational definitions set by researchers. Research instruments using Likert scale can be made in the form of a checklist or multiple choice. The scoring is determined by using the directly scale as in the following table (Sugiyono, 2009):

Table 5 Likert Scale

No	Respondents choice	Weighted value
1	Highly agree	5
2	Agree	4
3	Neutral	3
4	Disagree	2
5	Highly Disagree	1

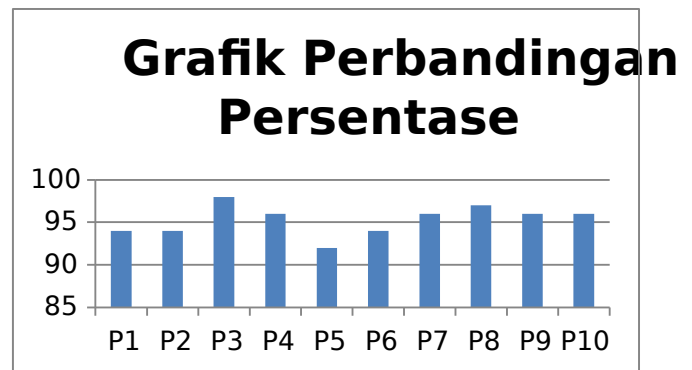


Table 6 Analysis of Beta testing

According to the chart the results of percentage of Likert scale can be concluded that, the highest frequency on the P3 chart (design of the application display is interesting) the average respondent expressed very agreed 22 people, and agreed 8 people with a percentage of 98%. And the lowest frequency on the P5 chart (character characters on interesting applications) the average respondent expressed very agreed 22 people, agreed 5 people, and neutral 3 people with a percentage of 92%.

IV. CONCLUSION

The conclusions that can be obtained are as follows:

1. Development of arithmetic application for child Age 7-8 as an alternative to the defenders system is effective, interesting and easy to understand by children with the concept of learning while playing using Adobe Flash. This application is taken by Godfrey Method, which consists of six stages, namely problem definition, genre and character, location and interface, plotting, scripting, production and testing which is structured.

2. Based on test results there are respondents, It can be concluded that the respondent gave a positive response to the application with the result referring to the beta testing that is: Statement 1 obtains 94%, Statement 2 earns 94%, Statement 3 earns 98%, Statement 4 earns 96%, statement 5 Gained 92%, Statement 6 gained 94%, Statement 7 gained 96%, Statement 8 gained 97%, Statement 9 gained 96%, and statement 10 96%.

[8] I. T. Saliskan *et al.*, "Game Pembelajaran Matematika Untuk Anak Sekolah Dasar 06 Medan Menggunakan ADOBE FLASH."

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