



Faculty of Computer Science and Information Technology

**EDUCATIONAL ROLE-PLAYING GAME (RPG) ON CLIMATE CHANGE
AWARENESS**

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Bachelor of Computer Science with Honours (Multimedia Computing)

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Educational Role-Playing Game (RPG) On Climate Change Awareness

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ABSTRACT

An educational role-playing game or more specifically known as serious game are games that are designed for a purpose beyond pure entertainment. This serious game uses the motivation levers of game design such as competition, curiosity and challenge to motivates the players to get engage in the tasks given. Thus, a role-playing game is a good tool to get the younger generation to be engaged in an educational game. Educational game usually embedded a certain topic in the game design so that players would be able to learn while playing the game.

This Educational Role-Playing Game (RPG) on Climate Change Awareness is an educational game which incorporate RPG genre which will cover on climate change awareness topic. Within climate change awareness, this project would be focused more on ocean pollution. The Game Development Process used to develop this game is game design development model. PlayGen Toolkit is used to generate ideas for the game victory conditions and the game mechanics while elements of Flow Theory is used to evaluate the effectiveness of this game.

ABSTRAK

Permainan berkarakter yang berunsurkan pendidikan atau lebih dikenali sebagai permainan untuk pendidikan adalah permainan yang direka untuk tujuan yang lebih daripada sekadar hiburan. Permainan berunsurkan pendidikan ini menggunakan tuas motivasi reka bentuk permainan seperti persaingan, rasa ingin tahu dan cabaran untuk memastikan pemain lebih tertarik dengan tugas yang diberikan. Oleh itu, permainan berkarakter adalah alat yang baik untuk menarik minat generasi muda untuk melibatkan diri dengan permainan yang berpendidikan. Permainan yang berunsurkan pendidikan ini biasanya menggunakan topik pembelajaran dalam reka bentuk permainan agar pemain dapat belajar sambil bermain.

Educational Role-Playing Game (RPG) on Climate Change Awareness adalah permainan Pendidikan yang menggabungkan genre RPG yang akan membahas topik kesedaran perubahan iklim. Dalam kesedaran perubahan iklim, projek ini akan lebih tertumpu pada pencemaran laut. Proses pengembangan permainan yang digunakan untuk mengembangkan permainan ini adalah model Game Development Process. PlayGen Toolkit digunakan untuk menjana idea untuk keadaan kemenangan permainan dan mekanik permainan sementara elemen Flow Theory digunakan untuk menilai keberkesanan permainan ini.

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CHAPTER 1: INTRODUCTION

1.1 Introduction

A role-playing game or RPG is a genre of a video game in which player take a role of a character that undertakes a quest in an imaginary world. According to an article by Celeste Ojatula (n.d.), role-playing games is the second place out of 9 most popular video game genres for 2019. This proves that RPG game is a favourable video game genre nowadays. RPG games are known for its decision making and the rich storylines that was used in all role-playing game. This RPG game is so attachable as each individual story in the game is developed depending on the choices made by player. Moreover, the extremely different world created in the RPG game makes the players feels attracted to explore more about the game world. However, most of the role-playing game are considered as entertainment instead of an activity with educational values that players can gain from playing it.

An educational role-playing game or more specifically known as serious game are games that are designed for a purpose beyond pure entertainment. This serious game uses the motivation levers of game design such as competition, curiosity and challenge to motivates the players to get engage in the tasks given. There are many types of educational games that covers different subject or knowledge. In this project, the topic that will be focused is on climate change.

Climate change is a long-term shift in global or regional climate patterns (National Geographic Society, 2019). Sometimes, people often mistaken climate for weather. But weather is something that can change from day to day or from year to year, while climate is measured over a long period of time.

The area of climate change that will be covered in this project is ocean pollution. The reason of choosing ocean pollution is because, as we all know, ocean covers more than 70 percent of our planet ("Ocean Pollution: The Dirty Facts", 2019). Moreover, ocean is the most valuable natural resources on earth. Yet we are attacking them with pollution. The types of ocean

pollution that are generated by humans are vast. For example, trash, noise, oil and carbon emissions. Therefore, in this project, the ocean pollution type that will be focused on is trash. Most of the targeted group of audience which is students in primary school did not learn much about this ocean pollution in school. Thus, to raise awareness about ocean pollution among primary school students, we can make learning interesting to the students by using this RPG game as a tool to appeal them to learn more about this topic. Students can be more engaged to the RPG as this game provides interesting storylines, rewards and colourful visualization by developing the game concept and ideas using the gamification theories which is Flow Theory, RPG Game Design Development and PlayGen Toolkit.

1.2 Problem Statement

Nowadays, as we all know, education on climate change is not taught in in most of the school throughout the world. Based on a survey among teachers in United States stated in an article by Phil Dzikiy (2019), 65% of them said that topic of climate change is “outside their subject area”. Some students may know about climate change by watching news on television but unfortunately, not all students like to watch news. This means they did not get any exposure to the environment of the outside world properly.

Thus, to help students to learn more about climate change, we can use gamification method to attract their interest in learning climate change. Gamification is when we apply a game playing element to a non-game environment in our everyday activities (Workman, 2013). By adding gamification in their way of learning, this can help student to learn more information in a fun and enjoyable way.

There is some existing game on climate change which are available online. For example, “Dumb Ways to Kill Oceans” (“Welcome to Dumb Ways To Kill Oceans.”, 2019). This game

is mainly about plastic pollution, warming ocean temperature and coral reef degradation. It is available online at <https://gamingfortheoceans.org/>. One more example is “The Big Catch” which is an interactive game that enable the players to collect pounds of virtual plastics (Gallucci, 2019). Unfortunately, both of this game is not an RPG game. There are no RPG games on climate change available.

Moreover, Malaysia is moving into the direction of gamification in their education system. The reason being so is younger kids nowadays is already exposed and comfortable with technologies. Therefore, we can use technologies as a tool to get them to learn new knowledge that is related to educational by providing them an educational game.

1.3 Scope

The proposed project target user is Primary school students around age of 7 to 12 years old. Teachers can download this game file, and once downloaded they can play the game offline to teach the students about awareness of ocean pollution in school.

1.4 Objectives

The main objectives of this project are:

- i. To investigate the gamification theories – i.e. Flow Theory, RPG game design and PlayGen Toolkit.
- ii. To develop an educational RPG game with the content of awareness of climate change due to ocean pollution.
- iii. To evaluate the outcome of the developed RPG games against elements of Flow Theory.

1.5 Methodology

The methodology that is used to develop this project is Game Design Development method. Game Design Development method consists of five major steps that was classed under three phases. Details on this methodology is evaluated in detail on Chapter 3.

1) Pre-production

a) Concept Development

Identifying the theme of the game. The goals of the project are also defined.

b) Design

During this step, a PlayGen Toolkit are used to help in designing the game design.

2) Production

a) Implementation

RPG Maker VX Ace Lite software are used to develop the game.

3) Post-production

a) Initial Testing

Initial testing of the game is carried out by developer to test the game functions. Test case is developed, and the game functions are observed.

b) Final Testing

Meanwhile, final testing is conducted by analysing the survey which was filled by game testers in order to evaluates the results against elements of Flow Theory to evaluate the effectiveness of the proposed game.

1.6 Significance of Project

An educational game that incorporate RPG approach to create awareness about ocean pollution while playing game. Idea from PlayGen Toolkit which is the victory conditions and the game mechanics are used to develop the game concept. Additionally, the game successfully applies the elements of Flow Theory, which is rewards, clear goals and the balance between player skills and challenge. Therefore, this educational role-playing game (RPG) can be used as a tool to raise awareness on ocean pollution to the players in a fun way.

1.7 Project Schedule

This Final Year Project was initially started from 23rd September 2019 and will be due for submission on 15th August 2020. Detailed project schedule is shown in Appendix B.

1.8 Project Outcome

The outcome of this project is a functional and educational RPG game that could successfully raise an awareness about ocean pollution to the students as this game provides questions on ocean pollution which can helps player to understand ocean pollution better. Moreover, the game provides interesting storylines which allows player to be more engrossed to the gameplay. This project also successfully applies elements of Flow Theory and PlayGen Toolkit as its parameters.

1.9 Thesis Outline

1.9.1 Chapter 1: Introduction

Before developing a project, it is important to build the foundation of the project as the first steps. Therefore, this Chapter 1 outlines the project introduction, problem statements, scope, objectives, brief methodology, significance, project schedule, and project outcome. These are the factors that needs to be defined before starting to develop a project.

1.9.2 Chapter 2: Literature Review

Chapter 2 will cover about the reviewed RPG Game. Several games were played in order to have a better understanding of the proposed RPG Game. Further explanation of those game can be referred in chapter 2. Apart from that, some comparison of the features used by each RPG Game is also documented. At the end of this chapter, there will be an explanation why the proposed RPG Game is better than the other RPG Games reviewed and a summary of the chapter 2.

1.9.3 Chapter 3: Methodology

Methodology is the way of searching and how to solve the project problem. Chapter 3 will explain about the methodology used in this project.

Two parameters will be covered in chapter 3 which is elements of Flow Theory and game design using PlayGen Toolkit.

1.9.4 Chapter 4: Implementation

Implementation is a phase where the process of developing the project takes place. This chapter explains in detail on the implementation steps of developing this Educational Role-Playing Game (RPG) on Climate Change Awareness, by using RPG Maker VX Ace Lite.

1.9.5 Chapter 5: Testing

Chapter 5 is where the project is tested. In this project, two types of testing were conducted which is initial testing and final testing. This testing phase is very important as this project needs to be tested in order to evaluate the effectiveness and end to make sure that the project will run smoothly without any error.

1.9.6 Chapter 6: Conclusion and Future Work

Chapter 6 touch on the conclusion as well as the potential future works of Educational Role-Playing Game (RPG) on Climate Change Awareness. The objective achievement as well as problems and limitations of the project was also discussed in this chapter. Lastly, some suggestions of potential improvement were listed.

1.10 Summary

Chapter 1 discussed about the introduction, problem statement, scope, objectives, brief methodology, project schedule, project outcome, and thesis outline of this project. This project, Educational Role-Playing Game (RPG) on Climate Change Awareness can help to teach and raise awareness on ocean pollution for students in primary school.

CHAPTER 2: Literature Review

2.1 Introduction

The purpose of this chapter is to explain the details of the background study and literature review. To be able to achieve the objective of the proposed project, a background studies have been carried out by reviewing three (3) existing RPG games. All the findings will be gathered and compared with the proposed game project. The literature study is based on various sources such as journal, article and websites in order to have a clear overview of the existing games. Hence, the strength and weakness of the existing game can be identified and formulate solution to be embedded to the proposed game project.

Role-Playing Game or RPG is one of video game genre which enable player to take a role of a character which undertakes a quest in an imaginary world. This RPG game genre is getting popular day by day due to couple of reasons. Firstly, is because of escapement. By playing RPG game, player can pretend that they are somebody else living in a fantasy world. This is a perfect chance to escape from the problems and boredom that we go through in our everyday lives ("Why are role-playing games (RPG) so popular?", 2019). Secondly, is Freedom. In our normal daily life, there are many rules that we must follow but in RPG games, every action can be attempted, and players are free to do anything that they like. People with free and imaginative minds would finds this fantastical RPG worlds very captivating. Next, they are also free to socialize with others in the game as most RPG games are played with a group of friends.

Nowadays, there are various types and genres of games available in the Internet and can be downloaded which allows player to play the game offline or can be played online. Games are famous among children and youth nowadays as it is very fun and enjoyable to play with. There

are several current RPG games have been studied and all the details of the project development and implemented are described in the following section.

2.2 Reviews on Existing Educational RPG-Game

Nowadays RPG games have taken over every video game genre as it is founded on a handful of core principles, such as telling a story and following the growth of a character. Hence, there are a lot of similar RPG games created using these principles and some of the features and functions of the existing RPG game can be studied, modified, upgraded and to be implemented in the proposed system. There are several kinds of Educational RPG game that exist which are Hero, A Hamilton Adventure and Mathoria: The Last Solution. All this RPG game is downloaded from itch.io website. These several similar existing of Educational RPG game have been reviewed for several factors and documented in this subsection.

2.2.1 Hero



Figure 2.1 Hero Game

Hero RPG game is an educational game about password security. A statistic shows that in 2015, 21% users use 10-year-old passwords, 47% use 5-year-old password and 73% users use passwords that are used in multiple sites (Security, 2019). Thus, this Hero game is built to raise