LEARNING HIJAIYAH ALPHABET USING METHOD HARAKI WITH AUGMENTED REALITY

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2020
DECLARATION

I hereby declare that this report is based on my original work except for quotations and citations, which have been duly acknowledged. I also declare that it has not been previously or concurrently submitted for any other degree at Universiti Sultan Zainal Abidin or other institutions.

________________________________________

Name    :  Muhammad Arif bin Ghani

Date    :  1 January 2020
CONFIRMATION

I have read this report, and in my point of view, this project has fulfilled a condition to be awarded a Bachelor of Information Technology (Informatics Media) with Honours.

________________________________
Name: Mat Atar bin Mat Amin

Date: 1 January 2020
DEDICATION

In the Name of Allah, the Most Gracious and the Most Merciful.

Alhamdulillah, I thank God for His grace and grace, I can prepare and complete this report successfully. First of all, I would like to thank my supervisor, En Mat Atar bin Mat Amin because with guidance, the advice and the thoughtful ideas given me the opportunity to prepare this report successfully.

In addition, my gratitude is also to my colleagues who share ideas, opinions, knowledge and reminders. They helped me answer every question that was important to me in completing this report. Thanks also to my beloved mother and father always support and motivated me to prepare for this report for Final Year Project.

I would like to take the opportunity to thank all lecturers of the Informatics and Computing Faculty for their attention, guidance, and advice in helping and sharing ideas and opinions in making this report successful. May Allah SWT bless to all the efforts that have been given in completing this report.

Thank you.
ABSTRACT

Nowadays, the use of writing in the form of hijaiyah has been less used because it is only used during the extra class, fardhul a’in. Student will study there only because of lack of knowledge when out of class. This project is called Hijaiyah Alphabet Learning. The purpose of this project was to develop for children between 4-6 years old. Because today is the modern age, children are less likely to look at books, so this project has used phones as a learning tool. That is, by using Augmented Reality (AR). AR is a software that can pop-up a 3D image on phone screen. When someone scan any marker-base with AR camera, there will pop-out a 3D image and maybe have some animation depends who make that marker-base. The Problem statement that is less of lecture Hijaiyah Application using method haraki, lack of animation approach for hijaiyah in haraki method, and the teacher has to pay close attention to teach student the letter form and pronunciation of hijaiyah. The main objective of the study is for children to better understand the use of the hijab alphabet, especially when living in an Islamic state as an official religion. The methodology used in this project is Analysis, Design,
Development, implement and evaluate in systematic and planned. This application was tested by developer and the user. Has received positive praise and feedback from various sources. Hijaiyah Alphabet Using Method Haraki with Augmented Reality developed based on ADDIE method is mainly aim to give the user to experience the new way of education for children with the edutainment concept. Meanwhile, the others aim is to give the user exposure and education about the AR technology.
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<td>AR</td>
<td>Augmented Reality</td>
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<tr>
<td>3D</td>
<td>Three Dimension</td>
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<td>FYP</td>
<td>Final Year Project</td>
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CHAPTER I

INTRODUCTION

1.1 Project Background

AR can be defined as a system that fulfills three basic features: a combination of real and virtual worlds, real-time interaction, and accurate 3D registration of virtual and real objects. The overlaid sensory information can be constructive (i.e. additive to the natural environment), or destructive (i.e. masking of the natural environment). This experience is seamlessly interwoven with the physical world such that it is perceived as an immersive aspect of the real environment.

Among the AR components used are cameras and sensors. Cameras and sensors are used to collect user collaboration information and send it for processing. In addition, reflection. Some AR gadgets have mirrors to help the human eye see virtual images. Marker-based AR uses cameras and several types of visual markers, such as QR / 2D codes. This technology will produce an output only when the marker is felt by the
reader. Meanwhile, Markerless Augmented Reality as one of the widely implemented AR applications, markerless augmented reality using GPS, digital compass, speed gauge, or accelerometer embedded in the device to provide data based on your location.

There is an application in learning hijaiyah that have three (3) benefits are available to the user. The first is to get the information right. Users can get information on how to use this application and how to pronounce it alphabetically. The second is exploring. When users play this application, users can explore each alphabet in which each alphabet has a spelling of each letter and can learn how to pronounce it correctly. Finally, the user gets an exciting moment as each alphabet will be included with the sound.

Another part is haraki method of hijaiyah alphabet is a method used for the purpose of learning to read the Qur’an with the correct and proper tajwid for children and adult. It will help the user to learn about types of Hijaiyah Alphabet haraki that allowing someone to read the Quran will correctly. This application will teach the user and given an information about the types of hand tool by implementing the current technology which is “Augmented Reality (AR)”

Learning Hijaiyah using method Haraki in Augmented Realitu (AR) is an application to be developed. It is an actual Hijaiyah alphabet in mobile devices which users can check the shape of the letters in the hijaiyah. The pronunciation and the example of the use of the letters in the name of an object. When users use this application, they can learn this hijaiyah faster and easier.
1.2 Problem statement

The purpose of developing this application is to solve a few problems:

1. Less of lecture Hijaiyah Application using method haraki. There have many Hijaiyah Application in playstore or appstore, but there are lack or Hijaiyah application with Haraki method.

2. Lack of animation approach for hijaiyah in haraki method. Out of there, many animation is presented in 2D.

3. The teacher has to pay close attention to teach student the letter form and pronunciation of hijaiyah.

1.3 Objectives

There are three aims that need to be achieved in this project. The objectives are follow:

1. To study a learning hijaiyah using haraki method.

2. To develop an application of learning hijaiyah using haraki method.

3. To test the functionality of application of learning hijaiyah using haraki method.
1.4 Scope

The scope will be explained about the actor who will involve in this system and what function involved in this system. The main scopes of the system:

i. Application
An environment of the application is Android platform. The application will show the object and its information of that Hijaiyah Alphabet. When marker pointed to the flashcard, the object will appear in 3 dimensional (3D) with information.

ii. User
The target user is for 4-8 years old and including children studying in the fardhul a'in class. They can use this flashcard AR Technology to learn about Hijaiyah Alphabet with an interesting way. They also can experience to see virtual object appear in real-world with the animation.

1.5 Limitation of works

The limitation of work in this application are:

i. This application is only available for android phones and not support ios.
ii. This application only uses the Malay language Only.
iii. This application only focuses on Haraki method for learning Hijaiyah.
iv. The user need camera smartphones to play application.
1.6 Significance of The Project.

This developed project is very important because it re-teaches the letters that should be learned by all Muslims in the world. The longer, the more people forget about this hijaiyah letter because it is too affected with other foreign languages such as english, mandarin and others.

The re-pronunciation of hijaiyah letters assisted by using augmented reality applications will make it more interesting, especially for children who are too fond of playing with electronic devices. So, with the presence of this AR can help raise this hijaiyah letter among Muslims today.

1.7 Report Structure

Thesis structure is a summary of the whole project that divided into 5 chapter. Chapter 1 will discuss the introduction, problem statement, objective, scope, expected result and limitation. Chapter 2 will discuss the existing system. In chapter 3, design and modelling will also discuss. Chapter 4 will show the implementation of the system and will show testing and result of the system. Lastly, chapter 5 is the conclusion of the whole project. With the technological advances of today’s increasingly fast-growing, it is hoped that this project will help to learn for they to get gain knowledge.
CHAPTER II

LITERATURE REVIEW

2.1 Introduction

A literature review is a process of identifying; evaluating and summarizing the existing body of a complete research that done by a researcher. It can be guideline to develop a new product so that the new product can provide a better functionality compared to the existing product. Besides, the research comparison between the current product and the new developed product is done to overcome the weakness of the current product.

2.2 Related techniques

Related techniques refer techniques of Augmented Reality already existing and used until now. This is two techniques in AR:
2.2.1 Marker based

![Figure 2.1 Marker based AR](image)

Image recognition is an imperative component of augmented reality systems. By use of identifying visual markers already embedded within the system, physical world objects are detected for superimposition of virtual elements. In order for an AR application to estimate the orientation and position of a camera with respect to the real world frame, most applications employ a tracking technique known as marker based augmented reality.

This form of tracking was introduced in AR approximately a decade or so ago. The marker tracking allows the use of a digital image to identify optical squares or markers and gauge their relative orientation to the camera itself. The optical square marker usually consists of a black square within a white box of a predefined size. It is the black square which is encoded with the ID of the marker. A variety of techniques is used which decode the marker by cross-matching with it.
Once you begin using the marker-based augmented reality system with a digital device, the image of the physical world captured by your camera is converted into a grayscale image to expedite the image processing algorithm. The algorithm then uses the image of the camera as well as the decoded marker ID to augment the virtual object onto the physical world model. By focusing the camera of whichever digital device you are using to deploy the augmented reality app on the specified markers, the app is able to retrieve the information stored to display the three-dimensional virtual object accurately.

2.2.2 Markerless

![Figure 2.2 Markerless AR](image)

New advances in the mobile hardware and software technologies led to the recent introduction of markerless augmented reality. This approach eliminated the need for 3D object tracking systems, overcoming the interactivity limitations marker-based augmented reality placed on the range of images encapsulated within the markers. Markerless augmented reality technique allows the use of any and all parts of the
physical environment as the target or base for the placement of superimposed virtual objects. Markerless AR depends on the natural features of a surrounding rather than the fiducial identifying markers. What’s more, some markerless systems have the ability to extract and store information and characteristics about the environments they are used on for later usage. When used in smartphones and other digital devices, the markerless AR system typically makes use of the GPS feature in-built in the device in order to locate and interact with the available augmented reality resources.

2.3 Related application in AR

Related application in AR are products refer a system already existing. Four application was studied as follow:

2.3.1 Learning Word using AR

![Figure 2.3. Application of Augmented Reality](image-url)
Learning Words Using Augmented Reality was made by Juan on July, 2010. This application is Augmented Reality Marker Based with this application help the children to spell an animal name correctly but there only out 2D image.

2.3.2 An Australian ABC of Animals

![Figure 2.4 An Australian ABC of Animals](image)

This application was made by Bancroft, B on 2004. This application was category by Mobile Apps. This application shows an animal by each alphabet but there are not have animation, only picture.
2.3.3 Alphabet Tracing Apps

![Alphabet Tracing Apps](image.png)

Figure 2.5 Alphabet Tracing Apps

This application was made by Neumann on 2018. This application on category by Mobile Apps. This application teach how to write the alphabet, but there only can be use at ios and not available in Android.

2.3.4 AR Flashcard Animal

![AR Flashcard Animal](image.png)

Figure 2.6 AR Flashcard Animal
AR Flashcards Animal are a new way to interact and make Flashcards more entertaining for toddlers and preschoolers. This application will rendered 3D animal and will pop up on the screen. Tap the animal to hear the letter and animal name.

2.4 Comparison table of existing product

<table>
<thead>
<tr>
<th>Product</th>
<th>Platform</th>
<th>Function</th>
<th>Technique</th>
<th>Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Learning Words using AR</td>
<td>● Android / IOS phone</td>
<td>● Help the children to spell an animals</td>
<td>● Marker based Method</td>
<td>● Only out 2D image.</td>
</tr>
<tr>
<td>An Australian ABC of Animals</td>
<td>● Android / IOS phone</td>
<td>● Show an Animals by each alphabet</td>
<td>● Mobile Apps</td>
<td>● There are not have animation, only picture</td>
</tr>
<tr>
<td>Alphabet Tracing Apps</td>
<td>● IOS phone</td>
<td>● Teach how to write Alphabet</td>
<td>● Mobile Apps</td>
<td>● No available in Android</td>
</tr>
<tr>
<td>AR Flashcard Animal</td>
<td>● Android / IOS phone</td>
<td>● Help to learn type of animal</td>
<td>● Marker based Method</td>
<td>● Design not interactive</td>
</tr>
</tbody>
</table>

Table 1.1 Comparison table of existing product
The Table 2.1 describes about comparison of the existing product with platform, function, method, advantage and disadvantages. This table we will know comparison each of product.

2.5 Comparison table of the existing products with 5 element of multimedia

<table>
<thead>
<tr>
<th>Product</th>
<th>Text</th>
<th>Image</th>
<th>Video</th>
<th>Audio</th>
<th>Animation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Learning Words using AR</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>An Australian ABC of Animals</td>
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<tr>
<td>AR Flashcard Animal</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

Table 2.2 Comparison table of the existing products with 5 elements of multimedia

The Table 2.2 describes about comparison of the existing product with 5 elements of multimedia such as Text, Image, Video, Audio and Animation. This table we will know comparison each of product.

2.6 Summary

In this whole chapter, this chapter discusses a product that uses a marker based and marker less in Augmented Reality. The comparison with the previous research is done so that the right choice is use marker based. In this chapter also is need to compare some of a similar project or application that have develop by other.
CHAPTER III

METHODOLOGY

3.1 Introduction

This chapter will explain the details of methodology being used in this project. The project methodology should systematically solve all the problems arise in the system analysis to make sure this project complete and working well. It is an important step of development since it will guide researcher through software development. After system has been completely developed. It should be tested for make sure all the objective of the project achieved.

3.2 Methodology Model

The model that I will use in this system is ADDIE model. The ADDIE model is important understand if a developer want to develop a successful project. The ADDIE model has five phase acronyms is Analysis, Design, Development, Implementation, and Evaluation. ADDIE is an extremely effective tool in training development that addresses instruction. Most employees have a significant amount of information to learn
in order to become more proficient at their jobs. Therefore, the ADDIE model should be helpful for many in planning a course of action that would lead to the successful implementation of a project.

When dealing with projects that involve instruction or steps, the approach fits nicely. In order to ensure effective learning outcomes from augmented reality (AR) education development, careful planning is required before the development process begins. ADDIE Instructional Design Model is used in this mobile AR application development methodology. The ADDIE model for instructional system design (ISD) is a basic model that can be applied to any kind of learning solution. The ADDIE model has five steps processes which is analysis, design, development, implementation, and evaluation.

![ADDIE model diagram](image)

Figure 3.1 ADDIE
3.2.1 Analysis

During this phase, it must define the problem, identify the source of the problem and determine possible solutions.

- **Problem Statement**
  1. Lack of Haraki approach
  2. Lack of animation for hijaiyah haraki

- **Objectives**
  1. To create Learning Hijaiyah Haraki application.
  2. To create Learning Hijaiyah Haraki application.

- **Target Audience**
  1. Kids the age 4-8 years old.
  2. Student Fardhul Ain

- **Content**
  This project included:
  1. Flashcard of Hijaiyah Alphabet
     - contains images picture with name of alphabet
  2. Flashcard using AR technology

- **Strategy**
  1. Use 3D model
  2. Augmented reality technology

- **Requirement**
  1. Software
     - Unity3D
     - Vuforia
     - Maya3D
  2. Hardware
     - Laptop

Figure 3.2 Analysis
3.2.2 Design

The design phase deals with learning objectives, assessment instruments, exercises, content, subject matter analysis, and lesson planning and media selection. The design phase should be systematic and specific. Systematic means a logical, orderly method of identifying, developing and evaluating a set of planned strategies targeted for attaining the project’s goals. Specific means each element of the instructional design plan needs to be executed with attention to details. The developer need make storyboard for create a visual map of application. This can help the developer shape the vision and flow of application.

### i- Storyboard application

<table>
<thead>
<tr>
<th>INTERFACE</th>
<th>AR camera scene</th>
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<tbody>
<tr>
<td>Interface scene</td>
<td></td>
</tr>
<tr>
<td>• Interface scene have button start.</td>
<td></td>
</tr>
<tr>
<td>• When touch button start go to AR Camera scene</td>
<td></td>
</tr>
<tr>
<td></td>
<td>AR camera scene</td>
</tr>
<tr>
<td></td>
<td>• AR camera scene show model in 3D.</td>
</tr>
<tr>
<td></td>
<td>• Use marker for show model</td>
</tr>
</tbody>
</table>
3.2.3 Development phase

The Development phase builds on both the Analysis and Design phase. The purpose of this phase is to generate the lesson plans and lesson materials. This phase will develop the instruction, all media that will be used in the instruction, and any supporting documentation. This may include hardware and software. During the development phase, the actual course materials are created. A successful development phase uses the information collected in the analysis phase and the decisions made in the design phase.
i. Create marker

This is the first step before start build 3d animation models. I must create markers using Adobe Photoshop CS64. On the picture there are pictures of object. So, the users are willing to scan images or markers on the picture and the 3D animation models automatically pop out on the phone screen.

ii. Modelling

Figure 3.5 Modelling
Show the developer making the process of modeling 3D animation models using Autodesk Maya software. The image of the table show as reference to create 3D animation.

iii. Texturing

![Image of Autodesk Maya software](image_url)

**Figure 3.6 Texturing**

shows the next process in animating 3d characters which is texturing. Texturing is the next phase involved while creating 3d animation. It includes creating a texture from the base, editing an existing texture for reuse. Shading intensity is to be decided during the texturing phase and textures are developed like maps and then assigned to a particular scene or model. After finish modeling the models, the developer needs to find the right texture to wrap the models.
iv. Rendering

Figure 3.7 Rendering

Shows the next process in animating 3d characters which is rendering. Rendering is the final step in the animating 3d character process. Rendering is the process of creating an image or sequence of images from a scene. During rendering, Maya generates a two-dimensional image, or series of images, from a specific view of a three-dimensional scene, and saves it as an image file.

v. Create marker use Vuforia

The figure 3.8 Create marker use vuforia
Show that Vuforia is able to recognize and track targets by analyzing the contrast based features of the target that are visible to camera. The developer can improve the performance of a target by improving the visibility of these features through adjustments to the target's design, its rendering and scale, and how it's printed. The star rating of a target ranges between 1 and 5 stars; although targets with low rating (1 or 2 stars) can usually detect and track well. For best results, the developer should aim for targets with 4 or 5 stars.

vi. Building environment AR use 3D Unity

The Figure 3.9 Building environment AR use 3D Unity

Shows the unity 3D software. The developer need to setup the Unity 3D before start using it. This is the platform where to begin build AR experiences. Next, developer need to create project and create the scenes which is Navigation, Camera & Light, 3D Object, Physics, Material and Scripts.
vii. Publish into APK for running in mobile phone

The Figure 3.10 Running in mobile phone

Shows a application was open in mobile phone. Developer was test in mobile app to check there was okey or not. Then developer give a test to user to check if that okey or not.

3.2.4 Implementation phase

The Implementation phase refers to the actual delivery of the instruction, whether it's classroom-based, lab-based, or computer-based. The purpose of this phase is the effective and efficient delivery of instruction. This phase must promote the students' understanding of material, support the students' mastery of objectives, and ensure the students' transfer of knowledge from the instructional setting to the job.

i) Test Run Project

The developer test runs the project herself. This is to ensure that the project can be used and is running accordingly.
ii) User Test Run

Developer give to the user to test the project and give the feedback before the presenting the final product. Criticisms and constructive feedback is taken to be implemented later on.

3.2.5 Evaluation phases

This phase measures the effectiveness and efficiency of the instruction. Evaluation should actually occur throughout the entire instructional design process—within phases, between phases, and after implementation. Evaluation phases may be formative or summative.

i) Debug

a) Identify Errors

After done test run, errors that were found by the users should be identified. Example, glitches and mistakes should be brought to light for developer to improve the project while also implementing the feedback by the alpha and beta testers.

b) Find solutions

If once errors have been identified, solutions the error must be done to solve.

ii) Final product

a) Presentation

The system is ready to be presented and launched for a large audience to use.
3.3 Framework

The framework shows how the user interacts with this application. The Android is running for display application. In the limitation work, have virtual button, marker-based, option, animation, text, and audio. The start build in this application from limitation work. Limitation work can be updated. The software for built this application from Vuforia, Unity, 3D Maya, and Photoshop. The marker-based is a flash card which interacts with the application for on the shape object.

3.4 Hardware and Software Requirement

This section will show that the all hardware and software that involve in the development process. All of these elements are important in the process of development of the system. List of hardware and software are shown as below:
3.4.1 Hardware requirement

i. Laptop HP

- To create the sketches for the characters, background and create scripts and also used for on the go coding and 3D modelling.
- Processor: Intel (R) Celeron CPU 2950M @ 2.0 GHz 2.00 GHz
- Operating System: Windows 10 Pro – 64 bit
- Memory: 12GB RAM

ii. Mouse

- For make easy task and faster to click when developing project.

iii. Pen drive

- To store the backup file
- Storage: 32GB

iv. Printer Canon MP287

- To print out the documentation
- To print picture dictionary

vi. Android Mobile Phone: OPPO A57

- Used to run and testing the application.

3.4.2 Software requirement

i. Unity3D

- Used to create the Virtual Reality app and overall project and modelling 3D object
ii. Autodesk Maya

- Used to create 3D object or tool.
- To create augmented reality

3.5 Summary

Methodology is very important in a system development. It helps to make sure the system develop correctly from phases to phases. In this system, Iterative and Incremental Model had been chosen as a guide to build system. It also helps to ensure all the objectives can be achieved. Besides, this chapter also explains the hardware and software requirements for this system.
CHAPTER IV

IMPLEMENTATION AND TESTING

4.1 Introduction

In this chapter, will be discuss about implementation of the methodology discuss in previous chapter and testing to obtain result of each implementation. Implementation are executed to ensure the application is develop according to the main objectives of the project and fulfill the user requirement. Testing will be executed so that developer will recognize the defects as soon as possible and repair it immediately. A successful test is one that can uncover errors.

4.2 Implementation

The purpose of this phase is to give the effective and efficient delivery of fully functional application. The purpose of this phase is the effective and effective delivery of instruction. This project developed and implemented as an android application by using 3D Unity which is integrated with Vuforia developer to develop design, code, test, debug and execute the main process of the project. Furthermore, this project use C# as the programming language for the coding purpose.
4.3 The Scene of Hijaiyah Alphabet AR

Figure 4.1 Main Menu Scene

Figure 4.2 Credit Scene
Figure 4.3 AR Camera Scene(Object)

Figure 4.4 Camera AR Scene(Alphabet)
4.4 AR Marker

A marker or image target can be anything, as long as it has enough unique visual points. Images with lots of concerns and edges work well. It designed with colorful element using Adobe Photoshop. The image of object at the center, and the name of the object so that users can play while spell the name of the object correctly. Besides that, Vuforia developer is a website that let developer check if the image is a suitable marker and every marker features. A feature is a sharp, spiked, chiseled detail in the image, such as the ones present in textured objects. The image analyzer represents features as small yellow crosses. Increase the number of these details in image, and verify that the details create a non-repeating pattern. There are 28 marker based as shown on table 4.1.

<table>
<thead>
<tr>
<th>Flashcard Image</th>
<th>Marker Feature</th>
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<tbody>
<tr>
<td><img src="image1.png" alt="Flashcard Image" /></td>
<td><img src="image2.png" alt="Marker Feature" /></td>
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<tr>
<td><img src="image3.png" alt="Flashcard Image" /></td>
<td><img src="image4.png" alt="Marker Feature" /></td>
</tr>
<tr>
<td><img src="image5.png" alt="Flashcard Image" /></td>
<td><img src="image6.png" alt="Marker Feature" /></td>
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<tr>
<td>Letter</td>
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4.5 Testing

Testing is one of important phase in the development of the project. This phase works to test the system or application whether it fully function or vice versa. In this phase there are three type of testing to test the application which are unit testing, integrate testing and system testing. Unit testing is carry out to verify the functionality of specific section code. Integration testing is to exposed defect in the application interfaces and interaction between module.

4.5.1 Flashcard Testing

Table 4.2 show the 28 flashcard testing is a test to determine whether all 3D model implement with the AR marker is success or not.
<table>
<thead>
<tr>
<th><strong>Output (Alphabet)</strong></th>
<th><strong>Output (3D Object)</strong></th>
<th><strong>Result</strong></th>
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</thead>
<tbody>
<tr>
<td><img src="image1.png" alt="Image" /></td>
<td><img src="image2.png" alt="Image" /></td>
<td>Success</td>
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<tr>
<td><img src="image3.png" alt="Image" /></td>
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**Table 4.2 Testing from mobile phone**

41
4.6 Summary

In this chapter of implementation and testing, it has been described and show all the user interfaces in the application. It can act as a guide for new user about how can they use the application. Testing also an important part to ensure that all the functionality achieved and run smoothly. Maintenance should be carry from time to time to check whether there are any bugs detected. This phase will repeat to ensure the error can be minimized and the application will be optimize.
CHAPTER V

CONCLUSION

5.1 Introduction

In this chapter, contribution Hijaiyah Alphabet Using Method Haraki with Augmented Reality, problem and limitation during project development as well as the future work in order to improve the application itself will be discuss.

5.2 Project Contribution

Hijaiyah Alphabet Using Method Haraki with Augmented Reality developed based on ADDIE method is mainly aim to give the user to experience the new way of education for children with the edutainment concept. Meanwhile, the others aim is to give the user exposure and education about the AR technology. Furthermore, it is very convenience to use because user only just need to install and can use them without any internet connection.

This project was successful because the objective was been achieved with great. For the first objective that to study a hijaiyah alphabet using method haraki. Haraki is
a pronounce of Arabic. There have 28 alphabet in Arabic and know how to say Arabic pronounce. There have teach how to say with carefully in google and in youtube. Second objective is develop an application about hijaiyah alphabet. This was success and this was explain in chapter 3 and chapter 4. Then, last objective is test the function of hijaiyah alphabet application. This also was explain in chapter 4.

5.3 Problem and Limitation

There were many problems to develop this app and there get a limit for this application.

1. Problem

   a) There was 28 object and 28 alphabet and 28 videos to build in this application. It took too long time to make this all. This make this success in a short time, 5 object, 28 alphabets were created by myself. That balance was download from internet.

   b) Need to create flashcard with carefully because when the feature is same with all flashcard, it will pop-out the same object while it used different flashcard.

   c) Find the way to optimize the application and stabilize the 3D model to ensure it can be reveals without any failures.

2. Limitation

   a) This application only available on the android platform only.
5.4 Future Work

Hijaiyah Alphabet Using Method Haraki with Augmented Reality still need to be improved a lot but it will take a lot of time. In the current version of application, it only available for 28 objects only, so for next planning is to add the other object and to add more information and certainly with much more entertainment. Moreover, this application can also be built by using a new technique which is marker-less-based technique. By using this technique, user does not need to find the marker and it can be use anywhere. Another suggestion is to develop this project in IOS device based on recommendation from user testimony.

5.5 Conclusion

Hijaiyah Alphabet Using Method Haraki with Augmented Reality help the target user to gain knowledge in the new way or experience. ADDIE model has been used in order to make this development workflow going well and give the expected outcome. The framework and user interface design that included in this report can also act as guideline for the user to use this application and also for research in their work. This application was success build in 3 months with helped by supervisor and my friends. After bild this application, it was test by user to know the problem. When solve the problem, that application was build again until success. Then, it was success wit great and can install and play in mobile phone. This success was explained in chapter 4.
REFERENCE


APPENDIX LIST

Figure Appendix