

BORANG PENGESAHAN STATUS TESIS

JUDUL: 3D FARMING EXPERT

SESI PENGAJIAN: 2014

Saya CHONG PEK TCHING

(HURUF BESAR)

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)

Alamat tetap: 2984/5,

Jln North Fence, Jinjang

Offora, 52000 K.L.

Tarikh: 05/08/14



(TANDATANGAN PENYELIA)

TARISA MAKINA KINTAKANZINGRUM

Nama Penyelia

Tarikh: 05/08/14

CATATAN: * Tesis dimaksudkan sebagai Laporan Akhir Projek Sarjana Muda (PSM)

** Jika tesis ini SULIT atau TERHAD, sila lampirkan surat daripada pihak berkuasa.

3D FARMING EXPERT

CHONG PEK TCHING

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

DECLARATION

I hereby declare that this project report entitled

3D FARMING EXPERT

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

STUDENT: _____  _____ Date: 25/08/14
(CHONG PEK TCHING)

SUPERVISOR: _____  _____ Date: 25/08/14
(TARISA MAKINA KINTAKANINGRUM)

DEDICATION

To my beloved parents.

ACKNOWLEDGEMENTS

I would like to thank Miss Tarisa Makina Kintakaningrum for giving assistant and advises to me throughout the development process of the project. Whenever there are mistakes or inappropriate areas in my project, Miss Tarisa will always reminds and corrects me. Under the supervision of Miss Tarisa, I am able to complete this project.

Next, I would like to thank my friends who did always give me good suggestions and opinion in improving my project. Besides that, I am very grateful to all friends who had spared out their precious time as a respondent for my project.

Finally, I would also like to thank my beloved parents and family who have been giving me support and motivation throughout my project.

ABSTRACT

Nowadays, game had widely implemented as an educational tool for various stage of study, pre-school, primary school, secondary school and higher education. This paper describes the development process of an education-based role-playing farm game for youth in Malaysia. The game which named 3D Farming Expert is aimed to deliver the farming knowledge in Malaysia to Malaysians. Generally, the interest of Malaysian youth in agriculture sector is low and their level of farming knowledge is poor. As a result of that, 3D Farming Expert is developed and distributed to 30 youths in Malaysia. The results gained and collected from the pre-test and post-test are analyzed and documented in Chapter VI. In short, the results shows that 3D Farming Expert had increase the farming knowledge of the 30 respondents significantly.

TABLES OF CONTENTS

CHAPTER	SUBJECT	PAGE
	DECLARATION	ii
	DEDICATION	iii
	ACKNOWLEDGEMENTS	iv
	ABSTRACT	v
	ABSTRAK	vi
	TABLES OF CONTENTS	vii
	LIST OF ABBREVIATIONS	xii
	LIST OF ATTACHMENTS	xiii
CHAPTER I	INTRODUCTION	1
	1.1 Project Background	1
	1.2 Problem Statement	2
	1.3 Objective	2
	1.4 Scope	3
	1.4.1 Users	3
	1.4.2 Platforms	4
	1.4.3 Game Content	4
	1.4.4 Game Function	4
	1.4.4 Limitations	5
	1.5 Project Significance	5
	1.5.1 Youth	5
	1.5.2 Agriculture sector	6
	1.6 Summary	6
CHAPTER II	LITERATURE REVIEW AND PROJECT METHODOLOGY	7
	2.1 Introduction	7
	2.2 Facts and findings	8
	2.2.1 Domain	8
	2.2.2 Existing System	9
	2.2.3 Comparison of Existing System	12

	2.3	Project Methodology	13
	2.3.1	Instructional Design	14
	2.4	Project Requirement	14
	2.4.1	Software Requirement	15
	2.4.2	Hardware Requirement	15
	2.5	Project Schedule and Milestones	16
	2.6	Conclusion	18
CHAPTER III		ANALYSIS	19
	3.1	Introduction	19
	3.2	Current Scenario Analysis	20
	3.2.1	Family Farm	20
	3.2.2	My Farm 3D	22
	3.2.3	Funky Barn	23
	3.3	Requirement Analysis	24
	3.3.1	Project Analysis	24
	3.4	Conclusion	26
CHAPTER IV		DESIGN	27
	4.1	Introduction	27
	4.2	High Level Design	27
	4.2.1	System Architecture for Game	28
	4.2.2	System Functionalities	29
	4.2.2	User Interface Design for Game	31
		4.2.2.1 Character Design	31
		4.2.2.2 Objects Design	32
		4.2.2.3 Screen Design	34
	4.3	Conclusion	41
CHAPTER V		IMPLEMENTATION	42
	5.1	Introduction	42
	5.2	Media Creation	43
	5.2.1	Production of Text	43
	5.2.2	Production of 2D Graphics	46
	5.2.3	Production of 3D Models and Objects	52
	5.2.4	Production of Audio	58
	5.3	Media Integration	58
	5.4	Product Configuration Management	61
	5.4.1	Configuration Management Setup	61
	5.5	Implementation Status	62
	5.6	Conclusion	63
CHAPTER VI		TESTING	64
	6.1	Introduction	64
	6.2	Test Plan	65
	6.2.1	Test Organization	65

	6.2.2	Test Environment	66
		6.2.2.1 Test Location	66
		6.2.2.2 Hardware configuration	66
	6.2.3	Test Schedule	67
		6.2.3.1 Test Schedule in Production Stage	67
6.3		Test Strategy	72
	6.3.1	Black-Box Testing	72
	6.3.2	User Acceptance test	72
6.4		Test Design	73
	6.4.1	Black-Box Test Design	73
	6.4.2	User Acceptance Testing Design	86
6.5		Test Result and Analysis	86
	6.5.1	Black-Box Test Result	86
	6.5.2	Result and Analysis of User Acceptance Test	99
		6.5.2.1 Pre-test Result	100
		6.5.2.2 Post-test Result	104
	6.5.2.3	Comparison of Results	109
		6.5.2.4 t-test Analysis	118
6.6		Conclusion	119
CHAPTER VI		PROJECT CONCLUSION	120
7.1		Observation on Weaknesses and Strengths	120
	7.1.1	Weaknesses in Developer Point of View	120
	7.1.2	Weaknesses in User Point of View	121
	7.1.3	Strength in Developer Point of View	122
	7.1.4	Strength in User Point of View	123
7.2		Propositions for Improvement	123
7.3		Contribution	125
	7.3.1	Contribution to individual	125
	7.3.2	Contribution to Agriculture Sector	125
7.4		Conclusion	125
REFERENCE			127

LIST OF TABLES

TABLE	TITLE	PAGE
1	Modules in the game	4
2	Comparison of Existing System	12
3	Project Activities	17
4	Analysis of Existing System	25
5	Growing Time of Crops	30
6	Character Design	31
7	Objects Design	32
8	Screen Design – Main Menu	34
9	Screen Design – Playing Scene	35
10	Screen Design – Shop Menu(buy)	36
11	Screen Design - Shop Menu(sell)	37
12	Screen Design - Planting Menu	38
13	Screen Design - Rearing Menu	39
14	Screen Design - Exit Menu	40
15	The use of fonts	43
16	2D Graphics	47
17	3D Models and Objects	52
18	Functions in the Game	59
19	Implementation Status	62
20	Test Schedule in Production Stage	67
21	Test Schedule in Post-Production Stage	70
22	Black-Box Test Case	73
23	Black-Box Test Results	86
24	Pre-test Result	100
25	Post-test Result	104
26	Comparison of Pre-test and Post-test Result	109

LIST OF FIGURES

DIAGRAM	TITLE	PAGE
1	Scene for Family Farm	9
2	Scene for My Farm 3D for chicken rearing	9
3	Scene for My Farm 3D for cow rearing	10
4	Scene for Funky Barn	11
5	Scene for Funky Barn	11
6	Project Methodology	13
7	Project Schedule and Milestone	16
8	Navigation Flow of Family Farm (part 1)	20
9	Navigation Flow of Family Farm (part 2)	21
10	Flow Chart of My Farm 3D	22
11	Flow Chart for Funky Barn	23
12	System Architecture	28
13	Label Money	46
14	Export fbx in Autodesk Maya 2012	59
15	Test Organization	65
16	Sample Feedback from Respondent	71
17	Sample Feedback from Respondent	71
18	t-test Result	118

LIST OF ABBREVIATIONS

2D	-	two dimensions
3D	-	three dimensions
CD	-	Compact disc
RPG	-	Role Playing Game
N/A	-	Not Available

LIST OF ATTACHMENTS

ATTACHMENT	TITLE	PAGE
1.1	Gantt Chart	1
1.2	User manual	2
1.3	Questionnaire	4

CHAPTER I

INTRODUCTION

1.1 Project Background

According to Oxford Dictionary, game is activities that are played with rules. It is usually undertaken for enjoyment and sometimes used as an educational tool.

In this project, a farming game will be developed. A farming game is the game that simulating the actual life in a farm. Basically, the target user is youth that lives in Malaysia. The game activities are harvesting crops and selling livestock. These activities are done by moving the character around the farm to a specific area and perform the activity. Generally, the user able to plant, feed, buy, and sell in the game.

The 3D Farming Expert is a combination of role playing game. The game will run as a console application. The game will be able to run with a CD in Windows, Mac or Linux.

1.2 Problem Statement

Malaysia is a developing country that greatly emphasized on agriculture in enhancing the development of economy sector. This fact had been stated in The Ninth Malaysia Plan where agriculture will be third income generator of Malaysia. It is commonly asserted that, youth is the pillar of one country. Hence, the interest to the agriculture and farming should be instilled to youths in Malaysia.

The existing farming games do not reveal the actual ways of managing a farm in Malaysia. This is in fact does not provide realism to the users about the management of farm in Malaysia. In fact, the users do not feel the environment in the farm is Malaysia and this will not be able to increase or instill the interest of user to farm or agriculture. In order words, the user will not able to get the general knowledge of managing a farm in Malaysia.

Other than that, the existing farming games do not provides the actual techniques and knowledge of planting crops and rearing livestock. The purpose of the farming games is just to generate income. On the other hand, the user plays the game just for entertainment purpose.

Therefore, this project will be developed to reveal the actual ways of managing farm in Malaysia in the same time provides the actual knowledge of farming in Malaysia to increase and enhance the interest of youth to be involved in the agriculture sector.

1.3 Objective

This project comprises of the following objectives:

- To investigate the effective ways to deliver the farming knowledge and farm management techniques. Regarding this, we would observe the

understanding of the player to the information provided in the game through testing which will be discussed in Chapter VI.

- To demonstrate the knowledge on planting and harvesting the plants through the game. For example, there are some plants that not advised to be planted next to each other and there are some animals that cannot be rear together.
- To develop a farming game that simulates the actual conditions in Malaysia. By using this application, the user will have an idea of agriculture in Malaysia planting techniques that suit to be used in Malaysia which is environmentally friendly such as crop rotation.
- To evaluate the effectiveness of techniques used in the game on delivering farming knowledge. The recommendations will be the delivering of farming knowledge in Malaysia through the use of game and applying role-playing elements such as power structure.

1.4 Scope

This scope of this project will be described in four categories, which are users, platform and game content and game functions. Each of them will be described as followed:

1.4.1 Users

The Malaysia Youth Council (2007) has emphasized that those whose age ranged between 15-40 years old can be considered as youth. The primary users for this project will be youth ages between 15-40 years old. The interest to agriculture and farm will be instill and enhanced among the youth.

CHAPTER II

LITERATURE REVIEW AND PROJECT METHODOLOGY

2.1 Introduction

Literature review is a writing that gathers, analyzes and summarizes facts and findings, theoretical and methodological contributions to a specific field which will serve as a part of a research article, thesis or grant proposal. By referring to all the published and authorized papers, the required information of a particular field will be obtained.

In this project, the articles about education, farm and agriculture in Malaysia, edutainment, farm game and role-playing game are read and analyzed. From these articles or papers, the current trend and actual facts about the related field of research are gathered. By result of the findings will contribute in achieving the desired result, which is to develop an education farm game that can deliver the farming knowledge and information in Malaysia effectively.

The methodology that will be used in this project is agile modelling. Agile modelling is widely used in many projects of various corporations due to its great advantages that contribute to the high quality software product.

2.2 Facts and findings

Facts and findings are the accurate information, appropriate knowledge, or important details that gathered during the initial stage of a research. In this project, the facts and findings about the related domain as well as some existing systems are gathered and analyzed.

2.2.1 Domain

Domain is the specific area or field of research and study. The domain of this project is education-based role-playing farm game. The game is intended to deliver the specific farming knowledge to be applied in Malaysia to the main target user which is youth.

Agriculture domain is widely used in increase economic growth rate and reduce unemployment rate in many countries including Malaysia. In Malaysia, it had been declared as the third income generator as stated in The Ninth Malaysia Plan. One of the strategies that Malaysia implements in promoting economic growth is contract farming (CF). There are three researches carried out by Jeffrey Lawrence D'Silva, Hayrol Azril Mohamed Shaffril and Jegak Uli and Bahaman Abu Samah which are intended to find out the acceptance of youth and demographic factors that affects the participation of youth towards CF. In all the research papers, they find out that the knowledge towards agriculture is one of the factors that affects the participation of youth in CF. Besides, promotion of the CF is believed to be able to enhance the interest of the youth to the CF.

The genre of the farm game that will be developed is role-playing game (RPG). RPG is a game that a player controls an avatar and able to interact to non-player characters (NPCs) as well as the game environment and objects with storyline. In game, there three forms of interactions, which are player-to-player, player-to-computer, player-to-game interactions. In this project, the form of interaction is player-to-game as there are storyline which defines the current situation of the user and the goals to obtain.

2.2.2 Existing System

- Family Farm

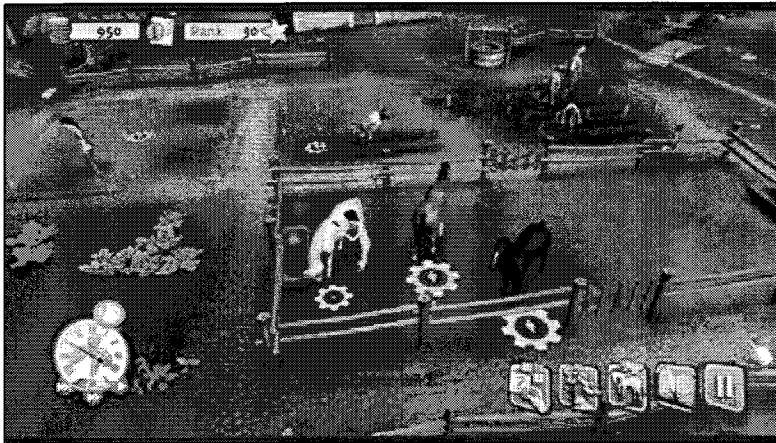


Figure 1: Scene for Family Farm

Family Farm is a simulation RPG farming game that emphasized on constructing and managing a farm. It applies RPG elements in which player can control an avatar to interact with the game environment. For example, the game can be controlled by RPG attribute such as skills. In the farm, there are various characters which possess distinct skills and requirements. As the farm had been well managed, player can upgrade the house and expand the farm to become wider. The Family Farm can be played on Windows and Linux.

- My Farm 3D

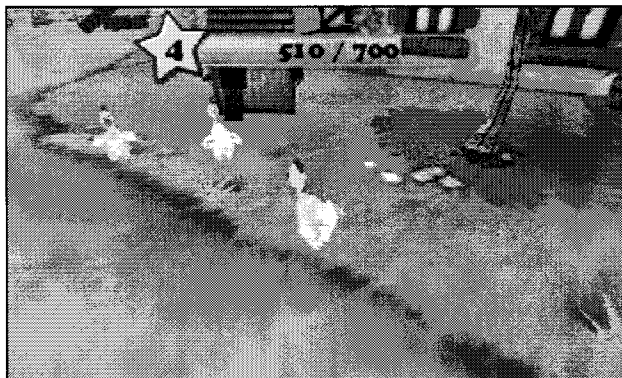


Figure 2: Scene for My Farm 3D for chicken rearing



Figure 3: Scene for My Farm 3D for cow rearing

In My Farm 3D, there is only a basic farm with a chicken. Player is required to feed the chicken and keep it happy. After doing so, the chicken will lay eggs and then the player can sold out the eggs to generate income. The income generated may be used to buy more chickens, or other poultry such as ducks, pigs, cows and horses. When the number of poultry increases, the player should buy a building as the animals will run away if there is no building for them. Player is required to always ensure that the food is enough for the animals and prepare medicine if there are animals get sick.

- Funky Barn



Figure 4: Scene for Funky Barn



Figure 5: Scene for Funky Barn

The Funky Barn provides farmlands that are increasingly difficult and player is required to gain coins to expand the land by rearing animals. Player must rear different types of animals in peace and provides enough food and water. While raising the animals, player may generate income from selling goods or trade with local farmers. Other than that, player must be aware of the natural disaster and pests that will destroy the farm.

2.2.3 Comparison of Existing System

Table 2: Comparison of Existing System

Criteria	Family Farm	My Farm 3D	Funky Barn
Platform	Computer game	Nintendo 3DS	Computer game
End users	General	General	General
Content	Entertainment game which includes farm constructing, crop planting and poultry rearing.	Entertainment game which includes raising poultry	Entertainment game which includes raising poultry
Virtual character's emotional state	No	Yes	No
Farm Education information	No	Yes, it exposed to user about the psychology of the animals	Yes, it exposed to user about the peace among animals.
Power structure	Yes, the farm can be expanded up to certain level	No	Yes, the farm can be expanded up to certain level

The table above illustrates various criteria of current existing farm games. There are advantages and disadvantages. From the table, the existing farm games do not provide the information about farming territory in Malaysia as their primary purpose is for entertainment purpose. Other than that, some of the games do not include virtual character's emotional state and the power structure. These elements are considered crucial in an education-based farm game.

2.3 Project Methodology

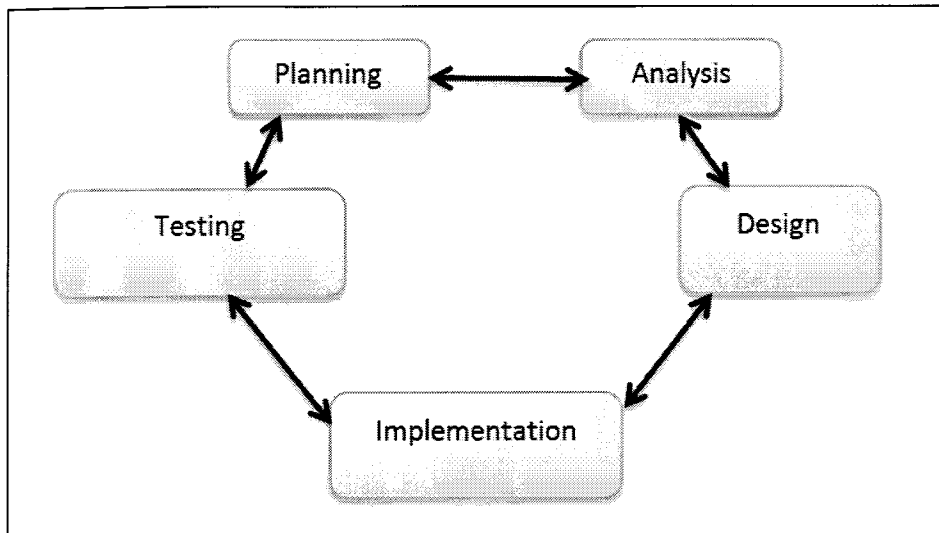


Figure 6: Project Methodology

The first iteration is planning and proposal will be prepared in this phase. The next iteration is analysis. In this phase, user requirements and farm operating environment will be gathered and analyzed. These are done through finding and reading research papers. The third iteration is design. Storyboards, screen, characters, objects, and interactive features will be designed in this phase. During the implementation phase, the game will be developed. After that, it will be tested in the testing phase. During this stage, the game will be distributed in a CD form to 40 users aged between 15 to 40 years old. After 3 days of experiencing the game, questionnaires will be distributed to the users.

2.3.1 Instructional Design

- Educational Goals
 - Learning objectives
 - To learn organic cultural methods such as crop rotation, green manure, compost and biological pest control which gives good harvest for maize, tomato and pea.
 - To learn the psychology and raising process of chicken and cow.
 - Expected Results
 - Player understands the organic cultural methods such as crop rotation, green manure, compost and biological pest control which give good harvest for maize, tomato and pea.
 - Player understands the psychology and raising process of chicken and cow.

2.4 Project Requirement

Project requirements are classified into software and hardware requirements. Software requirements are the software tools that used in project development. Whereas hardware requirements are the firmware required for running the software in project development.