BORANG PENGESAHAN STATUS TESIS*

INTERACTION BETWEEN VIRTUAL OBJECT AND REAL

JUDUL : **ENVIRONMENT (Learning Alphabet Using Augmented Reality)**

SESI PENGAJIAN : 2013 / 2014

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INTERACTION BETWEEN VIRTUAL OBJECT AND REAL ENVIRONMENT
(Learning Alphabet Using Augmented Reality)

NORATIKAH BINTI AZHAR

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

FACULTY OF INFORMATION AND COMMUNICATION TECHNOLOGY
UNIVERSITI TEKNIKAL MALAYSIA MELAKA
2013

DECLARATION

I hereby declare that this project report entitled
**INTERACTION BETWEEN VIRTUAL OBJECT AND REAL
ENVIRONMENT**
(Learning Alphabet Using Augmented Reality)

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

STUDENT   : _____   Date: _____
               (NORATIKAH BINTI AZHAR)

SUPERVISOR : _____   Date: _____
               (EN. MOHD ADILI B. NORASIKIN)

DEDICATION

Specially dedicated to my beloved parents and my family member

For my supervisor, EN MOHD ADILI BIN NORASIKIN
(UTEM)

For my evaluators, EN MOHD LUTFI BIN DOHALIT
(UTEM)

And lastly to my beloved friends and who have encouraged, guided and inspired me
throughout my journey in education

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I am deeply give a thousand of thanks to my tester who willing to share their time for answer the questionnaire and give some advice and recommendation that help me to accomplish the objectives in developing the product.

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ABSTRACT

This project is a requirement for students taking the subject BITU 3923 – Projek Sarjana Muda (PSM). In the process of completing the project, problems occurred are solved with the best efforts. In this project, the research is to investigate the user interaction between real environments with virtual learning objects. As for this system, it would focus on main user that is for children and teachers. For that purpose, webcam camera will be used to detect marker and appear the virtual object on the screen for interaction in learning purpose. By adding latest technology as Augmented Reality on the traditional method of learning, it could attract early aged children to learn alphabets. So that on that purpose, the product that come up from it was to develop an application that can let children to interact with the virtual object while they in the real environment.

ABSTRAK

Projek ini adalah wajib untuk pelajar yang mengambil subjek BITU 3923 - Projek Sarjana Muda (PSM). Dalam proses menyiapkan projek ini, masalah yang berlaku diselesaikan dengan mengambil penyelesaian yang terbaik. Kajian ini adalah untuk menyiasat interaksi pengguna antara persekitaran sebenar dengan objek pembelajaran maya. Bagi sistem ini, tumpuan akan diberikan kepada pengguna yang yang terdiri daripada kanak-kanak dan guru-guru. Bagi tujuan itu, kamera webcam akan digunakan untuk mengesan penanda dan objek maya akan muncul pada skrin computer untuk interaksi dalam tujuan pembelajaran. Dengan menambah teknologi terkini seperti Augmented Reality kepada kaedah pembelajaran yang biasa, ia boleh menarik kanak-kanak untuk belajar huruf. Oleh itu, produk yang terhasil adalah untuk membangunkan aplikasi yang membolehkan kanak-kanak untuk berinteraksi dengan objek maya semasa mereka dalam persekitaran yang sebenar.

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PSM	-	Projek Sarjana Muda
OS	-	Operating System
PDA	-	Personal Digital Assistant
ICT	-	Information and communication technologies
PSD	-	Photoshop Data File Extension
PNG	-	Portable Network Graphics
RAM	-	Random-Access Memory
SWF	-	Shockwave Flash
Wav	-	Waveform Audio File Format
GIF	-	Graphics Interchange Format
JPEG	-	Joint Photographic Experts Group
DVD-R	-	Digital Versatile Disc Recordable
CD	-	Compact Disc
PC	-	Personal computer

CHAPTER 1

INTRODUCTION

This project is a requirement for students taking the subject BITU 3923 – Projek Sarjana Muda (PSM). In the process of completing the project, problems occurred are solved with the best efforts. This project is simple applications that will research on the interaction in technology. Augmented reality (AR) is a field of computer science that involves combining the physical world and an interactive, three-dimensional virtual world. The concept behind it is pretty simple. It is to overlay the physical world with objects that appear to occupy the same space. The acceleration in AR technology is due to a few factors. Users are experiencing reality, so believability is easier to achieve. Adding simple graphics such as text or simple shapes and some color effects to object that visualized creates a better user experience. The user will see a mostly familiar with real world by this system. This more subtle use of computer graphics is less expensive in today's technology, so that it is more feasible than systems before it. Augmented reality has many applications, and many areas can get benefits from the usage of AR technology. AR was initially used for military, industrial, and medical applications, but was soon applied to commercial and entertainment areas as well. In this project, the research will be narrow down to investigate the user interaction real environment with virtual learning objects. As for this system, I would focus on main user that is for children.

For that purpose, webcam camera will be used to detect marker and appear the virtual object on the screen for interaction in learning purpose.

1.1 Project background

The acceleration in AR technology is due to a few factors. Users are experiencing reality, so believability is easier to achieve. In this research, I will investigate the acceptance of learning alphabet for children in the average of age 4 to 5 years old who in beginning phase of learning alphabet. They can interact with the virtual button that consists of alphabet A until Z. Each button will pop up different object according to the alphabet that user choose. Users will be able to manipulate the virtual object that appears on device screen. For that purpose, different interaction techniques and concepts have emerged in the field of AR. The virtual object then will give reactions when user touch or interact with them. This project focus on the interacting learning the alphabet in Augmented Reality instead using traditional method to teach children on recognize alphabet in real environment.

1.2 Problem Statement (s)

This idea for the project comes due to investigate on process of the interaction between real and virtual object occurs.

Current learning activities just let children to hear, see, and speak. If they can interact with the virtual object that appears on the screen, it will be much attractive. As children will be interested if they could do some activities while learning.

In education field, less of learning session offer on the intraction of both virtual system or application with the real world. This project will give user especially childrens new experince on make they experiencing as it is in reality, so believability is easier to achieve.

1.3 Objective(s)

This project carried business benefits for an organization to achieve goals. The objective of this proposal is:

1. To explore interaction in Augmented Reality (AR) Technology in teaching childrens on recognize alphabets from A to Z.

2. To investigate the acceptance from childrens on learning the alphabets using an Augmented Reality as learning method application.

3. To develop an AR system that can attract children to learn alphabet from A to Z.

1.4 Research Questions

Considering the time constraints and scope of this project, it is develop due to those research question:

- How AR application can be implement in education?
- How to make learning Alphabet for childrens more interesting?

1.5 Project Scope

1.5.1 Target user

Since this project aiming to teach children on recognize alphabet, the target user for this project are children in age 2 to 5 years old who in beginning phase to learn alphabet.

1.6 Project Framework
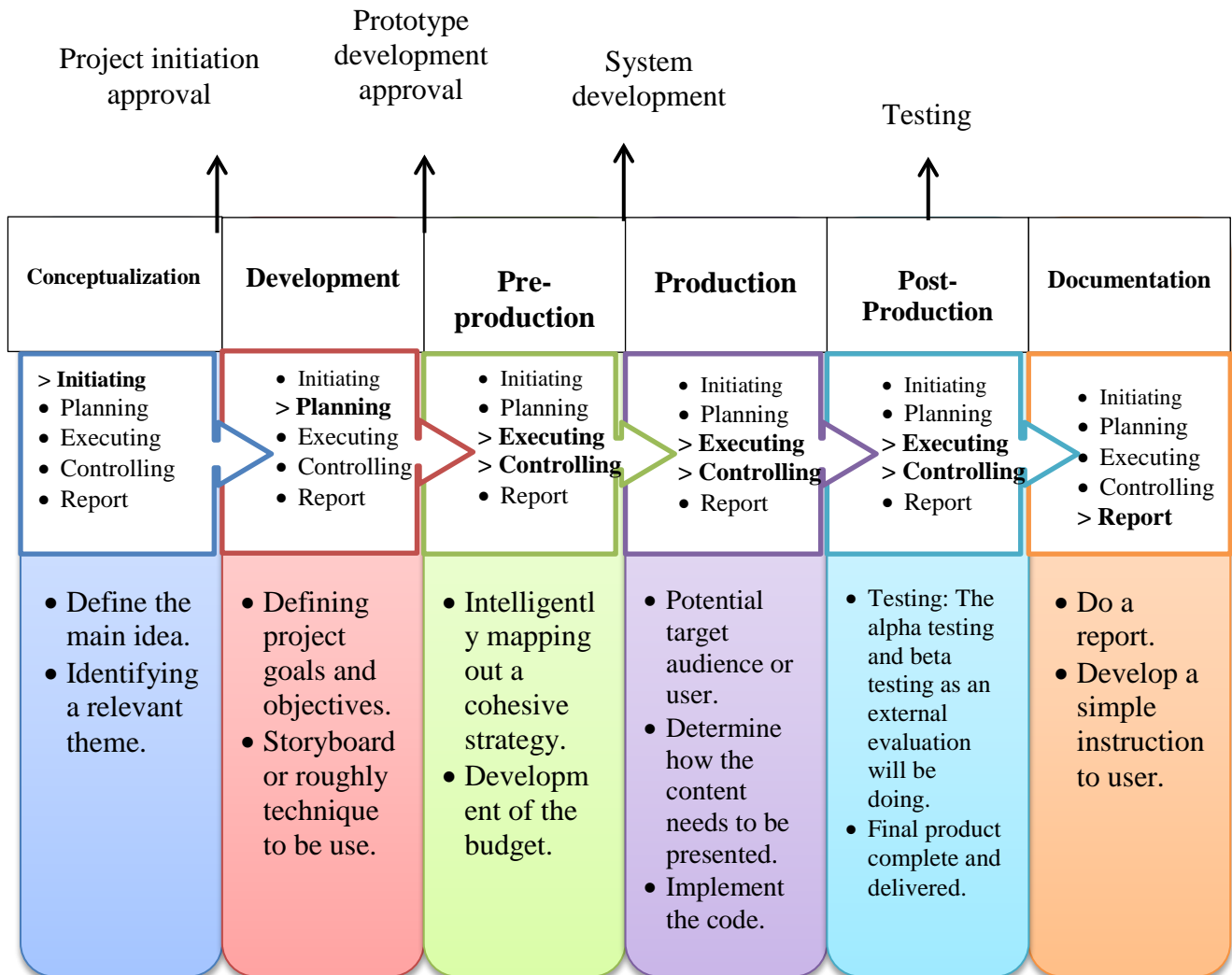
Figure 1.1: Project Framework

1.7 Project Significance

The significant for this project is to assist children and to attract them in learning alphabet by using simple AR application rather than traditional method that only focus on hear, see and speak the alphabet.

Summary

The project background introduces the whole project, current scenario, and the problem that might arise from the current situation. The problem statements describe the problem from the current scenario and why this project should be developed. From the problem statement, the objectives of project are clearly stated. The objectives should achievable and measureable at the end of the project. The scopes of the project explain the specific target user, platform, and functionality.

This project focus on teaching children in range of age 3 to 5 years old on recognize alphabet using augmented reality (AR) application situation in real environment.

CHAPTER 2

LITERATURE REVIEW

A literature review is a text written by someone to consider the critical points of current knowledge including substantive findings as well as theoretical and methodological contributions to a particular topic. Literature reviews are secondary sources, and as such, do not report any new or original experimental work. Also, a literature review can be interpreted as a review of an abstract accomplishment. Most often associated with academic-oriented literature, such as a thesis, a literature review usually precedes a research proposal and results section. Its main goals are to situate the current study within the body of literature and to provide context for the particular reader.

2.1 Area of Study

Educational technology is a wide field. Technology means the systematic application of scientific knowledge to practical tasks. Therefore, educational technology is based on theoretical knowledge drawn communication, education, psychology, sociology, philosophy, artificial intelligence, and computer science. Plus experiential knowledge had drawn from educational practice. Due to improvement through scientific research in the field and our knowledge of this condition has evolved over the years. Implementation of intelligent systems in education could attract children to learn alphabet faster compare to traditional method by using flash card or write it on board.

2.1.1 Augmented Reality (AR)

Augmented reality is a technique which uses 3D models to enhance learning. Applications for augmented reality are broad. The military uses augmented reality for simulations for training purposes; medical students use the technology to practice surgery in a controlled environment; in gaming field, Ogmento is betting on continued adoption of this technology and acceptance by the gaming community. In time, interactive technologies have become extremely important in a world where busy users demand intuitive devices which demand little to no learning time. In this modern scenario, tablets have emerged with their easy-to-use touchscreens, gaming consoles have been successfully exploring movement controls and augmented reality has started to emerge as a viable technology. In education field, it is being used today at all levels of education.

2.1.2 Early childhood Education (Learning Alphabet)

Researchers and early childhood educators both view the parents as an integral part of the early childhood education process. Often educators refer to parents as the child's "first and best teacher". It is very important for parents to stay engaged in their child's learning process. They should know what letters look and sound like and how they go together to form words. The best part is to make them be having fun.

2.2 Current Systems/Tools/Output

In many less developed countries, early childhood education and child care are receiving much attention. Current systems existing at present are less interesting for children in learning the alphabet. Although the existing application is delivered interesting in terms of color application techniques, training, and education, the techniques that used quite bored and children cannot do activity while learning it. Therefore, a new application must be developed in order to facilitate children to learn while enjoying the syllabus.

Construction of the education system will be built using a combination of software Autodesk Maya 2012, Adobe Photoshop CS5, and OpenSpace3D Editor that will produce an application to be learned by children on the letter that will be delivered together with the 3D object in order to facilitate memory their studies they have learned. It can also attract children especially when they can interact with the virtual objects that appear on screen.