

BORANG PENGESAHAN STATUS TESIS*

JUDUL : COMPUTER AIDED ORAL THERAPY FOR DOWN

SESI PENGAJIAN : 2011/2012

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COMPUTER AIDED ORAL THERAPY FOR DOWN SYNDROME

UMAIR BIN RAINUL

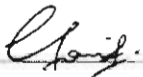
This report is submitted in partial fulfilment of the requirements for the
Bachelor of Computer Science (Software Development)


FACULTY OF INFORMATION AND COMMUNICATION TECHNOLOGY
UNIVERSITI TEKNIKAL MALAYSIA MELAKA
2011

DECLARATION

I hereby declare that this project report entitled
COMPUTER AIDED ORAL THERAPY FOR DOWN SYNDROME

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

STUDENT :  Date: 30/8/2012
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DEDICATION

I would like to dedicate this project to my beloved parents, family, friends and also to University Teknikal Malaysia Melaka.

ACKNOWLEDGEMENTS

I would like to thank Cik Syariffanor Hisham for giving assistance and guidance to complete this project successfully. All the teaching will not be forgotten will be used in the future.

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ABSTRACT

Down syndrome children is a group of people that require special care. They suffer a delay in developing their everyday skills. One of the skills is communication skills. People with Down syndrome have a higher incidence of pronunciation problems than any other group of people with severe learning difficulties. In addition, they have difficulties with coordinating the rapid tongue movements necessary for clear speech due to their small mouths and slightly enlarged tongues. These articulation problems can be compounded by their low muscle tone. This project focusing on developing a computer aided oral therapy for Down syndrome. The application developed called is 'Play With Casey'. The application helps the Down syndrome children with early stage of oral muscle problem to develop their communication skills. This project focuses specifically on stimulating the children with Down syndrome to train their mouth muscle tone and oral motor. By training their mouth muscle tone and oral motor, the children will be able to improve their speech and language skills. In this project, an interactive storytelling computer games based approach is used. The methodology applied for development of this project is the prototyping method. A prototyping methodology is a development process which allows developers to create portions of the solution to demonstrate functionality and make needed refinements before developing the final solution. The testing techniques used to test the project are by doing observations and distributing sets of questionnaires. The target user includes four Down syndrome children aged five to nine years old and two of their teacher. Based on the testing results, it shows that this project is useful and it helps the Down syndrome children to train their mouth muscle tone and oral motor.

ABSTRAK

Kanak-kanak sindrom Down adalah golongan yang memerlukan perhatian khas. Mereka mengalami kelewatan dalam mempelajari kemahiran-kemahiran hidup seharian. Salah satu kemahiran tersebut ialah kemahiran bercakap. Mereka mengalami masalah dalam mengkoordinasi pergerakan lidah yang diperlukan untuk bercakap dengan jelas. Ini disebabkan oleh mereka mempunyai fizikal mulut yang kecil dan lidah yang besar. Masalah percakapan ini juga disebabkan oleh otot-otot mulut yang lemah. Fokus projek ini adalah untuk membangunkan satu aplikasi terapi oral yang menggunakan komputer untuk kanak-kanak sindrom Down. Nama aplikasi tersebut ialah 'Play With Casey'. Aplikasi ini membantu kanak-kanak sindrom Down yang mengalami masalah otot mulut yang lemah pada peringkat awal untuk mempelajari kemahiran bercakap. Projek ini membantu dengan cara merangsang mereka untuk melatih menggunakan otot mulut dan motor oral mereka. Dengan melatih otot mulut dan motor oral, mereka dapat memperbaiki kemahiran bercakap dan bertutur. Dalam projek ini, kaedah permainan komputer bercerita yang interaktif digunakan. Metodologi yang digunakan untuk membangunkan projek ini ialah kaedah prototaip. Kaedah prototaip adalah satu proses pembangunan yang memberi peluang kepada pembangun untuk membina sebahagian kecil projek tersebut dengan tujuan mendemonstrasikan fungsi utama produk serta membuat pembaikan kepada produk tersebut sebelum membangunkan produk yang telah siap sepenuhnya. Teknik pengujian yang digunakan dalam projek ini ialah dengan cara pemerhatian dan memberikan borang soal selidik. Produk projek ini diuji kepada pengguna sasaran iaitu kanak-kanak sindrom Down yang berumur lima hingga sembilan tahun dan guru-guru mereka.. Hasil daripada pengujian produk menunjukkan bahawa produk daripada projek ini amat berguna dan dapat membantu kanak-kanak sindrom Down untuk melatih otot mulut dan motor oral mereka.

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LIST OF ABBREVIATIONS

PSM	-	Projek Sarjana Muda
2D	-	Two Dimensional
3D	-	Three Dimensional
iOS	-	Apple's Mobile Operating System
CD	-	Compact Disk
CS4	-	Creative Suite 4
MS	-	Microsoft
DVD	-	Digital Versatile/Video Disk
Exe	-	Executable File Format
Swf	-	ShockWave Flash
RAM	-	Random Access Memory
NA	-	Not Available
FICTS	-	Faculty of Information and Communication Technology
MP3	-	MPEG-1 or MPEG-2 Audio Layer III
WAV	-	Waveform Audio File Format

CHAPTER I

INTRODUCTION

1.1 Project Background

Computer games are usually developed to provide entertainment for people of all ages. Although computer games are used for entertainment purposes, they have a great potential to be developed as an alternative method in health care or therapy. Computer games can be used in helping users to learn or experience something in a fun way. However, there are some important issues that need to be considered in developing a computer game-based application, especially for users with special needs such as people with Down syndrome.

Children and adults with Down syndrome have a higher incidence of pronunciation problems than any other group of people with severe learning difficulties. In addition, their spontaneous speech and general intelligibility (speech clarity) lags behind their other language skills. Intelligibility is a problem even in older children with Down syndrome who has more advanced syntax (Bray and Woolnough, 1988). People with Down syndrome have difficulties with coordinating the rapid tongue movements

necessary for clear speech (Hamilton, 1993). Hence, speech therapy is a very important treatment for children with Down syndrome. Due to their small mouths and slightly enlarged tongues, they can have articulation problems. These articulation problems can be compounded by their low muscle tone. A speech therapist will work with an individual to help them learn to communicate clearly.

This project focuses specifically on stimulating the children with Down syndrome to train their mouth muscle tone and oral motor by developing a computer games application. Moreover, by training their mouth muscle tone and oral motor, the children will be able to improve their speech and language skills. In this project, an interactive storytelling computer games based approach is used.

1.2 Problem Statements

The first problem statement of this project is the lack of information in developing an application for children with Down syndrome. When designing an application for people with special needs, there are some important guidelines that need to be followed. It is to ensure that the application is useable by the target user.

The second problem statement is the lack in the amount of computer based technology in helping the children with Down syndrome. In this Information and Technology (IT) era, many computer based applications are developed to make life easier for normal people. But, the computer based application for people with special needs are neglected.

The third problem statement is the lack in the number of application which helps children with Down syndrome to improve their mouth muscle tone and oral motor. The number of application developed for Down syndrome children with early phase of oral motor problem is very little.

1.3 Objectives

The objectives of this project are:

- i. To identify the requirements needed in developing an application for children with Down syndrome.
- ii. To design a computer based oral therapy application for Down syndrome as an alternative method to the conventional method.
- iii. To evaluate a computer based oral therapy application that will help the children with Down syndrome to improve their mouth muscle tone and oral motor.

1.4 Scope

The target user for this project is specifically for children with Down syndrome that are having difficulties in speaking. The children could be aged from five to nine years old. However, the product of this project also could be use by other people that have low mouth muscle tone to train their mouth muscle and oral motor. Besides that, it could also be used by an oral therapist to include the product of this project as an exercise or module for their oral therapy session.

This project use an interactive storytelling computer games based approach to help children with Down syndrome improve their speech and language skills by training their mouth muscle tone and oral motor. However, this project only focuses solely on activities to exercise their mouth muscle in which will train them to control their mouth muscle. This project does not cover on teaching the children with Down syndrome to speak, spell or pronounce alphabets or objects.

1.5 Project Significance

The significance of this project is to produce a computer aided oral therapy for children with Down syndrome to train their mouth muscle tone and oral motor. Furthermore, this project could also be use to increase the number of application available in the market that helps children with Down syndrome. Moreover, this project

also could be use as an alternative method to vary the current method of conducting oral therapy session. In addition, the product of this project also could act as an additional mouth exercise for children with Down syndrome when they are not on the oral therapy session.

1.6 Conclusion

It can be concluded that this project aims to help children with Down syndrome. This project focuses on the children who have difficulties in speaking to overcome their difficulties using an interactive storytelling computer games based approach.

Generally, all the basic information of this project such as the project background, problem statements, objectives, project scope and the project significance have been explained in this chapter. Other topic such as the literature review and the project methodology, comparison between this project and the existing system will be explained on the next chapter.

CHAPTER II

LITERATURE REVIEW AND PROJECT METHODOLOGY

2.1 Introduction

A literature review is a term used to describe a critical points and in depth evaluation of previous research which includes substantive findings as well as theoretical and methodological contribution to a particular topic. Literature is defined as a summary and synopsis of a particular area of research, allowing anybody reading the paper to establish why you are pursuing this particular research program (Shuttleworth, 2009). Methodology is basically a set or a guideline system for solving a problem. Methodologies usually have specific components such as phases, tasks, methods, techniques and tools (Irny and Rose, 2005).

In this chapter, the domain of this project, the research of existing system and the project methodology that will be used in this project will be explained. This chapter will also discuss the requirements needed to complete this project.

2.2 Domain

The domain for this project is a 2D computer game. An interactive storytelling approach is used to help the children with Down syndrome to improve their speech and language skills by training their mouth muscle tone and oral motor. This project uses the web as the main platform and 2D authoring tools for developing the application.

Nowadays, the usage of computer games as a therapy is essential to cope up with the rising technology era. The benefits of using computer games as method in therapy session are:

- Provide learning/training in an entertaining way
- It can be used as an extra exercise when outside from therapy session
- It can be used as an alternative method to conduct therapy session
- Helps the children to get familiar with the current technology

2.3 Existing System

i. Tiga Talk – Speech Therapy Games

Tiga Talk application is developed by Tiga Talk 3 Inc. and Tactica Interactive. It is an application which was developed with licensed speech and language pathologists to help children who are in the beginning stages of speaking learn how to make 23 core phonetic sounds through playful voice-controlled games that can improve speech clarity and articulation. Tiga Talk is a confidence-building application. Even if the children try making the sound, the game stays positive, never criticizing children for making the “wrong” sound. By encouraging children to make sounds to drive cars, launch rockets, and pop balloons, this interactive game will have them “SP-ing” and “CH-ing” in no time at all.

Tiga Talk is a truly incomparable experience for children and adults alike. It is also the first application for children being translated into Canadian Cree, which is a television show in Canada, to help families preserve the language by introducing it to children as they are learning their first words.

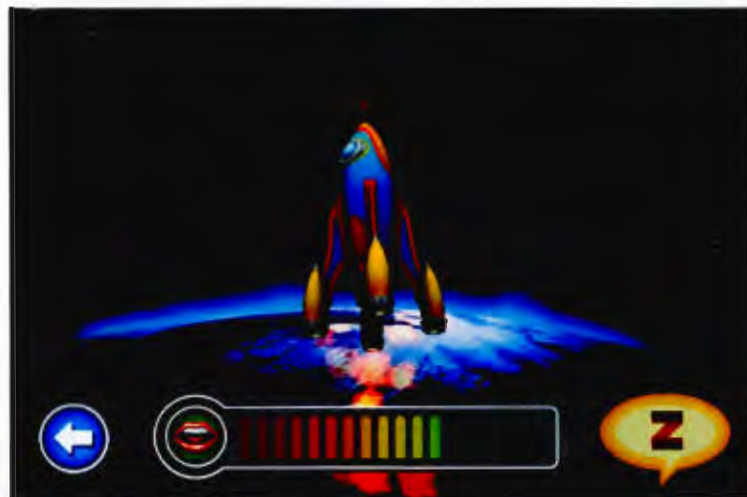


Figure 2.1 show the screenshots of Tiga Talk Application

ii. Speech With Milo

Speech with Milo which is developed by Doonan Speech Therapy, is an application focused on developing language skills in children. It is created by the licensed Speech-Language Pathologist that brought five other language apps, to build storytelling and narrative skills. The interactive story book allows children to build skills by telling the story on their own. They have the option of reading and listening to the words provided, or they may create their own story. The children can turn off the narration and words to create their own story with no distractions.

This is an original story with characters, plot, events, and a linear story progression selected carefully in order to develop and informally assess speech and language skills. It is intentionally simple in order that the focus of the book is on developing language skills. This application is made for children, approximately ages 2-10, in order to build a variety of language skills.

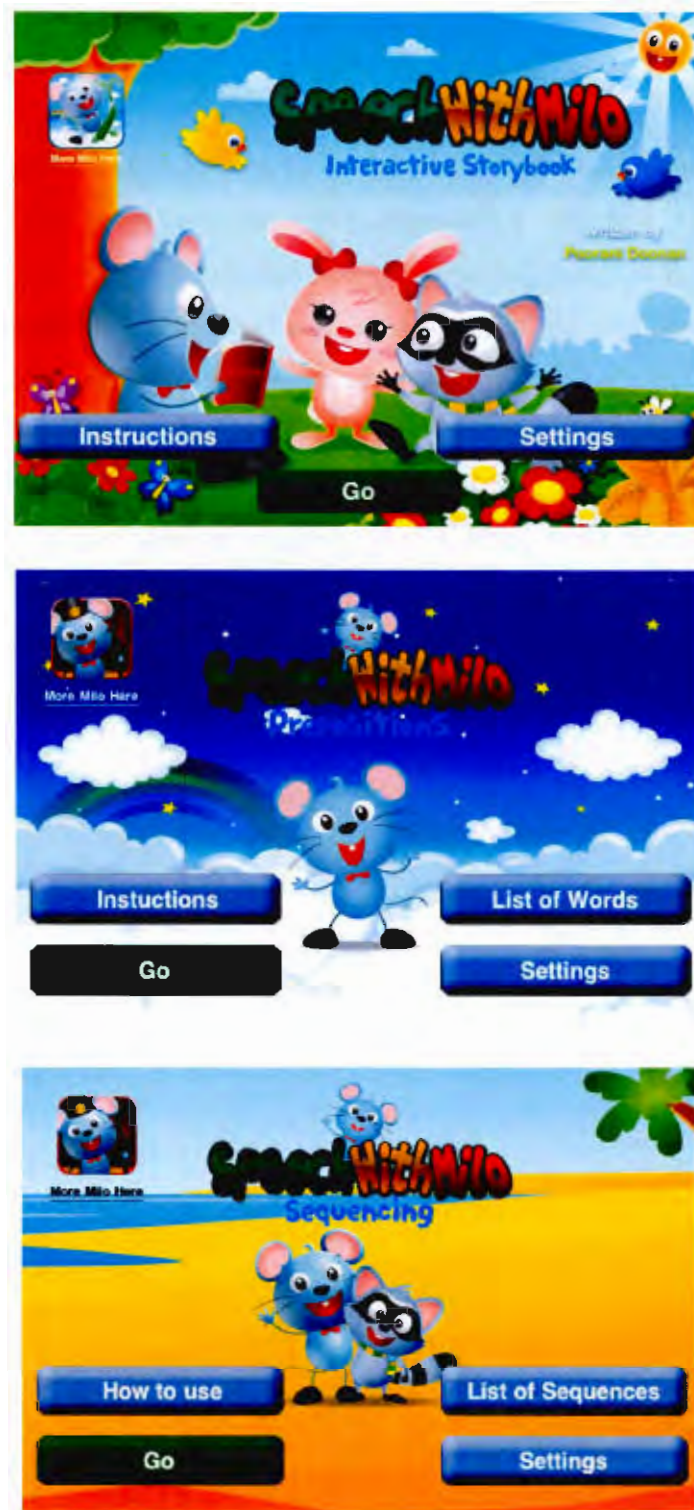


Figure 2.2 show the screenshots of Speech With Milo Application

iii. **Say-N-Play**

Say-N-Play® which is developed by Advance Games, LLC and Yatec, LLC, is a speech articulation practice game that provides a fun and visually engaging environment for children between the ages of four and nine. The PC based game features voice recognition technology combined with fun, motivating articulation drills that will have children asking to play again and again!

Say-N-Play® provides an exciting world filled with irresistible characters, enjoyable games, and multiple levels for children to explore while improving their articulation skills.