INTERACTIVE MOBILE MATHEMATICS APPLICATION FOR PRE-SCHOOL CHILDREN (MyMatematik)

FOCK SOON YEE

UNIVERSITI TEKNIKAL MALAYSIA MELAKA

BORANG PENGESAHAN STATUS TESIS

JUDUL: **INTERACTIVE MOBILE MATHEMATICS APPLICATION FOR PRE-SCHOOL CHILDREN (MyMatematik)**

SESI PENGAJIAN: **SESI 2014/2015**

Saya **FOCK SOON YEE**
mengaku membenarkan tesis (PSM/Sarjana/Doktor Falsafah) ini disimpan di Perpustakaan Fakulti Teknologi Maklumat dan Komunikasi dengan syarat-syarat kegunaan seperti berikut:

1. Tesis dan projek adalah hakmilik Universiti Teknikal Malaysia Melaka.
2. Perpustakaan Fakulti Teknologi Maklumat dan Komunikasi dibenarkan Membuat salinan untuk tujuan pengajian sahaja.
3. Perpustakaan Fakulti Teknologi Maklumat dan Komunikasi dibenarkan membuat salinan tesis ini sebagai bahan pertukaran antara institusi pengajian tinggi.
4. ** Sila tandakan (/)

_____ SULIT (Mengandungi maklumat yang berdarjah keselamatan atau kepentingan Malaysia seperti yang termaktub di dalam AKTA RAHSIA RASMI 1972)

_____ TERHAD (Mengandungi maklumat TERHAD yang telah ditentukan oleh organisasi/badan di mana penyelidikan dijalankan)

__√__ TIDAK TERHAD

(TANDATANGAN PENULIS) (TANDATANGAN PENYELIA)

Alamat tetap: No 7, Lrg Bkt Setongkol
45 Taman Cenderawasih Indah,
25200 Kuantan, Pahang.

EN MUHAMMAD HAZIQ LIM BIN ABDULLAH
Nama Penyelia

Tarikh : 4 September 2015

Tarikh: 4 September 2015

CATATAN: * Tesis dimaksudkan sebagai Laporan Akhir Projek Sarjana Muda (PSM)
** Jika tesis ini SULIT atau TERHAD, sila lampirkan surat daripada pihak berkuasa

INTERACTIVE MOBILE MATHEMATICS APPLICATION FOR PRE-SCHOOL CHILDREN (MyMatematik)

FOCK SOON YEE

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

FACULTY OF INFORMATION AND COMMUNICATION TECHNOLOGY

UNIVERSITI TEKNIKAL MALAYSIA MELAKA

2015

DECLARATION

I hereby declare that this project entitled

INTERACTIVE MOBILE MATHEMATICS APPLICATION FOR PRE-SCHOOL CHILDREN (MyMatematik)

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

STUDENT: _____ DATE: 4 September 2015

(FOCK SOON YEE)

SUPERVISOR: _____ DATE: 4 September 2015

(EN. MUHAMMAD HAZIQ LIM BIN ABDULLAH)

DEDICATION

To my beloved parents, friends and supervisor

ACKNOWLEDGEMENT

First and foremost, I would like to take this opportunity to express my very great and deepest appreciation to my dearest supervisor, En. Muhammad Haziq Lim Bin Abdullah for his constructive suggestion during the planning and development of this project. Thank you for truly inspired me with countless of valuable guidance and advices throughout the whole process of this final year project.

Next, I would like to thank my evaluator, Prof. Madya Dr. Faaizah Binti Shahbodin, for the criticism towards the positive improvement in my project. I appreciate for your opinions and guidance for me to improve my project. Furthermore, I would also like to thank teacher from one of the kindergarten at Malacca District for helping me lots on the application trial. Next, I am also particularly grateful for the assistance given by the lecturers from the Department of Interactive Media.

Last but not least, to all my beloved friends in BITM and family members, million thanks for all of your countless support and understanding during the completion of this project. You all have been giving me support and motivation throughout my project. Without all of the helps mentioned above, I would definitely not able to complete my final year project in time.

ABSTRACT

Interactive Mobile Mathematics Application (*MyMatematik*) is a support learning tool for Pre-School Children. The target users of the project are four to six years old children. The main problem in this project is the children are lack of interest when facing the same teaching method: whiteboard teaching method and practice using traditional exercise book. Therefore, *MyMatematik application* is potential to support children to lead their interest to learn Mathematics because the application provides a fun learning environment. This project using Agile Methodology as a development methodology. My Matematik are tested with two teacher and five children in a kindergarten at Melaka Tengah District. *MyMatematik* consists of four modules include learn number, count object, addition and subtraction calculation. We found that *MyMatematik* application can promote engagement in children learning through a reward. The simple design of *MyMatematik* are easy to be used for children so that they more engage in the learning session. As a conclusion, *MyMatematik* can help in support learning of Mathematics for pre-school children.

ABSTRAK

Mobile Aplikasi Interaktif Matematik merupakan alat pembelajaran sokongan untuk Kanak-Kanak di Pra-Sekolah (MyMatematik). Pengguna sasaran bagi projek ini adalah kanak-kanak yang berumur empat hingga enam tahun. Pernyataan masalah di dalam projek ini adalah kanak-kanak kurang berminat dalam kaedah pengajaran yang sama iaitu melalui kaedah pengajaran di papan putih dan amalan dengan menggunakan buku latihan. Oleh itu, aplikasi MyMatematik berpotensi untuk kanak-kanak bagi mendorong mereka berminat belajar Matematik kerana aplikasi ini membawa persekitaran pembelajaran yang seronok. Projek ini mengguna metodologi Agile untuk pembangunan aplikasi dan aplikasi ini telah diuji oleh dua guru dan lima kanak-kanak di sebuah tadika di Daerah Melaka Tengah. Aplikasi MyMatematik mengandungi empat modul iaitu "belajar nombor", "objek kiraan", "penjumlahan" dan "penolakan". Hasil projek ini adalah MyMatematik boleh menggalakkan penglibatan diri di kalangan kanak-kanak melalui pemberian ganjaran. Seterusnya, reka bentuk MyMatematik yang mudah untuk digunakan oleh kanak-kanak membantu di dalam penglibatan mereka semasa sesi pembelajaran. Kesimpulannya, MyMatematik boleh membantu dalam pembelajaran sokongan Matematik untuk kanak-kanak pra-sekolah.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATION

NGPM – Next Generation Preschool Math

PBS – Public Broadcasting Service

STEM – Science, Technology, Engineering, Mathematics

IWB – Interactive White Board

3D – Three Dimensional

CHAPTER I

INTRODUCTION

1.1 Introduction

Designing a mobile application for children is highly potential to support pre-school children in learning Mathematics. According to Ahmad et al., (2014), a new learners may need take some time to learn Mathematics such as numbers and basic operations like subtraction and addition. Even though they already know and understand but they also find it difficult to memorize numbers and mathematical concepts. The sophisticated technology such as computer and mobile phone able to integrate with education curriculum as a support teaching tool for children (Attewell, 2005).

Based on Shi et al., (2012) stated that by having the evolution of technology, learning Mathematics for pre-school children can be improved with the help of interactive tools or interactive graphic image in order to attract their attention and interest. Touch based mobile devices is potential to support children learning (McNally et al., 2014). In addition, most of the children are already exposed to mobile phone at an early stage. Moreover, touch-based intuitive gadgets, for example, cellular telephone, iPad, and tablet are simple and helpful to use by kids. The instructors also found in their studies that it is

essential and convenient instruments for showing concepts, for example, arithmetic in right on time stage learning (McNally et al., 2014).

On the other hand, children may need involve an interactive way in the learning process as they will find interest with Mathematics. This project is an Interactive Mathematics Mobile Application Intervention for pre-school children. An interactive interface design is composed of many elements that are important to deliver attractive prototype for children's learning. Furthermore, Multimedia is main elements to produce an interactive environment with the combination of texts, pictures, sounds and animation. This can perfect helping new maths learners practice and learn their math skills in fun and creative ways. Thus, teachers can teach more efficiently and consistently by using this Interactive Mathematics Mobile Application as an additional teaching tool. Animations, graphics and sounds major used to illustrate the ideas and concepts in this Interactive Mathematics Mobile Application.

1.2 Problem Statement

The main problem statement investigated by this project is based on current existing system or method and research. There are two issues which are:

i. Conventional teaching tool

Ordinarily teacher use text-book as a teaching tool in the classroom. Children are lack of interest when facing the traditional teaching method which is whiteboard teaching method and where the exercise book is used as the only source in learning Mathematics. This will results in a boring environment and also can cause the children lose their focus when learning (Nixon et al., 2014). Therefore, Interactive Mathematics Mobile Application may get the children attraction and interest to learn. When they need to use mental representations or fingers in order to do basic operation exercises, Interactive

Mathematics Mobile Application can help children to build cognitive thinking. Cognitive skills in youngsters can be sharpened through communication and interaction with interactive tool. Children are able to obtain the skills about people, events and objects, and use the symbols to imagine and represent real life such as the symbols of words, images and numbers. Children's cognitive and mental processes are the processes of recognizing,learning and understanding something new. The development of innovation must be parallel to the improvement of kids' intellectual deduction and ability to affirm that they find themselves able to impart to this present reality in future.

ii. Less interactive with current approach

There have been variety of effective traditional ways currently in which kids are taught numeracy in classrooms, however research recommends that youngsters are more connected and handle ideas immediately when they enjoy the topic being taught (Masood and Hoda, 2014). At the same time, kids are more attracted to colorful and interactive applications. With the support of multimedia elements, children's imagination of the mathematical concepts can be handle at more high levels. Children can learn better when words and animations are in conversational style rather than formal style teaching method (Mayer and Moreno, 2002). This will be improves their performance and allows them to be more excited, fun and active by using the Interactive Mathematics Mobile Application during learning sessions.

1.3 Objectives

This project embarks on the following objectives:

- To investigate the interaction design principle:engagement, functional minimalism and cognitive load in the Interactive Mobile Mathematics Application to support and engage interaction among pre-school children.

- To develop an Interactive Mobile Mathematics Application for pre-school children.

- To evaluate the user experience of using Interactive Mobile Mathematics Application with teacher and pre-school children.

1.4 Scope

This Interactive Mathematics Mobile Application is developing for four to six years old pre-school children. Interactive Mathematics Mobile Application is an application that can display highly efficient technique to users who are at early stage of learning Mathematics especially for preschoolers. The name of this application is *MyMatematik*. All the activities in *MyMatematik* application used Bahasa Melayu language. This application consists of four activities which are *Mari Belajar, Mengira Objek*, *Penjumlahan* and *Penolakan*.

In the first activity (*Mari Belajar*), it will help children learn whole number from one to ten with image. In this application will use animal, vegetable and fruits as a main object. In the next activity (*Mengira Objek)*, children need to answer by tapping the number match with the object given. All the number will indicate by pictures to make the application look attractive and children will be more interest to continue play and enhance their cognitive skills.

The next activity (*Penjumlahan)*, children will learn addition calculation. In this part, children can learn the addition lesson and practice their addition calculation. Children need to match the answer by drag the correct answer in below. Children need redo until answer correctly to proceed the next question.

For the last activity (*Penolakan)*, children will learn subtraction technique. This module is the same as addition activity. Children need to match the answer by drag the correct answer in below. Children need redo until answer correctly to proceed the next question.

This application integrates multimedia elements in an interactive and supportive way that is suitable for pre-school children level. Furthermore, it can be used as supporting tool since it is interesting, user friendly and enjoyable learning platform.

1.5 Project Significance

This Interactive Mathematics Mobile Application is able to increase excitement and interest of children during the learning session. The target user of this project is for pre-school children age range from four to six years old. The children's understanding is believed can be increase as they could visualize the techniques in a better way, which is using the animation element better than text alone. This learning mobile application can be a helpful tool in improving children performance and promote motivation in children learning.

By using this Interactive Mathematics Mobile Application in the classroom, it can help teacher to attract student attention. This is becauseInteractive Mathematics Mobile Application was apply interactive multimedia element by using 2D graphic and audio. In this application, it involve more graphics compare with text.

Hence, these Interactive Mathematics Mobile Application able to support learning activity in the classroom. This application can make children learn Mathematics in fun and enjoy environment.

1.6 Conclusion

As a conclusion, the expected results or benefit of this Interactive Mathematics Mobile Application is as a supporting learning tool for children to learn Mathematics in the pre-school classroom. *MyMatematik* is different from the conventional teaching tool. It bring a fun and interesting learning environment for children. By having this interactive application, children may can promote motivation in learning Mathematics.

Next , the coming activities is to study the literature review and identify the project methodology.