EDUCATION GAME USING KINECT FOR CHILDREN WITH HEARING IMPAIRMENTS

CHONG WEI SHIN

UNIVERSITI TEKNIKAL MALAYSIA MELAKA

BORANG PENGESAHAN STATUS TESIS*

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(TANDATANGAN PENULIS)

Alamat tetap: 10, Lorong Kempas 4,

Taman Kempas, 13400, Butterworth,

Pulau Pinang.

Tarikh: 7/8/2017

(TANDATANGAN PENYELIA)

Mohd Hariz bin Naim

Nama Penyelia

Tarikh: 21/8/2017

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EDUCATION GAME USING KINECT FOR CHILDREN WITH HEARING IMPAIRMENTS

CHONG WEI SHIN

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

2017

DECLARATION

I hereby declare that this project report entitled

EDUCATION GAME USING KINECT FOR

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

STUDENT : _____ Date: 7/8/2017

(CHONG WEI SHIN)

SUPERVISOR: _____ Date: 21/8/2017

(MR. MOHD HARIZ NAIM @ MOHAYAT)

DEDICATION

I would like to dedicate this project to my parents who give me a lot of love and support, their endless support gives me a lot of energy and strength to fight against the problems that I faced during the development of this project.

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I would like to dedicate thousands of thanks to my supervisor, Mr. Mohd Hariz Naim @ Mohayat for giving all the guidance, comments and full support to complete this project successfully. Throughout the process of developing this project, I have learnt a lot of valuable knowledge. Therefore, I need to give a big thanks to Mr. Hariz for all the help.

Besides, I would like to thank my lovely friends as well as parents who have given me a lot of motivation and support throughout the project. There are two audiologists who I wants to thank them for giving me help and guide me throughout this project, so that I can understand and know what are the game needed to provide for the children with hearing impairments.

ABSTRACT

Education game using Kinect for children with hearing impairments is a game developed for exposing science, mathematics and sign language to the primary school standard one children with hearing impairments and the normal children. This game will be developed is because of the current teaching material is targeted to normal children and it cause the children with hearing impairments get distracted easily. Those children also do not have chance to get in touch with educational game. Therefore, a simple Kinect game is developed and it provide a chance for those children to interact with the Kinect motion sensor because it use the player's body movement as input to interact with the game. Kinect game can change the way of people play games without making use of the remote control and it help those children to learn the knowledge in a better way by involving their body movement. This game consists of visual and graphic which can help children to better retrieve and remember information easier. In this game, it has three topics to learn and each topic consists of three stages. Before the player play this game, they can go to tutorial to learn how to play this game. The method to play this game is to place a hand over a button and push it to select the correct answer and also close your hand and move to scroll to find the correct answer. The game is developed by using waterfall model, a software development methodology which is linear and sequential. In each phase of the model must be completed fully before going to next phase and each phase will not be overlap to each other. This model is used for small project where requirements are very well understood. At the end of the project, the developer hopes that this Kinect educational game will help the children with hearing impairments learn a lot of knowledge in these three topics instead of learning through education book.

ABSTRAK

Sistem permainan pendidikan yang menggunakan *Kinect* untuk kanak-kanak yang mempunyai masalah pendengaran merupakan satu permainan yang dibangunkan untuk memperkenalkan sains, matematik dan bahasa isyarat kepada pelajar darjah satu dan pelajar darjah satu yang mempunyai masalah pendengaran. Permainan ini dibangunkan adalah disebabkan bahan-bahan pengajaran kini hanya sesuai untuk pelajar normal dan ini menyebabkan pelajar yang mempunyai masalah pendengaran akan kehilangan tumpuan. Kanak-kanak tersebut tidak dapat peluang untuk bermain permainan pendidikan. Oleh itu, permainan pendidikan *Kinect* dibangunkan untuk membantu kanak-kanak yang mempunyai masalah pendengaran. Permainan pendidikan ini tidak menggunakan alat kawalan jauh dan dapat membantu kanak-kanak memperolehi pengetahuan yang baru. Penggunaan grafik yang menarik dapat menarik perhatian kanak-kanak dan dapat membantu meningatkan daya ingatan dalam proses pembelajaran. Permainan pendidikan ini mengandungi tiga topik dan tiga jenis bahasa iaitu Bahasa Inggeris, Bahasa Malaysia dan Bahasa Cina. Cara memain permainan adalah menggunakan tangan untuk cari dan tekan jawapan yang betul. Permainan ini adalah dibangunkan dengan metodologi yang sesuai untuk projek kecil dan serdahana iaitu *Waterfall*. Setiap peringkat haruslah diselesaikan sebelum peringkat berikutnya dimulakan supaya setiap peringkat tidak akan bertindih. Justeru, projek ini adalah diharapkan dapat membantu meningatkan prestasi kanak-kanak yang mempunyai masalah pendengaran dalam pembelajaran dengan menggunakan bahan-bahan multimedia seperti permainan pendidikan ini selain daripada bahan-bahan bacaan.

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LIST OF ABBREVIATIONS

ABBREVIATIONS	FULL NAME
SMILE	Science and Math in an Immersive Learning Environment
VLE	Virtual Learning Environment
ASL	American Sign Language
HMM	Hidden Markov Model
BIM	Bahasa Isyarat Malaysia
WPF	Windows Presentation Foundation
IDE	Integrated Development Environment
SDLC	Software Development Life Cycle

CHAPTER I

INTRODUCTION

1.1 Introduction

In the past 5 years ago, Kinect hits our market. Kinect is a type of motion sensor detection device that used in gaming systems or industries. It brought a great turning point by changing the way people play games without making use of the traditional game controller/ remote control. The arise of Kinect is believed has brought great impact to children with defects such as hearing impairments. Due to the research that had been carried out by Interactive Multimedia Technology, this powerful technology (motion sensing) is believed to benefit children with disabilities where children can interact with the game happily.

Nowadays, many children with hearing impairments cannot enjoy their childhood to the fullness because of their defects. Due to their defects, they cannot grab any

opportunities to learn or to grab some new knowledges. Because of that, they feel they are ignored and isolated by the society and started to feel depression. Besides, they are having difficulties to get in touch with the latest technology because of their defects. Hence, by implementing Kinect in games, it's believed it can improve interaction, social skills, learning abilities of children with hearing impairments.

In this game, it will be consisted of some level with the topic of science and mathematics for standard one, and some basic sign language and it is using the Kinect sensor to detect the player motion, so that the player can play the game by moving their hand and the Kinect sensor will capture their motion. Thus, this game is design with simple, attractive and interesting interface for the children with hearing impairments to easy understand and they also can learn science, mathematics and basic sign language through this game without depends much on the education book. If without the Kinect, those children can only learn through book and without move their body, so they will feel boring to study, sleepy and cannot focus study easily. However, with this Kinect, they can learn through motion and it also can let the children to get in touch with the educational game like normal children.

1.2 Problem Statements

a) The current teaching materials is targeted to normal children and it cause the children with hearing impairments get distracted easily.
b) Children with hearing impairments no chance to get in touch with educational game.

1.3 Objective

a) To develop a simple Kinect game for children with hearing impairments, so that they can easy understand and learn science, mathematics and basic sign language through this game.
b) To provide a chance to let the children with hearing impairments to get in touch with the educational game, like Kinect.

1.4 Scope

This education game is limits to full windows devices like Windows 7, 8, 8.1 and 10 due to it is developed using the Windows Presentation Foundation (WPF). This game is to expose the topic of science and mathematics for standard one which according to the Malaysian Primary School Science and Mathematics Syllabus. This game also includes some basic sign language to let children to learn more knowledge. It also provides three language versions which are English, Malay and Chinese for the children to learn different language. There are two type of users who can play this game which are children with hearing impairments and hearing children between age 6 to 8. For this game, it is design with simple interface and it give instruction through animation and words, so that the children with hearing impairments can able to play this education game with Kinect like normal children. Thus, for the hearing children, they can also learn science and mathematics by read the instruction and they also can learn the basic sign language. It can train the children for the reading skill and this game is more attractive than the education book. Besides the game, there's also a system is developed to allow the teachers to add additional questions to the game, so that the children can experience many kinds of questions.

1.5 Project Significance

In this project, it will develop a game that gives the chance for children with hearing impairments to play educational game which is using the Kinect to have a different way of learning science and mathematics for standard one and basic sign language instead of learning from books. This is because those children will loss of concentration and get bored while reading books. Also, hearing children can also play and learn science, mathematics and basic sign language in this game and have a different experience with the game which is this game is giving instruction more on animation and words.

Besides, this game provides English version, Malay version and Chinese version to let the children with hearing impairments and hearing children can choose which language they more familiar. Since primary school children learn only one language for science and mathematics, so it is better to have multiple languages in this game for children to choose their major language. Thus, they also can learn other languages through this game to learn more languages and gain a lot of knowledge.

Most of the children with hearing impairments are lose interest in study due to their defects. They feel they are ignored by the society and this cause them to become more depression. They started to lose confidence in their capabilities. Therefore, this education game is developed to help them to find their interest in study, train their motor skills and improve them to have better in retrieving information.

1.6 Expected Output

For the storyboard of this project, it will have several stages which are including the topic of science, mathematics and sign language. The method to play this game is to place a hand over a button and push it to select the correct answer and also close your hand and move to scroll the scroll bar and find the correct answer. There will have some animations to give instruction on how to play this game in the tutorial. Every stage will give a period of time to play. If the stage is clear, it will record your marks and the time used and go to the next stage. At the end of this game, it will show the players total marks score and the time used. This education game helps the children with hearing impairments learn a lot of knowledge and different language in science, mathematics and sign language without depends much on the education book. This game also can train their motion become more perceptive by using the Kinect.

1.7 Conclusion

In conclusion, the education game using Kinect will provide a simple Kinect game for children with hearing impairments and give a chance for them to get in touch with educational game. This game gives the children a fun and exciting environment for them to learn, therefore they will not think that learning is stress and bored. It can help them memorizes the topic of science, mathematics and basic sign language easily than from education book. With this game, they can play game like normal children, so that they won't think that they are different with other children.

CHAPTER II

LITERATURE REVIEW AND PROJECT METHODOLOGY

2.1 Introduction

The project's problem statements and objectives has been explained clearly in the previous chapter. An education game will be developed for this project and this education game is acts as an alternative way for children with hearing impairments or normal children to learn about the science, mathematics and sign language. This education game is using the Kinect motion sensor to capture the body movement and use it as an input for the game.

In this chapter, it will be discussing about the facts and findings, methodology, project requirements and project schedule for this project. The purpose of this chapter is to let the reader to understand what kind of ideas that have been established on this project