ENHANCED ALPHABET LEARNING BY USING AUGMENTED REALITY

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REALITY

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This report is submitted in partial fulfilment of the requirement for the
Bachelor of Computer Science (Media Interactive)

FACULTY OF INFORMATION AND COMMUNICATION TECHNOLOGY
UNIVERSITI TEKNIKAL MALAYSIA MELAKA
2017

BORANG PENGESAHAN STATUS TESIS

JUDUL: ENHANCED ALPHABET LEARNING BY USING AUGMENTED
         REALITY

SESI PENGAJIAN: 2017

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Nor Amanina Binti Kasimil   Encik Shahril Bin Parumo
Tarikh:_____ 25/8/2017_____   Tarikh: ____25/8/2017_____

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DECLARATION

I hereby declare that this project report entitled

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is written by me and is my own effort and that no part has been plagiarized
without citations.

STUDENT: _____   Date   : __25/8/2017____

(NOR AMANINA KASIMIL)

I hereby declare that I have read this project and found this project is sufficient
in term of the scope and quality for the award of Bachelor of Computer
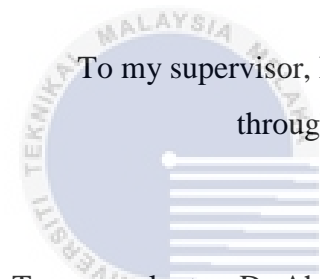Science (Interactive Media) With Honours.

SUPERVISOR: _____   Date   : __25/8/2017____

(ENCIK SHAHRIL BIN PARUMO)

DEDICATION

To my beloved family for supporting me during my study in UTeM

To my supervisor, Encik Shahril Bin Parumo for his guidance to me
throughout the development of this project,

To my evaluator, Dr Ahmad Naim for his good advice to improve this project,

Lastly, to all my friends for their moral support to me during the development
of this project.

ACKNOWLEDGEMENTS

Firstly, I would like to give all the praise to Allah S.W.T for giving me the strength and patience for the whole process of completing this Final Year Project.

I would like to thank to the people around me who keep supporting and giving advice during the development of this project. Special thanks to my supervisor, Encik Shahril bin Parumo for his support and guidance.

I also want to thank to my family who always support and give advice to finish my final project. Then, I would like to thank to my friends who always spend their time and help me to complete this project.

Next, thank you to the Faculty Information and Communication Technology as this project really help me to learn a lot about my skills and knowledge that I already earn throughout three years of my study.

Lastly, I would like to thank my evaluator, Dr Ahmad Naim for evaluating and giving comment on my final year project.

ABSTRACT

Alphabet is a collection of 26 letters. Alphabet learning must be beginning during a childhood. The alphabet becomes a barrier in language learning to the children because of the difficulty to recognize the letters and name of the letters. From the observation, most of the children learn the alphabet when they enroll to the kindergarten. Therefore, this Augmented Reality (AR) application have been developed to encourage children to learn the alphabet in early age and enjoying between real world and augmented reality. After the children coloured the alphabet, they can view the two-dimensional or three-dimensional animation of the alphabets. This project applied the multimedia elements such as images, sound, text, and animation in Augmented Reality technology so that the children will be more interested in learning Alphabet rather than just using a traditional method learning. This application will be presented using mobile application. Children will open the application in their android smartphone to display the two-dimensional or three-dimensional animation of the colouring alphabet. This application can be a medium to improve alphabet learning to the five years old students.

ABSTRAK

Abjad adalah koleksi huruf yang mengandungi 26 huruf. Pembelajaran abjad seharusnya bermula dari zaman kanak-kanak lagi. Abjad menjadi salah satu kesukaran dalam pembelajaran bahasa disebabkan kanak-kanak tidak mengenali bahkan tidak mengetahui nama huruf-huruf tersebut. Daripada kajian yang telah dijalankan, kebanyakan mereka akan mengenali bentuk dan nama huruf dengan serius apabila mereka mula memasuki ke alam pra-sekolah. Oleh sebab itu, aplikasi 'Augmented Reality' diperkenalkan untuk menarik minat kanak-kanak belajar mengenal abjad di awal peringkat awal kanak-kanak dan menghayati di antara dunia sebenar dan dunia maya. Selepas kanak-kanak mewarna abjad tersebut, mereka boleh melihat animasi dua dimensi atau tiga dimensi setelah mengimbas 'marker' pada telefon pintar. Projek ini menggunakan pelbagai elemen multimedia seperti gambar, bunyi, tulisan dan animasi dalam teknologi "Augmented Reality' untuk membuatkan kanak-kanak lebih tertarik belajar abjad berbanding hanya menggunakan cara lama iaitu menggunakan buku teks. Aplikasi ini diterjemahkan menggunakan aplikasi telefon pintar. Kanak-kanak boleh membuka aplikasi tersebut melalui telefon pintar Android untuk belajar mengenal ABC dengan mewarna abjad dan selepas itu, animasi dua dimensi atau tiga dimensi mewarna abjad dipaparkan. Aplikasi ini boleh dijadikan sebagai medium untuk mempertingkatkan pelajaran abjad pada kanak-kanak berusia lima tahun.

TABLE OF CONTENT

LIST OF FIGURES

LIST OF TABLE

LIST OF ABBREVIATIONS

2D	-	Two-dimensional
3D	-	Three-dimensional
API	-	Application Programming Interface
SDK	-	Software Development Kit
JDK	-	Java Development Kit
MB	-	Maya Binary
PNG	-	Portable Network Graphics
GIF	-	Graphic Interchange Format
JPEG	-	Joint Photography Expert Group
AI	-	Adobe Illustrator
PS	-	Adobe Photoshop

LIST OF APPENDICES
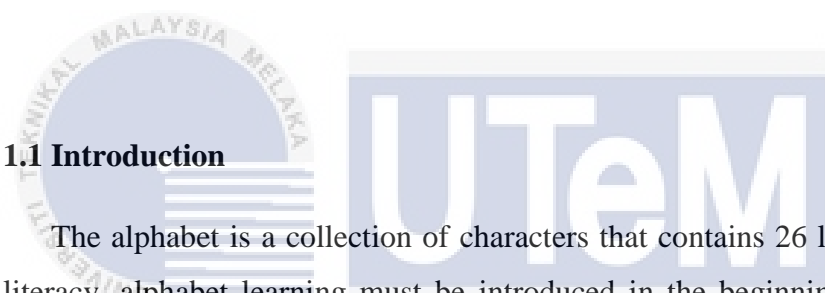
CHAPTER I

INTRODUCTION

1.1 Introduction

The alphabet is a collection of characters that contains 26 letters. In early literacy, alphabet learning must be introduced in the beginning of a child's life. The alphabet can become a barrier in language due to children not being able to recognise the letters and their names. In order to acquire knowledge faster, children should start learning the alphabet prior to enrolling for primary education. This method could help them recognise the letters and their names, as well as remember the sounds of every letter in the correct sequence at an early age.

Early childhood education is the best way to allow children to acquire the knowledge of the alphabet and motivate them to do well in their studies. It is widely known that children nowadays are prone to using technology at a very young age to watch cartoon shows that contain image, audio, video, animation and text, rather than acquiring basic knowledge on the alphabet first. Without the necessary exposure to the alphabet, children will face difficulties in reading, writing and spelling. One of the best solutions to heighten their interests in learning the alphabet is by implementing more interactive ways of learning, such as using Augmented Reality in mobile applications.

Based on the observation, most children will start learning the alphabet seriously when they start kindergarten. Augmented Reality (AR) is a technology that can enrich the real world with digital information and media. Children tend to be attracted to colourful and concrete things. AR is a powerful tool that can attract children and boost their interests in learning. Today's are no longer insterested in learning because they prefer playing rather than learning. Since children are fast-learners, teaching them to use AR mobile applications will not a problem. Not only can the AR application encourage children to start learning the alphabet at an early age, they can also enjoy switching between the real world and Augmented Reality.

Each student has their own learning style. Fleming (2001) defined learning styles as "an individual's characteristics and preferred ways of gathering, organizing, and thinking about information". The VARK stands for 'Visual', 'Aural', 'Read/Write', and 'Kinesthetic'. In this project, the students are approached with VARK learning styles with visuals (different coloured pencils and alphabet flashcards), aurals (attending class), reading and writing (colouring the alphabet flashcards) as well as kinesthetics (doing activities to understand the alphabet).

Besides using AR in smartphone applications, this project will also use alphabet flashcards. With the technology, the children will be able to view the two-dimensional (2D) or three-dimensional (3D) animation of each coloured alphabet.

This project used multimedia elements such images, sounds, texts, and animations in Augmented Reality technology to attract the children towards learning the alphabet instead of a traditional learning method. The application will be presented through mobile phones; the children will have access to the application on their Android smartphones to start the learning process.

1.2 Problem Statement

Most children today grow bored when they are required to focus when their teachers or parents ask them to read what they were taught in front of their classes, or even when they are at home. This is one of the reasons why they cannot take learning seriously. This learning method makes it difficult for them to even remember what they have already learned because the traditional learning method lacks fun.

Next, parents and teachers do not expose their children to this AR mobile application because they were also not exposed to the AR technology during their early childhood education. Thus, the proposed solution to attract children towards learning is through using Augmented Reality in mobile applications.

1.3 Objectives

This project has three objectives to fulfil within four months.

1. To study the requirements of enhanced alphabet learning by using Augmented Reality (AR).
2. To design and develop alphabet learning in mobile applications for children.
3. To evaluate the effectiveness of AR in alphabet learning.

1.4 Scope

This section defines the scope of this study, followed by the reasons for the involvement of the scope.

1.4.1 Target User

This project is a platform for children aged five years old to learn alphabet by using an AR application. This is because at this age, the children are very active and earger to learn something new. At present, the children are using traditional methods through physical books to learn the alphabet. The existing learning method makes the children grow bored at an early stage and start losing focus rather than paying attention to what is being taught. Therefore, this project proposes to combine the traditional method and AR technology by having the children colour in the flashcards that are animated.

1.4.2 System

This project will be using smartphones as devices. The platform used for the development is the fifth version of Android (Lollipop). The smartphones will be used to display the 2D or 3D animation from the marker alphabet flashcards after the children finish colour the alphabet. The internal storage space of the smartphones is 32 GB while the external storage space is16 GB. The model of the smartphones used for this project is Samsung Note 3.

1.5 Project Significance

The significance of this project is to propose more effective and attention-grabbing ways to teach the children the alphabet. Usually, children will start learning the alphabet when they enrol in kindergartens or pre-schools; hence, the augmented alphabet flashcards can help them recognise the letters and improve their learning abilities even before those levels. . In addition, the children will do the colouring activity in order to get the 2D or 3D animations to appear.

By using this application, children will be able to remember and understand the alphabet better. They will also enjoy a new learning experience when using the AR application at home. This project can definitely help children to familiarise themselves with the alphabet a lot sooner. This project also serves as a guideline for future educators and educational application developers to create a new and engaging experience for children in their learning process,

1.6 Expected Outputs

The expected result of this project is a developed AR mobile application for children of the age of five years old. This project is also expected to help parents in encouraging their children to learn the alphabet at a young age.

1.7 Conclusion

In conclusion, this project aims to enhance the children's learning method in acquiring the alphabet by using Augmented Reality. The objectives of this project are to improve alphabet learning strategies using AR in early childhood education, and to evaluate the effectiveness of the AR method compared to traditional learning methods. The project is expected to heighten the interest of children in acquiring knowledge about the alphabet through the implementation of Augmented Reality.

CHAPTER II

LITERATURE REVIEW AND PROJECT METHODOLOGY

2.1 Introduction

This section focuses on the literature review and critical summary of published research literature related to the topic of this study. The purpose is to create and provide some information that can justify the current research. From the previous chapter, the problem statement of this project has been discussed. This chapter aims to formulate a solution for the problem based on facts and information on Augmented Reality obtained from relevant published literature.

The methodology of this project will also be discussed in this chapter. Each phase and process of the methodology will be explained to achieve the objectives and decide the goal of this project. The requirements of software and hardware for this project will be specified to explain the functionality in detail. In addition, this project needs to be completed according to the set schedule. Therefore, the milestones of this project are also provided at the end of this chapter to show the progress and the duration for each task to be done successfully.

2.2 Domain

The facts and findings of this project are the definition of Augmented Reality, Augmented Reality for education, traditional learning method and Augmented Reality in mobile application, as well as the current method used to learn the alphabet and a comparison between existing methods.

2.2.1   Augmented Reality (AR)

Actually, the Augmented Reality is continued from a previous technology which is known as Virtual Reality, or Virtual Environment (VE). The virtual reality immerses the user in a synthetic environment. However, while being immersed, the user cannot see the real world within their space (Azuma, 1997). So, AR comes up with a solution to let the user see the real world, as well as virtual objects in their space in the real world, similar to the "Snapchat" application that was developed by former students of Stanford University. Figure 1 shows the examples of the application. It shows real people with different filters based plastered on their faces.

Figure 2.1: Real people with virtual filters effect

Other definition of Augmented Reality is to been said by other researchers which AR requires the use of Head-Mounted Displays (HMDs) and to avoid limiting AR to specific technologies, AR contains three characteristic which are combines real and virtual, interactive in real time and, registered in three-dimensional.

2.2.1.1 Augmented Reality in education

In education, Augmented Reality helps the user to learn and have fun at the same time. The most important factors in education using Augmented Reality are the teaching and learning methods. Today, fun and interactive learning in education is a powerful factor to engage children in the learning environment. The first Augmented Reality popup book called "Magic Book" was created by Billing Hurst (2001). This "Magic Book" allows users to view virtual content superimposed over the real pages of the book by looking at the real pages of the book through a hand held display device. From his work, other researchers used "Magic Book" as their inspiration to create other Augmented Reality in education. For example, Karawalla et al. has developed an Augmented Reality application in science learning, which is to study the relationships between the earth, sun, moon, and time.

Augmented Reality is applied in the learning process to help the students improve their understanding and attention during their learning sessions. Augmented Reality in education creates an educational environment that is more productive, fun and interactive rather than a traditional learning environment.