ACTION-ADVENTURE GAMES ON TRASH DISPOSAL AWARENESS

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This report is submitted in partial fulfillment of the requirements for the Bachelor of [Information Technology (Games Technology)] with Honours.

FACULTY OF INFORMATION AND COMMUNICATION TECHNOLOGY
UNIVERSITI TEKNIKAL MALAYSIA MELAKA

2021

DECLARATION

I hereby declare that this project report entitled

ACTION-ADVENTURE GAMES ON TRASH DISPOSAL AWARENESS

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

STUDENT : _____ Date : 24/6/2021
(MUHAMMAD IRFAN BIN MOHD RADZI)

I hereby declare that I have read this project report and found this project report is sufficient in term of the scope and quality for the award of Bachelor of Information Tecnology (Games Technology) with Honours.

SUPERVISOR : _____ Date : 24/6/2021
(TS. DR. HAMZAH ASYRANI BIN SULAIMAN)

DEDICATION

This research is dedicated to my supervisor Dr. Hamzah Asyrani Bin Sulaiman who always supported, inspired, and guided me in this process and the committee who kept me on track.

I also dedicated this thesis to my lovely parents who helped me in all things great and small and supported me in completing my research.

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I would also like to thank my wonderful parents for their unwavering support no matter by donating funds or keep supporting me and encouragement during my endeavor.

Thank you for all your concern.

ABSTRACT

This project is an Action-adventure game named Untrashed! was developed to teach all the individuals about how important trash disposal awareness is in the form of video games. This game was created to introduce a different way to raise awareness towards the younger generations allowing them to engage both in entertainment and educational content. Nowadays, the younger generations do not care about the importance of trash awareness, as they become clueless and have no idea about recycling. Thus, the outcome for this project is to raise awareness towards the importance of trash disposal.

ABSTRAK

Projek ini adalah permainan aksi-pengembaraan Bernama Untrashed! yang dibangunkan untuk mengajar semua individu tentang betapa pentingnya kesedaran pembuangan sampah dalam bentuk permainan video. Permainan ini diciptakan untuk memperkenalkan cara yang berbeza untuk meningkatkan kesedaran terhadap generasi muda yang memungkinkan mereka untuk terlibat dalam hiburan dan kandungan pendidikan. Pada masa kini, generasi muda tidak mengambil berat tentang pentingnya kesedaran sampah, kerana mereka tidak tahu dan tidak tahu mengenai kitar semula. Oleh itu, hasil projek ini adalah untuk meningkatkan kesedaran mengenai pentingnya pembuangan sampah.

TABLE OF CONTENTS

PAGE

DECLARATION.....ERROR! BOOKMARK NOT DEFINED.

DEDICATION..... III

ACKNOWLEDGEMENTS.....IV

ABSTRACT..... V

ABSTRAK..... VI

TABLE OF CONTENTS.....VII

LIST OF TABLES.....X

LIST OF FIGURES..... XI

LIST OF ABBREVIATIONS.....XIV

LIST OF ATTACHMENTS..... XV

CHAPTER 1: INTRODUCTION..... 1

1.1 Project Background..... 1

1.2 Problem Statement.....2

1.3 Objectives.....2

1.4 Goal and Genre.....3

1.5 Features 3

1.6 Conclusion.....4

CHAPTER 2: LITERATURE REVIEW AND PROJECT METHODOLOGY.....5

2.1 Introduction.....5

2.2 Genre.....5

2.3 Existing Game.....6

2.3.1 Comparison of Existing Game.....8

2.4 Project Methodology.....9

2.5 Conclusion.....11

CHAPTER 3: ANALYSIS.....12

3.1 Requirement Analysis.....12

3.1.1 Project Requirement.....12

3.1.2 Technical Requirement.....13

3.1.2.1 Software Requirement.....14

3.1.2.2 Hardware Requirement.....14

3.1.2.3 Other Requirement.....15

3.2 Project Schedule and Milestone.....16

3.3 Conclusion.....16

CHAPTER 4: DESIGN.....17

4.1 Introduction.....17

4.2 Game Architecture.....17

4.3 Game Design.....18

4.3.1 Gameplay.....18

4.3.2 Core mechanics.....19

4.3.3 Flowboard..... 21

4.3.4 Level Progression..... 22

4.3.5 User Interface/Interaction Model..... 23

4.4 Game Art..... 27

4.4.1 Game World..... 29

4.1 Character Design..... 31

4.1 Camera Model..... 32

4.1 Audio/Sound Effect..... 33

4.5 Conclusion..... 33

REFERENCES..... 34

LIST OF TABLES

PAGE

Table 2.1: Comparison of Existing Game.....8
Table 3.1: Comparison of Existing Game Analysis..... 14
Table 3.2: Project Milestone..... 14
Table 3.3: Gantt Chart for Project Management..... 15
Table 5.1: Audio Types.....36
Table 5.2: Testing Phase.....44
Table 6.1: Technical Evaluation Mean and Standard Deviation..... 57
Table 6.2: Knowledge Mean and Standard Deviation..... 60

LIST OF FIGURES

PAGE

Figure 2.1: Island Saver..... 6
Figure 2.2: Phasmophobia..... 7
Figure 2.3: Game Development Life Cycle.....9
Figure 4.1: Action-Adventure Game Architecture.....17
Figure 4.2: Flowboard of the Game..... 20
Figure 4.3: Main Menu Interface..... 22
Figure 4.4: Setting Menu Interface..... 23
Figure 4.5: Level Selection Interface..... 23
Figure 4.6: Pause Menu Interface..... 24
Figure 4.7: Main GUI..... 25
Figure 4.8: Sketch of the Main Menu..... 26
Figure 4.9: Sketch of the GUI.....27
Figure 4.10: Level 1 (Uncolored City) layout..... 28
Figure 4.11: Level 2 (Night Market Colosseum) layout..... 28
Figure 4.12: Level 3 (Rimba Forest) layout.....29
Figure 4.13: Trash Monster Model..... 30
Figure 4.14: First Person Perspective..... 31
Figure 4.15: Camera Position in Unity Engine..... 31
Figure 4.16: Main Menu and Level Audio..... 32
Figure 4.17: Audio and Sound Effect.....32
Figure 5.1: 3D Art Pipelines..... 33
Figure 5.2: Interface Editing in Unity Engine.....34
Figure 5.3: Example of main menu graphic in the game..... 34
Figure 5.4: Audio Editing in Audacity.....35

Figure 5.5: Audio Configuration....36
Figure 5.6: Audio Implementation....37
Figure 5.7: Animator Controller....37
Figure 5.8: Animator Component....38
Figure 5.9: Main Player System Component....39
Figure 5.10: Cursor Lock Script....40
Figure 5.11: Gun System Components....41
Figure 5.12: Interactable with Gun Script....41
Figure 5.13: Quiz Interface....42
Figure 5.14: Quiz Button Component....42
Figure 6.1: Result of Question 1 Part A....49
Figure 6.2: Result of Question 2 Part A....50
Figure 6.3: Result of Question 3 Part A....50
Figure 6.4: Result of Question 4 Part A....51
Figure 6.5: Result of Question 5 Part A....51
Figure 6.6: Result of Question 6 Part A....52
Figure 6.7: Result of Question 7 Part A....52
Figure 6.8: Result of Question 8 Part A....53
Figure 6.9: Result of Question 1 Part B....53
Figure 6.10: Result of Question 2 Part B....54
Figure 6.11: Result of Question 3 Part B....54
Figure 6.12: Result of Question 4 Part B....55
Figure 6.13: Result of Question 5 Part B....55
Figure 6.14: Result of Question 6 Part B....56
Figure 6.15: Technical Evaluation Graph....57
Figure 6.16: Result of Question 1 Part C....58
Figure 6.17: Result of Question 2 Part C....59
Figure 6.18: Result of Question 3 Part C....59
Figure 6.19: Result of Question 4 Part C....60
Figure 6.20: Result of Question 1 Part D....61
Figure 6.21: Result of Question 2 Part D (i)....61
Figure 6.22: Result of Question 2 Part D (ii)....62
Figure 6.23: Result of Question 3 Part D....62
Figure 6.24: Result of Question 4 Part D....63

Figure 6.25: Result of Question 5 Part D (i).....64
Figure 6.26: Result of Question 5 Part D (ii).....64

LIST OF ABBREVIATIONS

FYP	**-**	**Final Year Project**
UI	**-**	**User Interface**
GUI	**-**	**Game User Interface**
2D	**-**	**2-Dimensional**
3D	**-**	**3-Dimensional**
FPS	**-**	**First-Person Shooter**
AI	**-**	**Artificial Intelligence**
BGM	**-**	**Background Music**
Q&A	**-**	**Question and Answer**
GDLC	**-**	**Game Development Life Cycle**

LIST OF ATTACHMENTS

		PAGE
Appendix A	**Analysis of data collection**	**72**
……..	……	**-**

CHAPTER 1: INTRODUCTION

1.1 Project Background

This project is an Action-adventure game named Untrashed! An Action-adventure is a video game genre that incorporates aspects from both action and adventure games. Because of its enormous scope, it is possibly the most diverse video game genre. It can include a wide range of games that are better divided into specific genres.

This project is about an adventure game where the user or player is required to clean up the city that is full of trash. People in the city does not care about throwing trash into the dustbin anymore thus you are required to clean up the mess within the time given for each level. If the player could not clean up the mess within the time given, the trash will be a huge giant trash monster which you need to defeat to clean up the mess again but with a shorter time limit. The game will be finished if the player succeeds in cleaning all the areas in the city. This game will be developed using Unity Engine. The game's target audience is more focused on younger generations and children.

This project is inspired by the game called ‘Island Saver’ and ‘Viscera Cleanup Details’. The difference is this project teaches the players about maintaining cleanliness and the importance of recycling. Information will be given to the players through the loading screen to provide players know the rules and what to do in the game. The objective of this project is to make sure all the areas are clean without any trash.

Untrashed! is a simple game that was made to raise awareness among all individuals, from younger generations to adults, because there are not many games that educate us how to keep our surroundings clean nowadays, and this game allows the player to experience how to do so.

1.2 Problem Statement

The environment in which we live is critical to our survival. People who are unconcerned with the environment just do not realize how vital it is to all of us, even if it does not directly affect them. The more individuals who are unconcerned about our environment, the more contaminated it will become.

This project has the potential to teach our younger generations about recycling and cleanliness. Having experience while playing the game will also draw many players who will learn the necessity of keeping the environment clean while having fun.

1.3 Objectives

i. To observe the elements and requirements of action-adventure games for trash disposal awareness.

ii. To develop an action-adventure games based on the identified elements and requirement.

iii. To analyze the level of awareness gained from the people that plays the game.

1.4 Goals and Genre

The goal of this game is to deliver educational and entertaining information to younger generations about the necessity of keeping the environment clean, the importance of recycling, and the importance of preserving cleanliness.

The game is an action-adventure with a theme of a littered city and a trash-filled environment, as well as some fantasy elements.

1.5 Game Features

This project is targeting on younger generations between 8 to 15 years old where mostly people around this age can understand the rules of the game and can interact according to the simple rules were given. Furthermore, this project also focused on children because the aim of this project is to know whether the target audience will gain information about maintaining cleanliness and recycling or not.

To advance to the next level, players must achieve their objectives. After the player completes a level, that level will be unlocked. After completing all the levels in the game, the player can play it again, but to unlock mini games, players must look for secret mini game features on one level.

The mini game for this game is look like basketball games in which they must throw trash into the designated recycle bin to obtain a score.

1.6 Conclusion

In conclusion, this chapter states the report's introduction, which includes the project's background, problem statement, objectives, goals and genre and game features for this game.

With this teaching method, it will make use of the positive qualities of this game to pass on information to the younger generations. It gives a new lease on life by turning it into a fun, exciting game without the need for tedious courses.

CHAPTER 2: LITERATURE REVIEW AND PROJECT METHODOLOGY

2.1 Introduction

This chapter will go through the game's genre, a list of existing games that are related to the project, a comparison of the existing games, and the project methodology used to develop the project.

2.2 Genre

The game genre for this game is Action-adventure game. Action-adventure is a video game genre that incorporates aspects from both action and adventure games. Because of its enormous scope, it is possibly the most diverse video game genre. It can include a wide range of games that are better divided into specific genres.

Action-adventure gamers are better learners who have improved because of playing action-adventures games. 50 hours of action gameplay over nine weeks may turn non-gamers into gamers. Surprisingly, the rise in performance lasted a long time, with improvements visible months to years later. (Melina Unchaper, 2016)

There are many debates in the gaming community and the media about what exactly constitutes an action-adventure game. Some people consider action games to be a distinct genre, while others consider them to be situational problem-solving games with physical difficulties or time

constraints. Due to its wider scope, the word "action-adventures" is frequently used to refer to a specific subgenre.

2.3 Existing Games

The next subsections provide explanation about existing games games in Action-adventure genre which are Island Savers and Phasmophobia since there are not many games that based on Action-Adventure Educational game.

i. Island Saver

Figure 2.1 Island Saver

Island Saver is a free-to-play action-adventure game produced by National Westminster Bank and developed by Scottish studio Stormcloud Games. Island Saver is a video game where player is required to save Savvy Islands from pollution. The game's objective is to traverse an island. New areas can be unlocked by spending in-game coins. The player learns about the fundamentals of using a bank account, in addition to related topics such as paying taxes. Two downloadable expansions are available with the proceeds going towards the charities SpecialEffect and Young Money.

ii. Phasmophobia

Figure 2.2 Phasmophobia

Kinetic Games produced and published Phasmophobia, an indie horror game. In September 2020, the game was released in early access on Steam for Microsoft Windows, featuring virtual reality support. Phasmophobia is a video game in which players can join up with up to three other players to investigate haunted areas filled with ghosts, spirits, and other paranormal events as a team of paranormal detectives.

2.3.1 Comparison of Existing Games

	Island Saver	**Phasmophobia**
Gameplay	The game's objective is to traverse an island. The player learns about the fundamentals of using a bank account, in addition to related topics such as the concept of paying taxes. Two downloadable expansions are available with the proceeds going	The game features 14 different ghost types, each of which behave differently. The player takes control of one ghost from a group of up to four players in the roles of ghost investigators. The players must collect various types of

	towards the charities SpecialEffect and Young Money. In-game coins are obtained by cleaning up litter, cleaning up goop and saving the bankimals.	evidence to determine the type of ghost they are dealing with. The end goal is not to defeat the ghosts, but to determine their type and complete optional objectives.
Game Mechanic	Physics such as riding rhinoceros, jumping and shooting, Internal economy, saving coins in bank account to use it on the next level and Progression mechanic which the player need to traverse through the island by completing levels.	Physics mechanics such as walking and throwing items, Internal economy, after the player has complete the objectives, they will receive amount of money and can spend the money to buy different equipment and the Social Interaction mechanic which the player need to interact with another player to know the location of the ghost.
Platform	Microsoft Windows, Nintendo Switch, PlayStation 4, Xbox One	Microsoft Windows
Duration	10 hours average for main content	If player can survive

Table 2.1 Comparison of Existing Games

Untrashed! is a project that is being developed to provide relevant information about the importance of trash disposal. Untrashed! differs from both games mentioned above in that it is a game on trash disposal awareness. Untrashed! gameplay is comparable to a mix of Island Saver and Phasmophobia in that it demands the player to clear up the trash in the area before the trash monster comes. While Island Saver just requires the player to clean up the environment, Phasmophobia requires the player to locate the ghost before it begins hunting the players. Physics and Progressions are the game mechanics of Untrashed! Walking and running, as well as Phasmophobia, jumping, and firing, are the physics identified

in this game. The game progresses in such a way that the player must first accomplish level 1 before moving on to levels 2 and 3. Only Microsoft Windows users will be able to play this game.

2.4 Project Methodology

This game will follow the Game Development Life Cycle

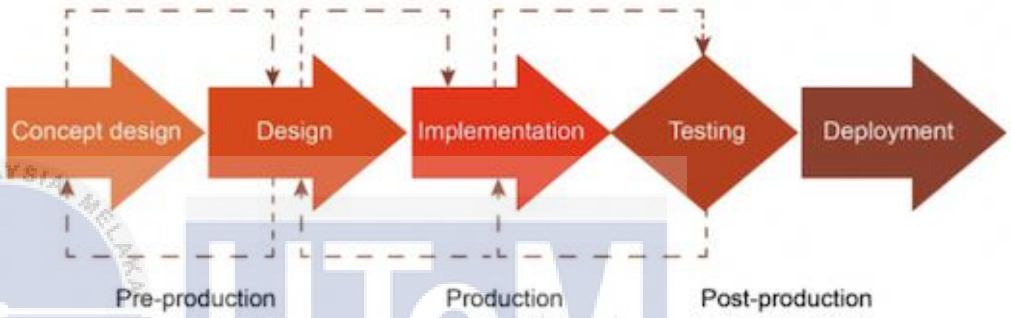


Figure 2.3 Game Development Life Cycle

Concept Design

The heart of each game/product is the design. Making a game requires an imaginative, creative, and sophisticated process known as game design. It necessitates critical interactive thinking, comprehension, implementation, execution, behaviour, and user interface design. In GDD, all virtual concepts and designs are described as a blueprint for the game/products.

Design

All the important design elements including UI Interface, Game data, Player data and characteristics, level design, gameplay, and mechanism, 3D/2D game arena, game objects/powers/properties, artificial intelligence, VFX/animations, audio, and sound effects.

Implementation

After completing the Game Design, it is time to start the implementation of the actual game concept/idea. Programming is the most important thing about the game development progress and quality in this process.

Testing

In any game/concept development architecture, testing and game design are equally important. Testing isn't just a game that we play at work. It's a real-life end-user experience with regard to our product. Ensure that some documents and file systems are included in every testing phase for QA.

Deployment

During the distribution stage, the first several months are usually devoted discovering and fixing defects in video games. Players are expected to submit bug reports or speak up about flaws in online forums, which developers rely on. This is all part of post launch support, which includes providing regular software updates for the game. These updates range from game-balancing patches to new downloadable content, or DLCs.

2.5 Conclusion

In conclusion, in this chapter, it focuses on the process of how to develop the project. This chapter elaborate about the existing games for the same genre and the comparison between the project and the existing games. Hence, in this chapter also mentioned about the project methodology using the Game Development Life Cycle.

CHAPTER 3: ANALYSIS

3.1 Requirement Analysis

3.1.1 Project Requirement

This project's requirements include both software and hardware. The project's development has been made easier because of this requirement.

	Island Saver (2020)	**Phasmophobia (2020)**
Player Roles	Washing away glop, collecting rubbish, earning coins, and rescuing the bankimals are all tasks that the player must complete! These unique animals are living piggy banks, and you may use them to help save the Savvy Islands and restore order.	The player controls one of up to four ghost investigators who have been hired to deal with ghosts that have taken up residence in various abandoned buildings such as homes, schools, jails, and asylums.
Gameplay	Earn coin and rescue the bankimals to learn about fundamentals using bank accounts	Explore the abandon building to investigate what kind of ghost that lives in the area
Victory	The player wins after rescue all	The player wins getting the information about the ghost

Condition	the bakimals in the area	that lives in the area
Core Mechanics	Items and inventory, Player skills	
Level Progression	Level increases as the player proceed to the next level	Level of difficulties increases as the player complete the objectives of the game
User Interface Features	Inventory UI, Objectives UI, Bankimals Counter UI	There is only one interface which is the game world UI
Camera Model	3D First-Person Camera	3D First-Person Camera

Table 3.1 Existing Game Analysis

Both games had the action or adventure elements in their genre. The popularity of the action-adventure genre got a big boost in 1983. Based on the article 'Game Popularity by Genre' (Akhulkova, 2020), Studies show that in any country action-adventure games and shooters remain the most popular genres on PC and consoles, but there is not many action-adventure educational game that can give a lesson towards the player. One of the games that teach the player a lesson is Island Saver. Based on the review from TheXBoxHub, the reviewer commented "it plays well, looks all cute and cuddly, teaches kids about money and it's free to download."

3.1.2 Technical Requirement

Mouse and Keyboard

Most interactions with a computer involve using a keyboard and a mouse. The keyboard allows the player to move, and the mouse allows the user to position the cursor, execute program functions by clicking mouse buttons.

Controls

The controls are WASD to moving forward, backward, left, and right. SPACEBAR to jump. E to interact with objects. Left Clicks to shoot. Tab to open objectives. Escape to open and closed pause menu

3.1.2.1 Software Requirement

Unity Engine will be used as the game engine in the development of the entire project in this project. In addition, Microsoft Visual Studio would be utilized to program the Unity Engine project. Blender 3D was used to produce a 3D model for this project. Audacity software will be used to create and modify the audio and sound effects for this project. and some of the User Interface in this project are edited by using Adobe Photoshop.

3.1.2.2 Hardware Requirement

A laptop, mouse, and keyboard are required for the entire project development, and an internet connection is required during the project development because accessing asset stores in Unity requires an internet connection.

3.1.2.3 Other Requirement

The required tools or platform required in assisting the project development during Movement and Control Order (MCO) are Microsoft Teams (Online meeting platform), Google Drive (Cloud Backup), UTeM Official Learning Management System (ULearn) (E-learning portal).

3.2 Project Schedule and Milestone

To ensure that the project's progress is on track, a project schedule and milestones were prepared as a point of reference for the entire project. In addition to milestones, a Gantt chart was constructed to instruct the developer each week.

Key Milestone	Start Date	End Date
Concept and Idea	15/3/2021	29/3/2021
Proposal and Game Design Concept	15/3/2021	1/4/2021
Basic Codes and Game Object Design	30/4/2021	29/5/2021
Implementing Main Game Elements	30/4/2021	29/5/2021
Prototyping and Bug Fixing	1/5/2021	20/6/2021
Finishing the Game	1/5/2021	20/6/2021
Evaluation	16/6/2021	30/6/2021

Table 3.2 Project Milestone

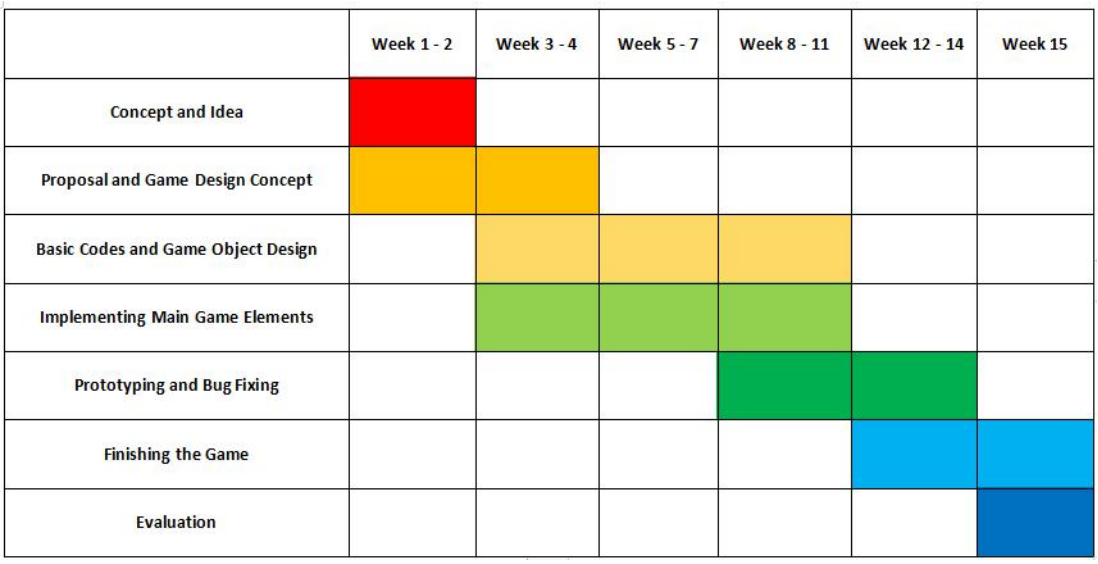


Table 3.3 Gantt Chart for Project Development

3.3 Conclusion

This chapter conclude on analyzing the requirements for the projects such as the technical requirements, software requirements, hardware requirements, and other requirements. This chapter also discuss about project milestone for this project, Project milestones are dates on the schedule that indicate a significant accomplishment or the completion of a key project phase. Project milestones are critical for good project management and keeping the team on schedule.

CHAPTER 4: DESIGN

4.1 Introduction

A computer game's purpose is to provide the player with an enjoyable interactive experience. Game design is a discipline that attempts to answer these questions. Game design is a field of study that teaches us how to make games more engaging and intriguing. It's not simply about stunning graphics, cutting-edge technology, or a large licence.

In this chapter, the whole design for Untrashed! will be explained including the game architecture, gameplay, core mechanics, flowboard, level progression, user interface, game art, game world, character design, camera model and audio or sound effect.

4.2 Game Architecture

Base architecture for this project is researched from (System Models Patterns and Software Architectures 14 February, n.d.)

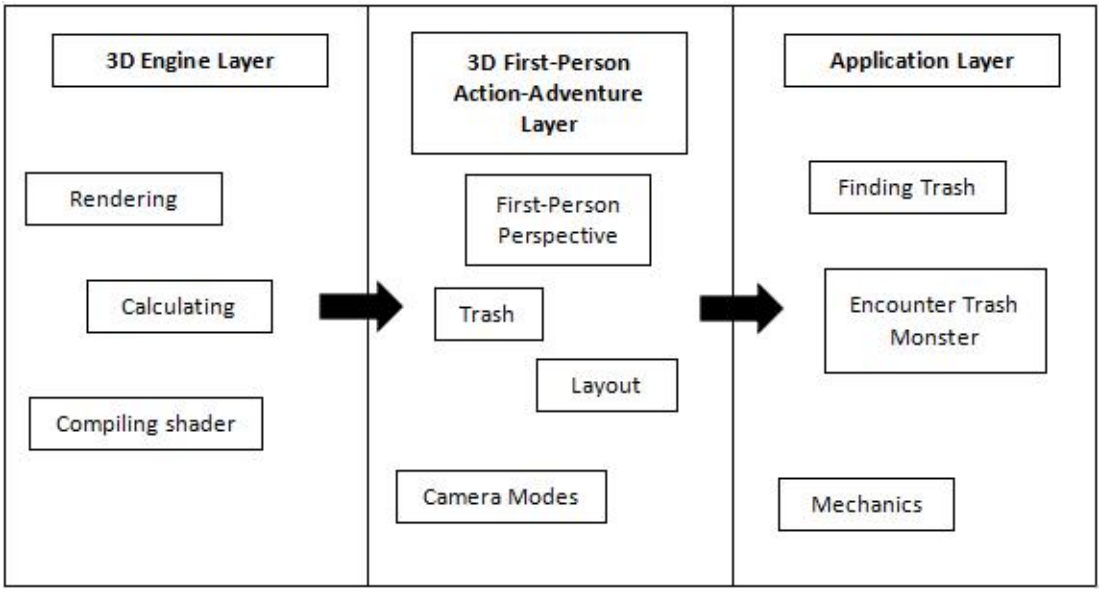


Figure 4.1 Action-Adventure Game Architecture

4.3 Game Design

4.3.1 Gameplay

Player Roles

The player needs to clean up the trash-filled area. To clean up the area, the player must gather all rubbish and place it in the appropriate recycle bin; however, the player can only pick up one type of trash at a time.

Game Rules

Players are free to roam the levels, but there is a restriction in place that prevents them from going outside of bounds, which breaks the immersion of the game. To advance to the next level, the player must clean up all the trash in the area. Players must gather all trash in the time allotted; if they do not collect all trash in the time allotted, a trash monster will spawn and cause even more havoc in the area. If the trash monster appears, players must search the area for a concealed bubble gun to stop the trash monster from causing havoc. After that, the player must pick up all the trash to advance to the next level.

Victory Conditions

Players will achieve the game's goal by accomplishing all the objective on each level, which include cleaning up the environment by collecting trash and placing it in the appropriate bins.

Termination Conditions

When colliding with the trash monster for an extended period, the player's health is depleted. When a player dies, the level can be restarts and the player is given full health at the start of each level.

Level of Difficulty

Medium level, depending on the player's abilities and knowledge of action-adventure game mechanics. When the trash monster appears, it will be more stressful for the player, and the surroundings will become more messed up if the player is near the trash monster. It will be easier for the player if he or she can defeat the trash monster using strategies.

4.3.2 Core Mechanics

Lives

Health is treated as player lives when it drops to zero, player die.

Powerups

A bubble gun will appear as a powerup for the player when the trash monster appears, allowing them to destroy the trash monster and clean up the area.

Collectibles

A bubble gun is one of the game's collectibles, and it can only be used to defeat the trash monster.

Time

The time mechanic in this game is a time limit mechanic that ensures the player collects all the trash within the time allotted. If the player does not collect all the trash within the time allotted, a trash monster will appear and cause more chaos in the area, increasing the player's stress to collect all the trash.

Score

In this game, the score mechanic only applied to the mini games. In mini games, players must throw trash into the correct recycle bin to earn points; if they throw trash into the incorrect recycle bin, they will receive no points.

4.3.3 Flow board

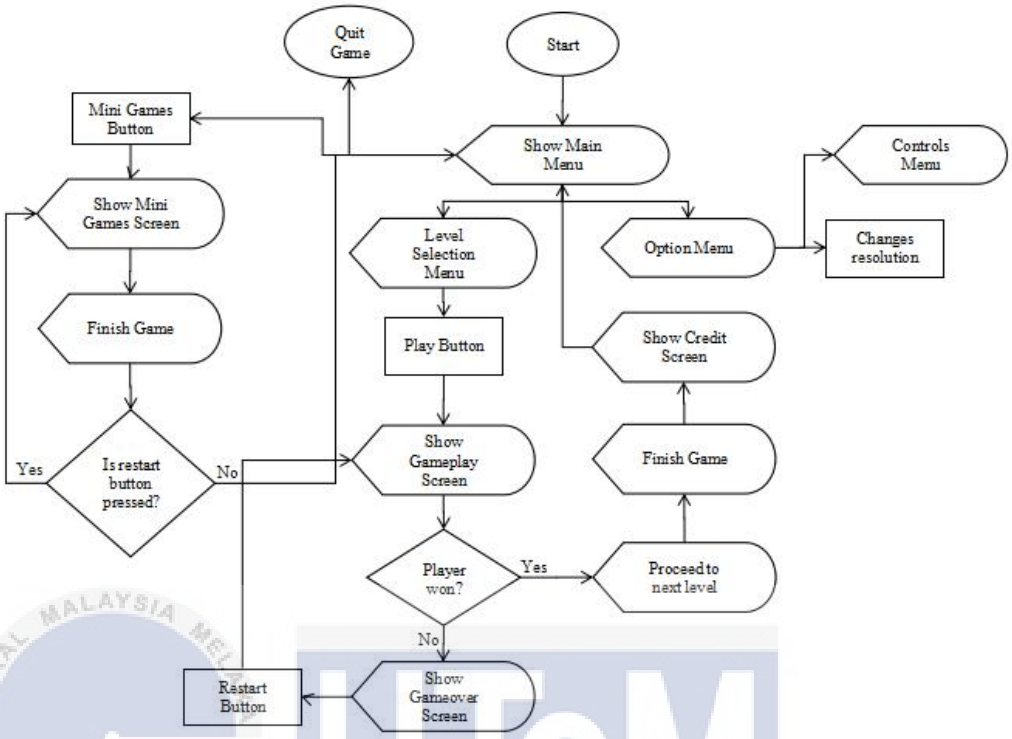


Figure 4.2 Flow board of the game

Start

When player start the program, the game will start and bring player to the Main Menu.

Main Menu

In Main Menu, players are given option to choose from

Play Game

For the Play Game option, players must choose a level to play; level 2 or level 3 will be unlocked after the player completes both levels.

Mini Games

Players can play mini games that look like basketball games in which they must throw trash into the designated recycle bin to obtain a score in the Mini Games option.

Settings Menu

The Player's Setting Menu will appear, allowing you to change the graphic and resolution settings. In the settings menu, players may also access the Controls Menu to view the game's controls.

Quit Game

Quit game button will quit the program from running.

4.3.4 Level Progression

Level 1

Condition

There are only three trash which is glass bottle, plastic bottle, and paper cup. Player are given 120 seconds to clean up the area. Low Damage.

Result

Player will have a hard time fighting the enemy. It is easy level completion.

Level 2

Condition

There are four kind of trash which is glass bottle, plastic bottle, paper cup and toilet paper. Player are given 240 seconds to clean up the area. Higher Damage.

Result

Player can easily kill enemy. Easy level completion.

Level 3

Condition

There are four kind of trash which is glass bottle, plastic bottle, paper cup and battery. Player are given 180 seconds to clean up the area. One battery only can be disposed for 25 seconds. Enemy is faster than before.

Result

Have a hard time fighting with enemy. Medium level completion.

4.3.5 User Interface/Interaction Model

Figure 4.3 Main Menu Interface

In the Main Menu, players are given option to choose from Play Game, Mini Games, Settings or Quit Game

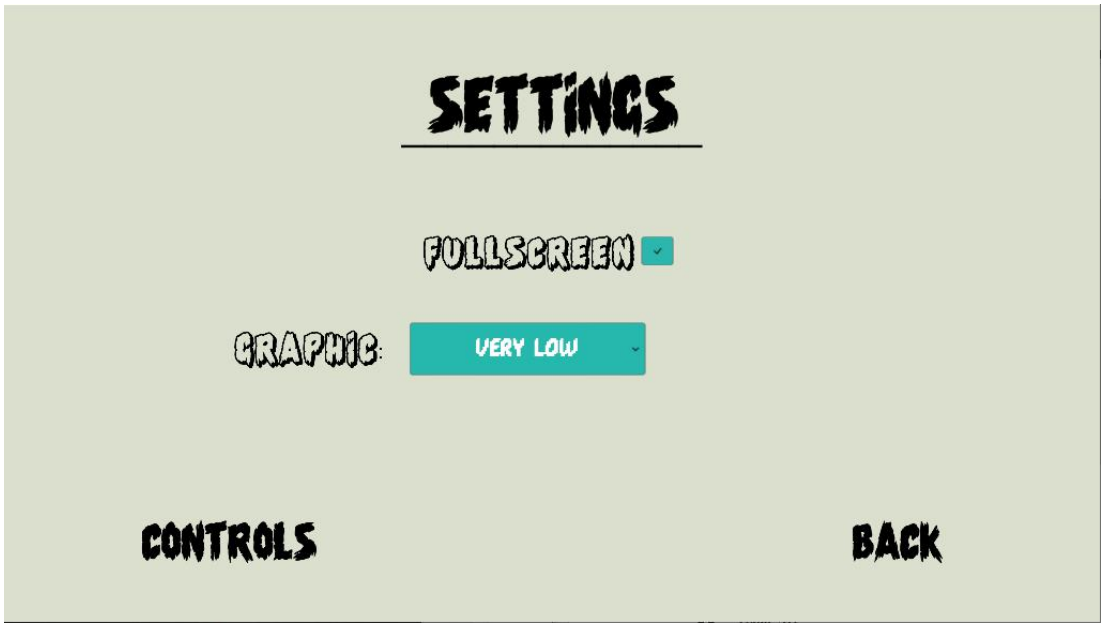


Figure 4.4 Settings Menu Interface

The Player's Setting Menu will appear, allowing you to change the graphic and resolution settings. In the settings menu, players may also access the Controls Menu to view the game's controls.

Figure 4.5 Level Selection Interface

In the Level Selection menu, players can choose the level that they wanted to play. Level 2 or level 3 will be unlocked after the player completes both levels.

Figure 4.6 Pause Menu Interface

For the Pause Menu, players are given options to resume the game, go back to main menu or quit game.

Figure 4.7 Main GUI

In the GUI, there are 5 interfaces which are the Objectives interface at the top left corner of the screen. The Time given at the top middle of the screen. The Inventory interface at top right corner of the screen. The health bar interface at the bottom left corner of the screen. The Current trash counter interface at the bottom right corner of the screen.

4.4 Game Art

Figure 4.8 Sketch of the Main Menu

This is a hard sketching for the Main Menu of the game. The sketch contains the options to play the game, settings option, and quit game. The game title would be at the top center of the screen.

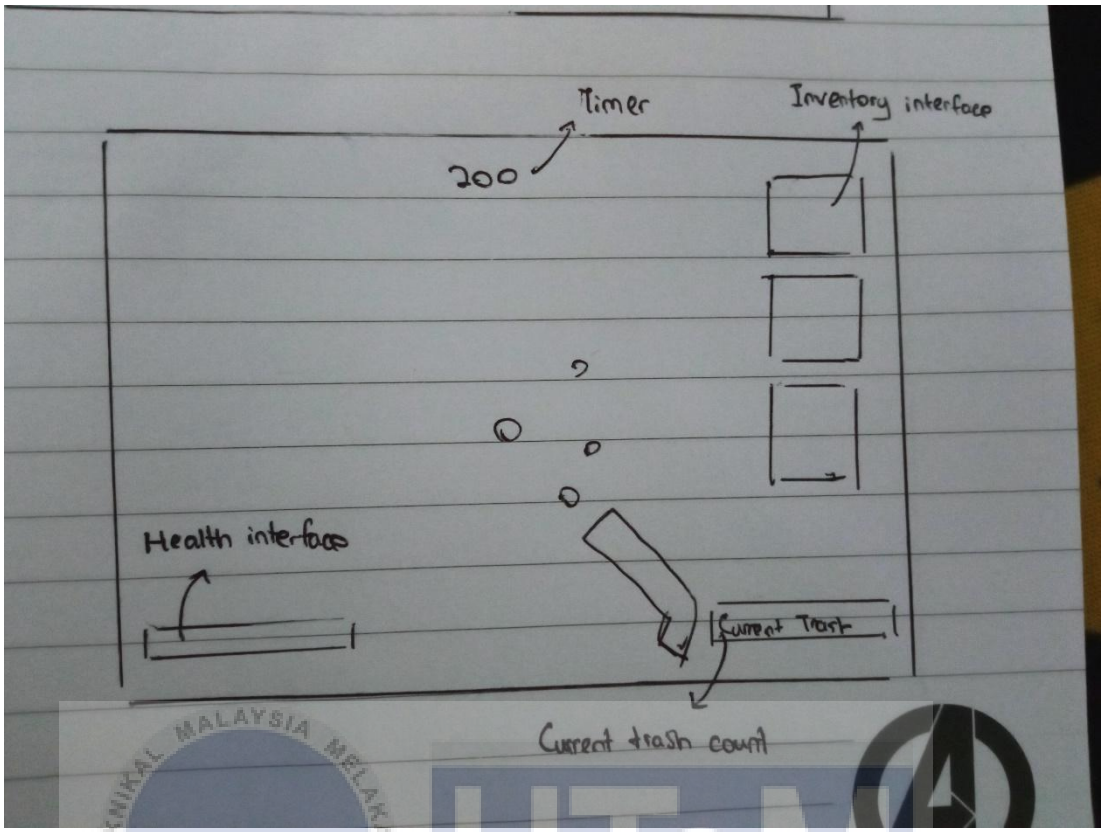


Figure 4.9 Sketch of the GUI

This is a hard sketching for the GUI for this game. From the interface, at the left bottom of the interface, is a health bar. The timer mechanic interface will be at the top center of the screen. The inventory item after the player collects the trash will be on the top left corner on the screen. Lastly, the current trash counter is at the bottom right corner of the screen

4.4.1 Game World

Level 1 (Uncolored City)

Figure 4.10 Level 1 (Uncolored City) layout

Level 1 world resembles the world of Uncolored City where everyone in the city does not care about trash disposal and there was a lot of trash left in the city.

Level 2 (Night Market Colosseum)

Figure 4.11 Level 2 (Night Market Colosseum) layout

Level 2 game world reflects the situation of what happens when the night market is closed, and people still throw garbage and rubbish all around after going to the night market even if there is a recycle bin.

Level 3 (Rimba Forest)

Figure 4.12 Level 3 (Rimba Forest) layout

In the level 3 game world, the world resembles a situation where people that love recreation always throw their trash around the beautiful environment.

4.4.2 Character Design

There is only 1 character in this game which is the enemy (trash monster)

Trash Monster

Figure 4.13 Trash Monster Model

This model is used as the enemy in this game.

After the time limit has expired, the trash monster will spawn. When it encounters the player, it will throw additional trash at you. The player's health will be reduced if the trash monster collides with them. The only way to defeat this trash monster is to use a bubble gun to shoot a bubble. The longer it takes the player to defeat this monster, the longer it takes to clean up the area after the garbage monster has caused havoc.

4.4.3 Camera Model

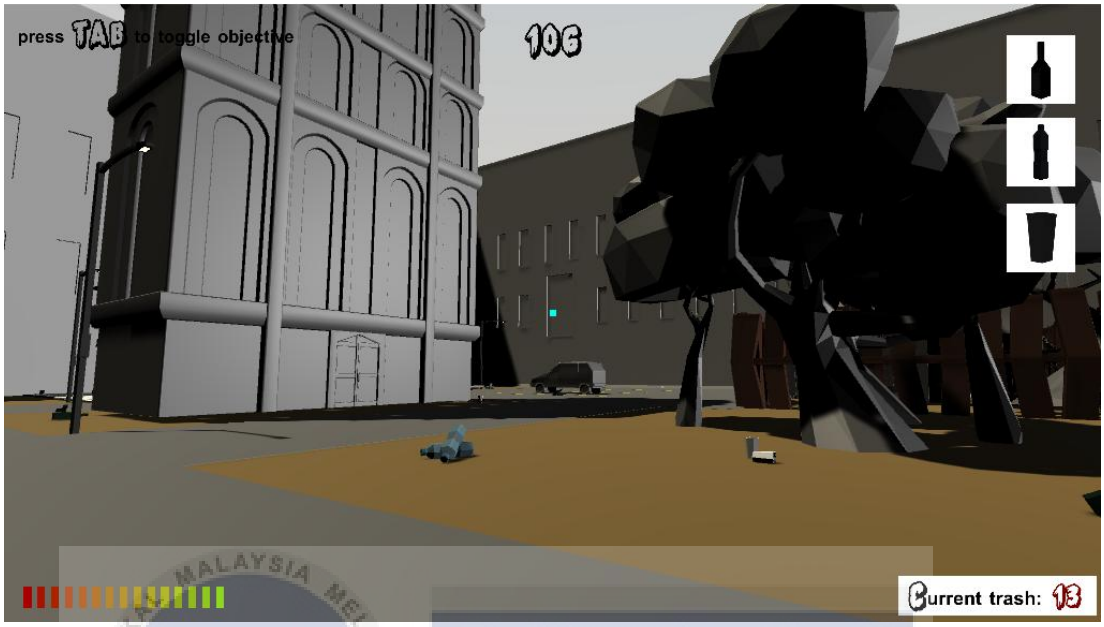


Figure 4.14 First Person Perspective

Based on figure 4.14, this game applied the first-person perspective which based on a shooting game because in this game, the player can obtain the bubble gun and shoot the trash monster like the original shooting game.

Figure 4.15 Camera position in Unity Engine

Figure 4.15 shows the camera position in Unity Engine which the camera will be positioned at the player's head to make the point of view become first person perspective.

4.4.4 Audio/Sound Effect

Main Menu and Level Audio

Figure 4.16 Main Menu and Level Audio

Sound Effects

The sound effects that are used I this game are the Bubble gun sound, Button press sound, jump sound, Monster attack sound, Monster attacked sound, pick up trash sound, Battery processing sound, Throwing trash sound, Wrong sound.

Figure 4.17 Audio and Sound Effects

4.5 Conclusion

Finally, in this chapter, design and sketching were completed to give the project an overall appearance. In fact, this chapter may provide insight into how the game functions. Some people choose to focus completely on design rather than writing programming, hence game design has become a separate, specialised school of study. The purpose of game design is to create an experience that serves as a brief diversion or transfers you to another planet.

CHAPTER 5: IMPLEMENTATION

5.1 Introduction

This chapter will focus on the implementation to make this game about conversion and integration of the game art in this game. This chapter will explain about the creation of game art, production of graphics, audio, video, and animation. In this chapter also, we will be discussed about the game configuration management which consists of the configuration setup, version control procedure and the implementation status.

5.2 Creation of Game Art

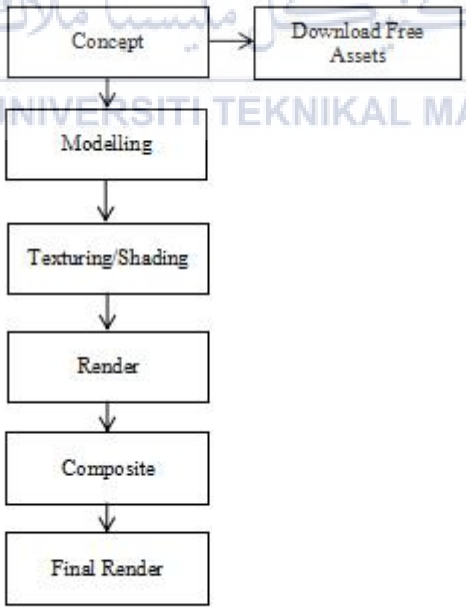


Figure 5.1 3D Art Pipeline

5.2.1 Production of Graphics

This game is using the 3D art. 3D modelling is the process of using computers to produce three-dimensional images and graphics. The asset for game character was downloaded from Unity Asset Store. Some of the assets and objects in this game are taken free from Unity Asset Store, but some of them are modelled using Blender 3D software that involve texturing, shading, and rendering. The 3D Model will be imported into Unity Engine as a fbx file.

For the User Interface, it was designed by using Adobe Photoshop, Microsoft Software (Microsoft Word and Microsoft PowerPoint) and by Unity Engine itself.

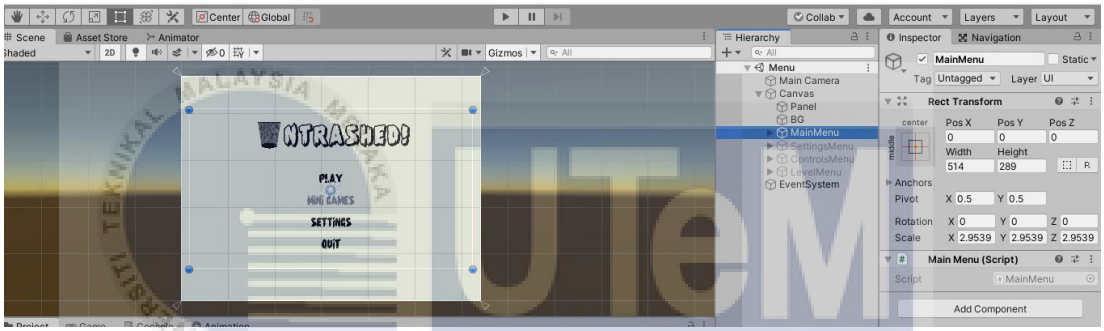


Figure 5.2 Interface Editing in Unity Engine

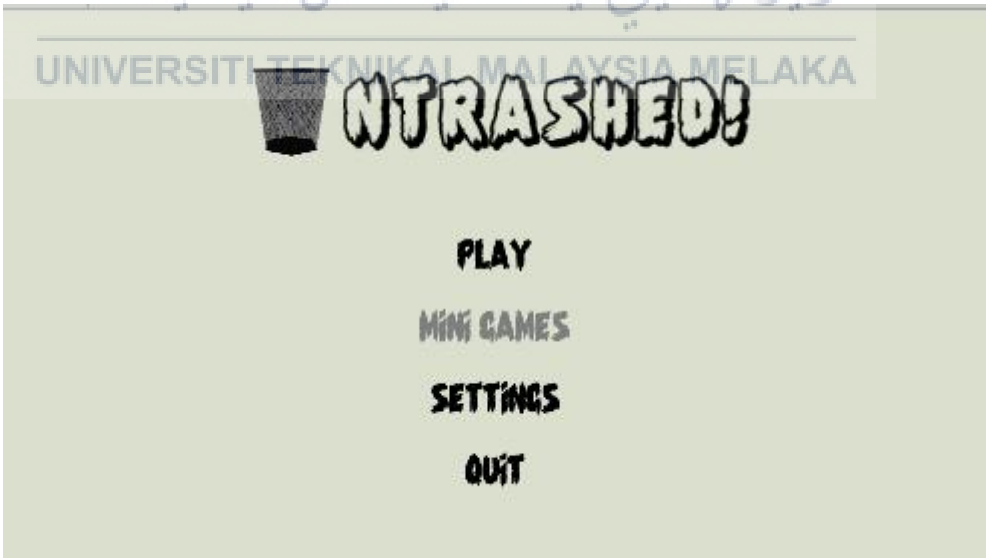


Figure 5.3 Example of main menu graphic in the game

5.2.2 Production of Audio

The audio of this game is downloaded from free source on the internet and some of the sound effects has been modified by using Audacity software. The types for the audio files are mp3.

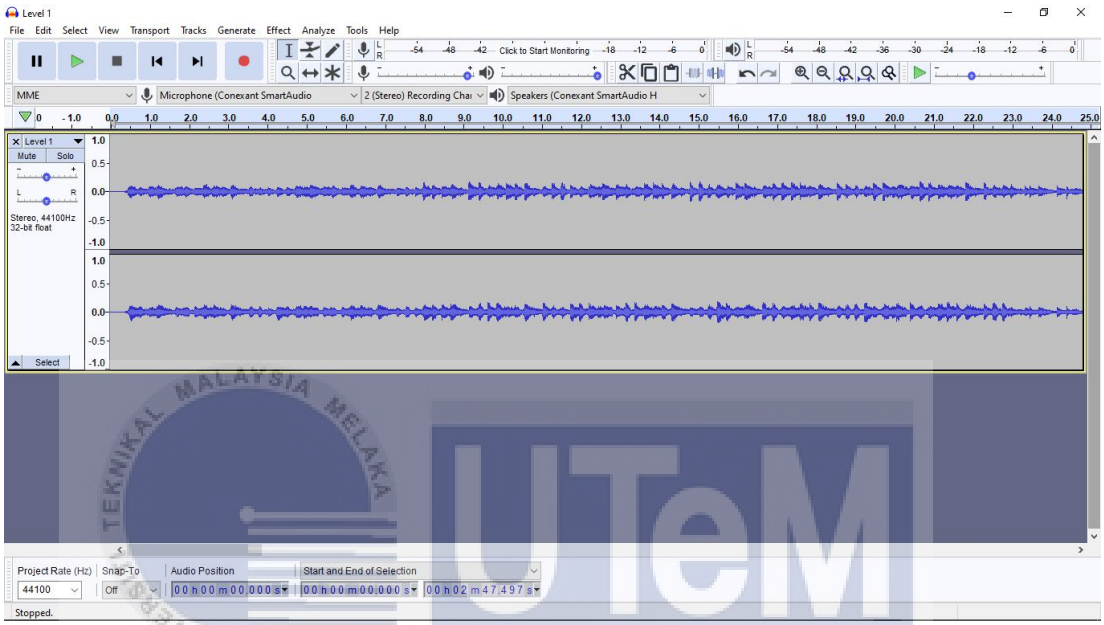


Figure 5.4 Audio Editing in Audacity

Sound	Description
Shooting Sound	Used when the player shooting the monster using a bubble gun. It is a bubble blowing sound.
Jumping Sound	Used when the player presses the jump button.
Monster Attack Sound	A sound when the monster approaches the player, it will make an attacking sound.
Monster Attacked Sound	A sound when the monster gets shoot with the bubble gun by the player.
Pickup Objects Sound	Used when the players pick up the trashes.
Processing Sound	Used in level 3, when the player picks up the batteries

	and put it in the disposal machine.
Throwing Objects Sound	Used when the player throws the trash that they had picks up into the recycle bin.
Wrong Sound	Used in the mini games, which when the player throws the wrong trash into a different recycle bin.
Level Music	The level music is taken from a free source on the internet and used as the background music (bgm) for each level.

Table 5.1 Audio Types

We can configure the sound settings after the audio file has been imported into the Unity Engine.

Figure 5.5 Audio Configuration

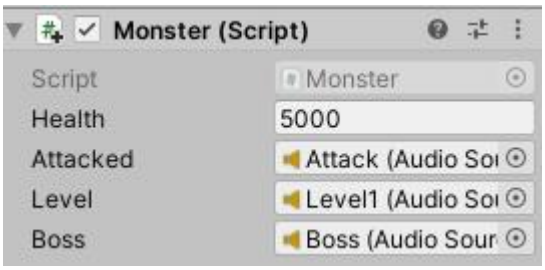


Figure 5.6 Audio Implementation

Based on figure 5.6, the audio will be implementation into the trash monster script which consists of monster attacked sound, the level music, and the boss music.

5.2.3 Production of Video

There is no video that were produced in this game.

5.2.4 Production of Animation

Animation - Animator Controller

When we use the Animation Window to animate a Game Object or connect an Animation Clip to a Game Object, Unity automatically produces an Animator Controller. Based on the figure 5.7, the animator will set the condition for the movement of the trash monster.

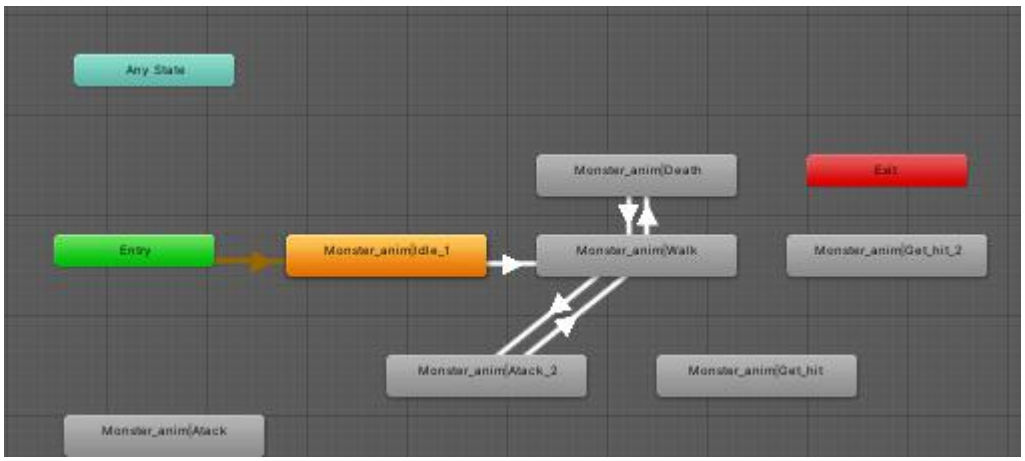


Figure 5.7 Animator Controller

Figure 5.7 shows that the monster starts with being idle, then, if the monster is appeared, the walking animation will be triggered. After that, there are 2 conditions for the trash monster while the walking animations, whether attack animation or death animation. For the attack animation, the animation will only trigger if the player approaches the trash monster. For the death animation, the animation will only trigger after the trash monster health point becomes 0.

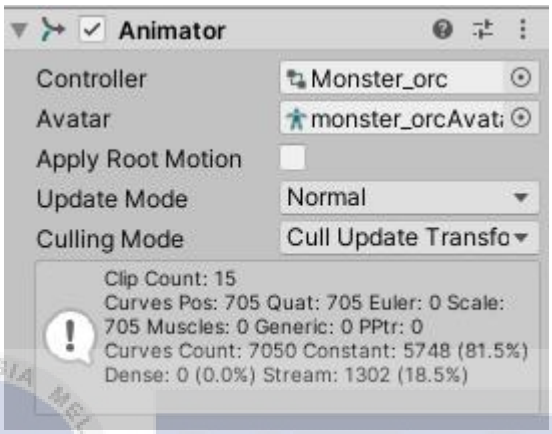


Figure 5.8 Animator Component

Based on figure 5.5, after we are done arranging the animation for the trash monster, we need to insert the animator controller that we have set before into the animator component to get it fully animated.

5.3 Integration of Game Components

Player Character System

Implement a character blueprint that contains all the character's essential functions, including GUI and UI controllers, attack, movement, interaction, and other mechanics.

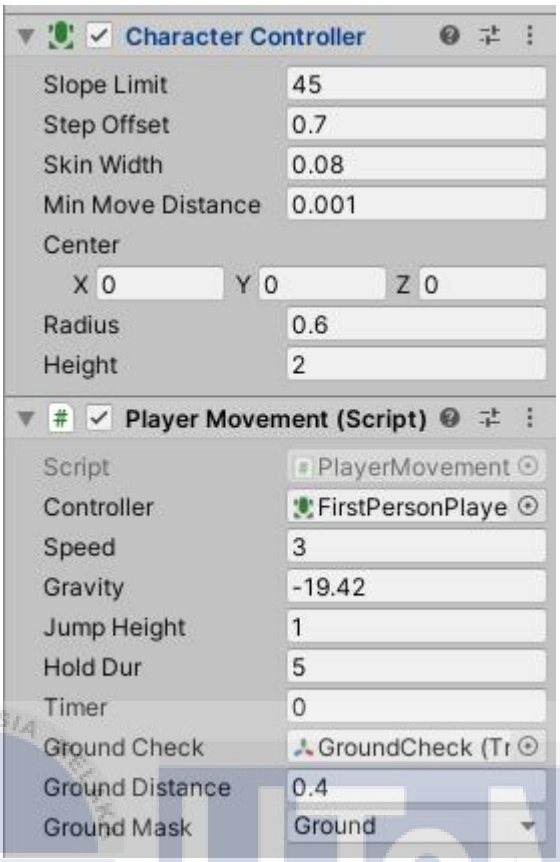


Figure 5.9 Main Player System Component

The Main Player does not have a 3D model because it is a based on first-person perspective.

Cursor Lock System

```
using System.Collections;
using System.Collections.Generic;
using UnityEngine;

public class Mouselook : MonoBehaviour
{

    public float mouseSensitivity = 110f;
    public Transform playerBody;
    float xRotation = 0f;

    // Start is called before the first frame update
    void Start()
    {
        Cursor.lockState = CursorLockMode.Locked;
        Cursor.visible = false;
    }

    // Update is called once per frame
    void Update()
    {
        float mouseX = Input.GetAxis("Mouse X") * mouseSensitivity * Time.deltaTime;
        float mouseY = Input.GetAxis("Mouse Y") * mouseSensitivity * Time.deltaTime;

        xRotation -= mouseY;
        xRotation = Mathf.Clamp(xRotation, -90f, 90f);

        transform.localRotation = Quaternion.Euler(xRotation, 0f, 0f);

        playerBody.Rotate(Vector3.up * mouseX);

        if (Input.GetKeyDown(KeyCode.Escape))
        {
            Cursor.lockState = CursorLockMode.None;
            Cursor.visible = true;
        }
    }
```

Figure 5.10 Cursor Lock Script

Figure 5.10 shows the camera lock script which only triggers when the player pauses the game. This script provided the cursor lock system and the mouse sensitivity system for the developer to try first.

Gun System

For the gun interaction, we have been set the damage, range, force, fire rate, bullet spawn, bullet speed and adding some particle system.

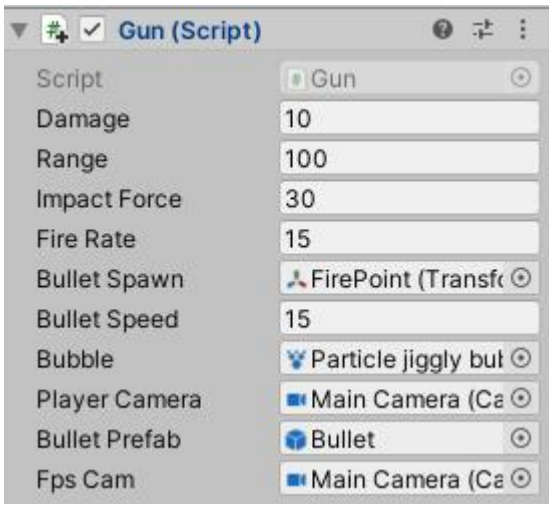


Figure 5.11 Gun System Component

```
using System.Collections;
using System.Collections.Generic;
using UnityEngine;

public class PickupWeapon : MonoBehaviour
{
    public GameObject PressE, pistolair;

    private void Start()
    {
        PressE.gameObject.SetActive(false);
    }

    private void OnTriggerStay(Collider col)
    {
        if (col.transform.CompareTag("Player"))
        {
            PressE.gameObject.SetActive(true);

            if (Input.GetKeyDown(KeyCode.E))
            {
                Destroy(gameObject);
                pistolair.gameObject.SetActive(true);
                PressE.gameObject.SetActive(false);
            }
        }
    }

    private void OnTriggerExit(Collider col)
    {
        if (col.transform.CompareTag("Player"))
        {
            PressE.gameObject.SetActive(false);
        }
    }
}
```


Figure 5.12 Interactable with Gun Script

Figure 5.12 shows that the interactable with the bubble gun script. When the player approaches the bubble gun, to interact with the gun, the player needs to press E to pick up the bubble gun.

Quiz System

Figure 5.13 Quiz Interface

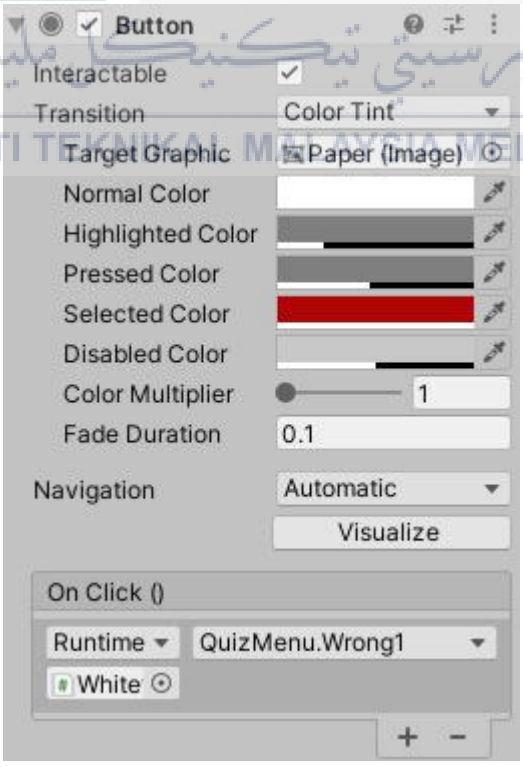


Figure 5.14 Quiz Button Component

Figure 5.14 shows a different mechanic in this game which is the quiz trivia mechanic. The player needs to answer the question correctly to go to the next level. The implementation made in this mechanic is by using a button component where the player must click the right button.

5.4 Game Configuration Management

Game configuration management will specify the product implementation process as well as the procedure for controlling the game's output. This game is using Unity Engine and can be played by downloading the whole file on Google Drive. The game only needed input devices like mouse and keyboards to play.

5.4.1 Configuration Setup

This project was published using Unity Engine for Windows 64-bit. It necessarily requires a few configurations within the project settings, such as setting up the map, which is supposed to be the player's first interaction with the application, building lighting based on quality, and setting up other crucial information for the game, such as the project title, logo, and so on.

5.4.2 Version Control Procedure

Alpha Version

Programmers will test the game to see what works and what doesn't, as well as major issues that influence the game in major ways. It must be playable and in the form of an early prototype. Most of the time will be spent on mechanics and localizing content. This will be implemented during Project 1 in the final year.

Beta Version

The game will be tested by a target focus group, and feedback and questionnaires will be collected from them to improve the game further. Following the evaluator's and supervisor's feedback during the Final Year Project 1 presentation. The game will enter a semi-Beta phase, during which it will be improved in terms of

critical features such as the game's goal. Then, during Final Year Project 2, it will reach the final phase, where input from the target focus group will be obtained.

Golden Version

The final version of the game, which is ready to be released on the market. The golden version will be published after evaluation in Final Year Project 2.

This game is currently only playable in Closed Beta Version. This game is still in the testing stage to ensure that there are no bugs or errors in the programmed.

5.5 Implementation Status

The implementation state indicates how far each component's development has progressed. The component implementation status of the project is shown in the table below.

Component	Description	Duration to completed	Complete duration	Status
3D Character and Model Creation	Modelling, Texturing, Rigging and Animating 3D models using Blender	2 Weeks	2 Weeks	On Time
Game World Creation and Level Design	Design the level by adding some blocks and 3D Models	5 Weeks	7 Weeks	Delay
Interface Element and Implementation	Using 2D and 3D elements to design game user	2 Weeks	10 Days	In Time

	interfaces and user interfaces in the game engine			
Game Mechanic Implementation	From the gameplay element to the UI functionality, implement all functions and mechanics within the game.	7 Weeks	8 Weeks	Delay
Audio Implementation	Implement the sound in the game from specific source	2 Weeks	2 Weeks	On Time
Polishing All Aspects	For a finishing touch, polish any leftovers or minor details. Before exporting, there are some project options that need to be configured.	1 Week	1 Week	On Time

Table 5.2 Testing Phase

5.6 Conclusion

In conclusion, this chapter discusses the game's implementation phase, which includes the media and components. The game mechanisms must function properly throughout the implementation phase. It entails the creation of game art, including graphics, music, video, and animations.

CHAPTER 6: TESTING

6.1 Introduction

The gaming industry relies heavily on video game testing. It's an important aspect of the game development process since it lets developers to examine the game and find, document, and fix any software errors that could detract from the overall gaming experience.

In this chapter, we will state about the test plan, test implementation, test results and analysis. The goal of this phase is to assess the product's efficacy based on the findings of the problem description and project requirements.

6.2 Test Plan

Test plan had a purpose which to evaluate the game developed by implementing Untrashed! folklore. This game will follow the Game Development Life Cycle methodology to focus on user acceptance of the project. The target groups are distributed for the younger generations and above by using application like VRChat, Instagram and WhatsApp platform to promote about this game. The testing method that are used are survey method using Google form that are needed to prepare the questionnaire. The elements being tested are the Demographic of the user, Technical Evaluation, and Knowledge Improvement and View of the user after using the product.

The Game User Experience Satisfaction Scale (GUESS) was created by Phan, M. H., Keebler, J. R., and Chaparro, B. S. and was used to evaluate the game (2016). Demographic, technical, knowledge, and viewpoint are the elements that have been

picked. The questionnaire's scoring system is based on the Linkert Scale, which requires testers to answer questions based on the score and its description.

Game Feature

Multiple components such as respondent demographics, game technical evaluation, knowledge improvement and view, suggestion, and feedback from playing the game are the subject of this testing. First, the demographic is used to collect specific data from respondents and will be utilised as manipulative data that may influence the respondent's behaviour when answering various sections of the questionnaire. Second, the technical evaluation of the game is used to determine whether the user interface, user experience, and control system are user-friendly and responsive. This phase is also used to see how well the game design and gameplay attract the player's interest and turn them into fans of the game, as well as to evaluate the player's acceptance of the game's setting and goal. Following that, the knowledge improvement phase is used to assess the game's content in relation to the player. Finally, after playing Untrashed! the view phase is utilised to observe and measure the intensity of the player's enjoyment and opinion of the game.

6.3 Test Implementation

Test implementation will explain in detail about how the testing and evaluation were conducted that included the procedure of testing methods. For this game, the data that were tested to documented are by using google form to create questionnaire about Untrashed! Players are also available to download the game for free with the link that I have provided and if they are unable to play Untrashed! they also can watch the gameplay video on Youtube with link provided. After playing Untrashed! they need to answer some questions from the google form and then I will collect the analysis given from the Q&A.

The test is implemented by four phase which are Involvement Registration, Playing Time, Unofficial question and answer session, and Answering Questionnaires. First, I will introduce myself and explain a little bit about the game

details such the gameplay, the requirements and genre, then, promote the game to Instagram, WhatsApp and Discord application and gather who interested to be the game tester for my game. Next, for Playing Time, I will provide 48 hours playing time for the participants and give the download link to play. After the tester had finished test my game, they need to report to me about the completion and I will send them a set of questionnaires with a total of 23 questions to answer about my game.

6.4 Test Results and Analysis

The purpose of survey questionnaire is to gather the data of three parts from questionnaire which are user Demographic of the user, Technical Evaluation, Knowledge Improvement and View of the user from the respondents. Online questionnaires help me to collect many responses for a lower cost. It has the potential to save time. Respondents can usually finish an online survey faster than they can conduct a face-to-face survey.

Part A: Demographic

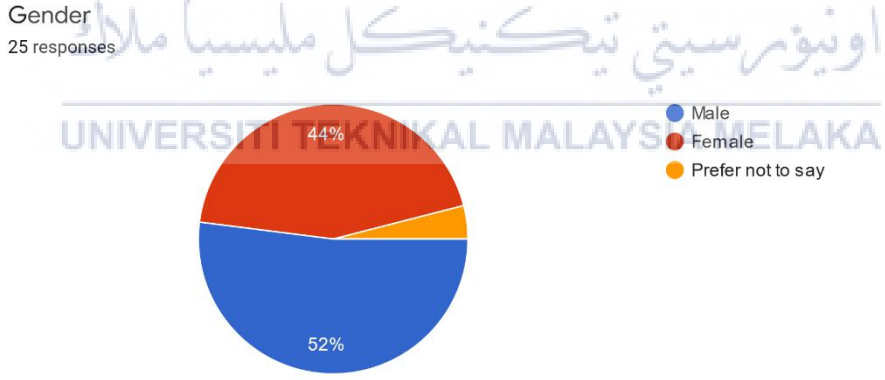


Figure 6.1 Result of Question 1 Part A

Figure 6.1 shows that out of 25 respondents', (52%) gender is Male, (44%) gender is Female and (4%) are prefer not to say.

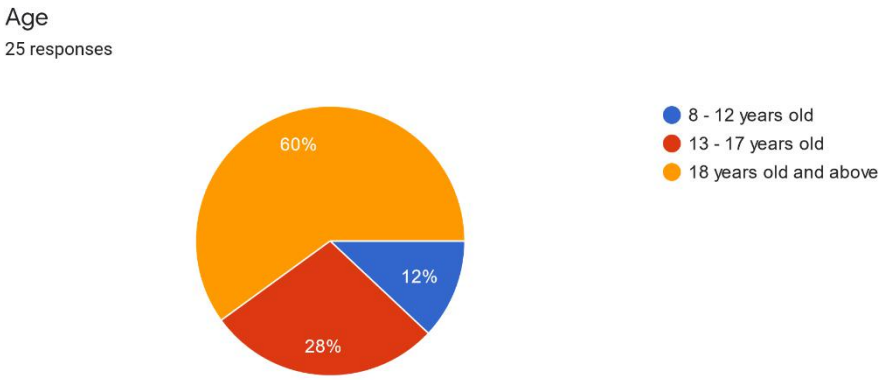


Figure 6.2 Result of Question 2 Part A

Figure 6.2 shows that out of 25 respondents', (60%) ages are among 18 years old and above, (28%) ages are among 13 until 17 years old and (12%) ages are among 8 to 12 years old.

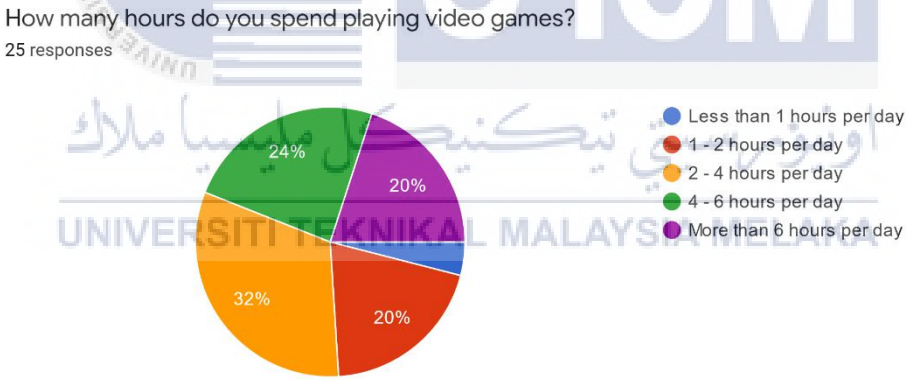


Figure 6.3 Result of Question 3 Part A

Based on the figure 6.3, the pie chart shows the most respondents' (32%) spend their times playing video games are about 2 to 4 hours per day, (24%) at 4 to 6 hours per day, (20%) of the respondent's spend their time playing video games are about 1 to 2 hours and more than 6 hours per day and (4%) of the respondents' only plays video games less than 1 hours per day.

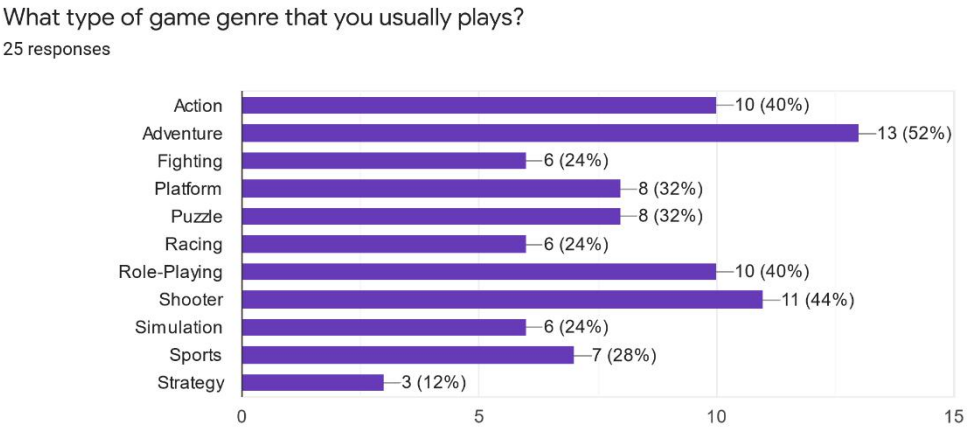


Figure 6.4 Result of Question 4 Part A

Figure 6.4 shows that out of 25 respondents' most the respondents' play Adventure games the most (52%) while the least are respondents that play Strategy games (12%).

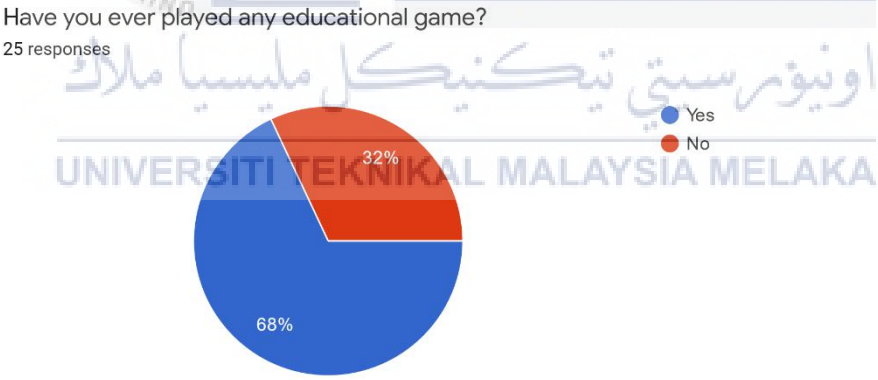


Figure 6.5 Result of Question 5 Part A

Figure 6.5 shows that out of 25 respondents, (68%) of the respondents have played any educational games and (32%) of the respondents never played any educational games.

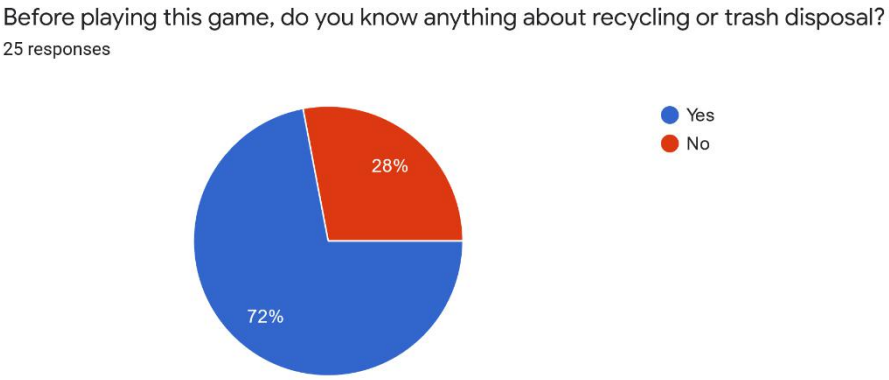


Figure 6.6 Result of Question 6 Part A

From the pie chart in figure 6.6 shows, there are many of the respondents (72%) know anything about recycling and trash disposal meanwhile (28%) of the respondents does not know about recycling and trash disposal.

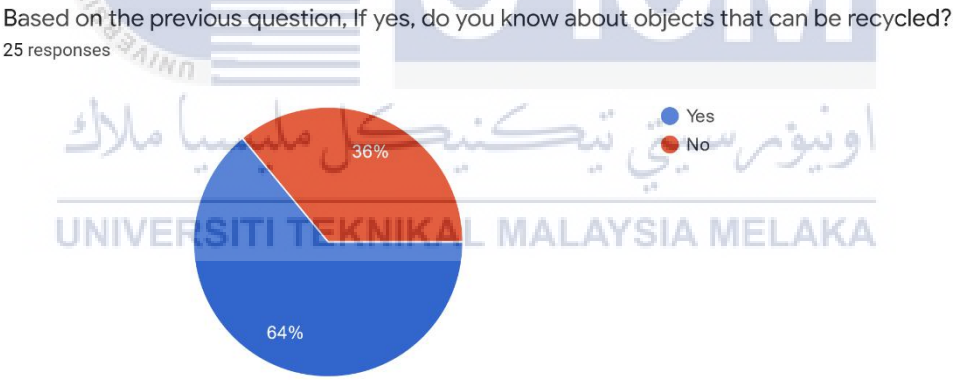


Figure 6.7 Result of Question 7 Part A

From the pie chart in figure 6.6 shows, there are many of the respondents (64%) know about objects that can be recycled meanwhile (36%) of the respondents does not know about objects that can be recycled.

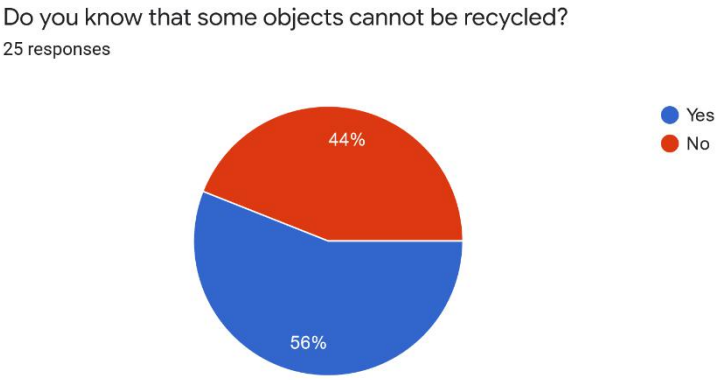


Figure 6.8 Result of Question 8 Part A

From the pie chart in figure 6.6 shows, there are many of the respondents (56%) know that some objects cannot be recycled meanwhile (36%) of the respondents does not know that some objects cannot be recycled.

Part B: Technical

In this section, there consist of 6 scaling questions and responses must answer all the questions given based on technical evaluation.

Scaling: 1. Strongly disagree / 2. Disagree / 3. Neither / 4. Agree / Strongly Agree

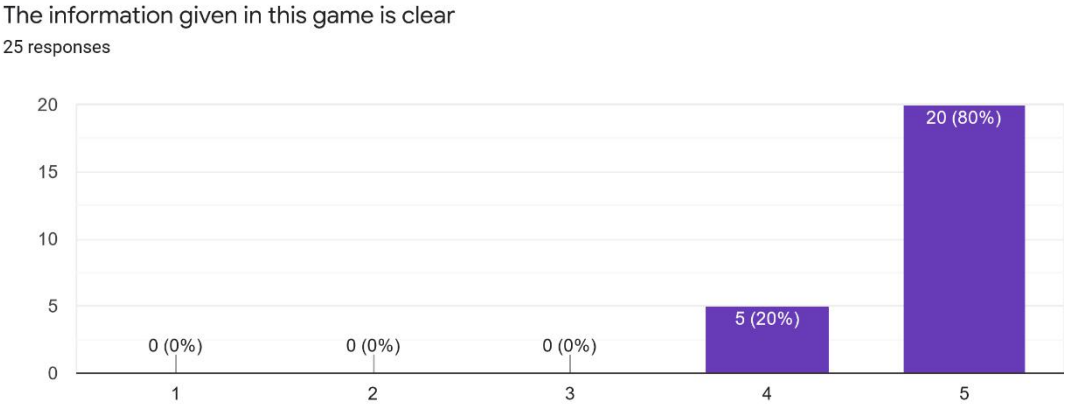


Figure 6.9 Result of Question 1 Part B

From the graph in figure 6.9, the graph shows the majority which 20 responses (80%) strongly agree that the information given in this game is clear and 5 responses (20%) only agree that the information given in this game is clear.

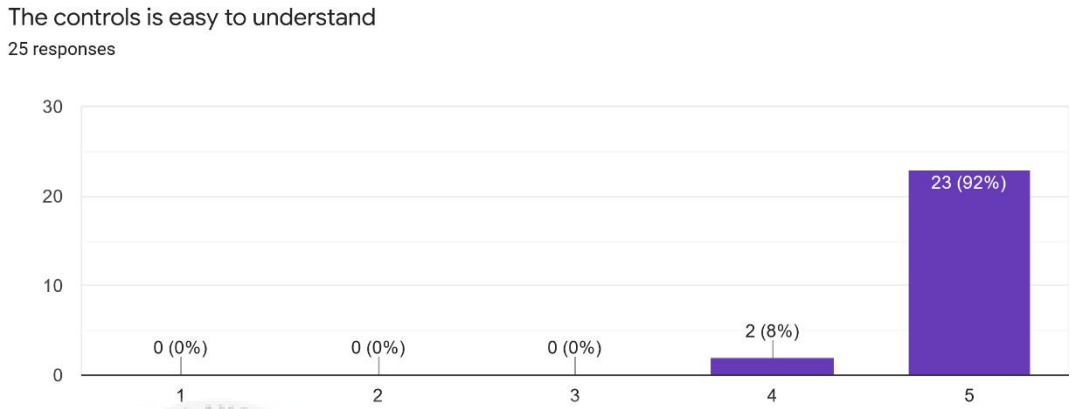


Figure 6.10 Result of Question 2 Part B

From the graph in figure 6.10, the graph shows the majority which 23 responses (92%) strongly agree that the controls are easy to understand, and 2 responses (8%) only agree that the controls are easy to understand.

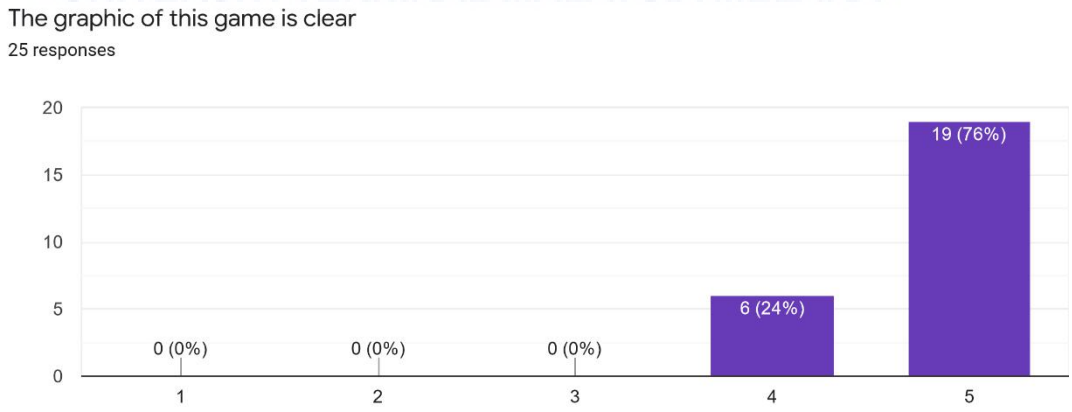


Figure 6.11 Result of Question 3 Part B

From the graph in figure 6.11, the graph shows the majority which 19 responses (76%) strongly agree that the graphic of this game is clear, and 6 responses (24%) only agree that the graphic of this game is clear.

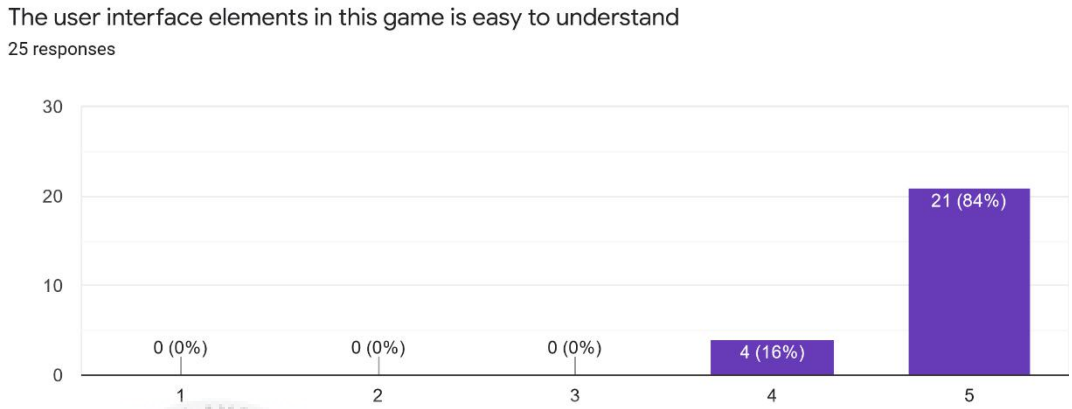


Figure 6.12 Result of Question 4 Part B

From the graph in figure 6.12, the graph shows the majority which 21 responses (84%) strongly agree that the user interface elements in this game is easy to understand, and 4 responses (16%) only agree that the user interface elements in this game is easy to understand.

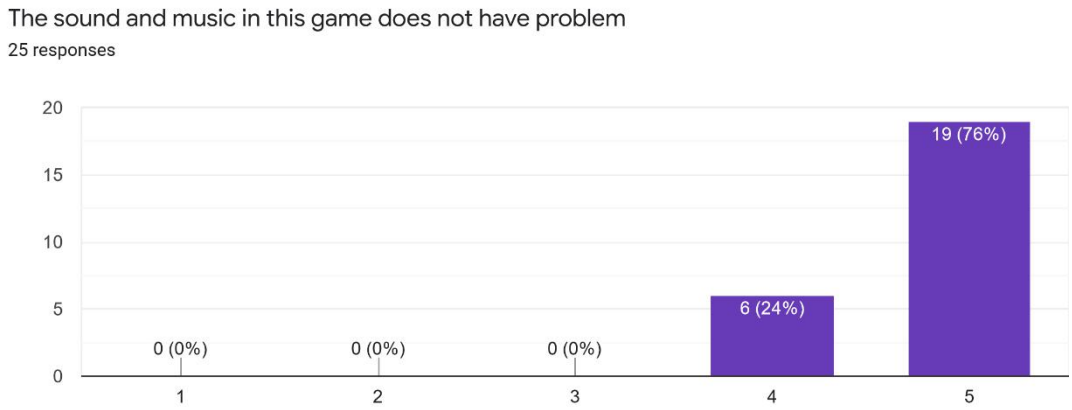


Figure 6.13 Result of Question 5 Part B

From the graph in figure 6.13, the graph shows the majority which 19 responses (76%) strongly agree that the sound and music in this game does not have problem for them, and 6 responses (24%) only agree that the sound and music I this game does not have problem with them.

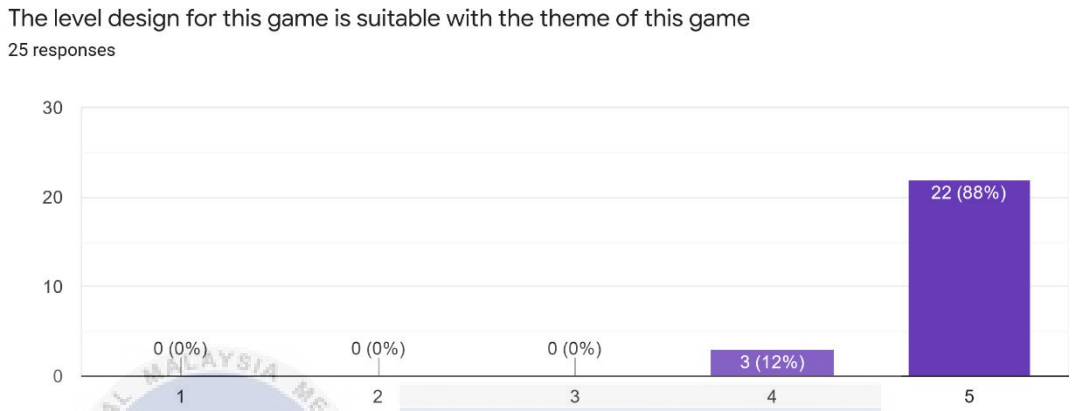


Figure 6.14 Result of Question 6 Part B

From the graph in figure 6.14, the graph shows the majority which 22 responses (88%) strongly agree that the level design for this game is suitable with this game, and 3 responses (12%) only agree that the level design for this game is suitable with this game.

Analysis from Part B: Technical

	Mean	**Standard Deviation**
The information given in this is clear	4.8	0.4
The controls are easy to understand	4.92	0.27
The graphic of this game is clear	4.76	0.43

The user interface elements in this game are easy to understand	4.84	0.37
The sound and music in this game does not have problem	4.76	0.43
The level design for this game is suitable with the theme of this game	4.88	0.32

Table 6.1 Technical Evaluation Mean and Standard Deviation

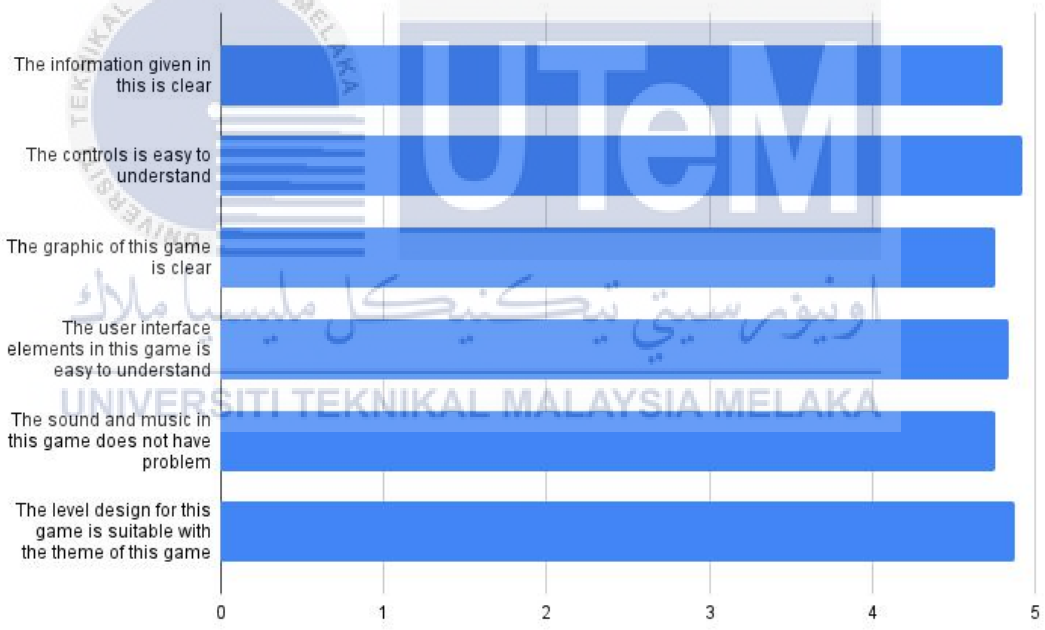


Figure 6.15 Technical Evaluation Graph

Based on mean graph on figure 6.15, there are 6 evaluations given including on the information of the game, the controls, the graphic, the user interface, the sound and music and the level design. The least mean for this evaluation is the graphic of this game and the sound of this game, however we can conclude that the graphic and visual presentation in the game still have some weaknesses to receive

maximum satisfaction from the user. The mean for all six evaluations is above 4 indicating that most of the respondents are agree with the assessment

From the result, we can conclude that most of the player feel the enjoyment from the game due to a lot of technical evaluation implemented to make an educational game enjoyable.

Part C: Knowledge

In this section, there consists of 2 scaling questions and 2 choice questions.

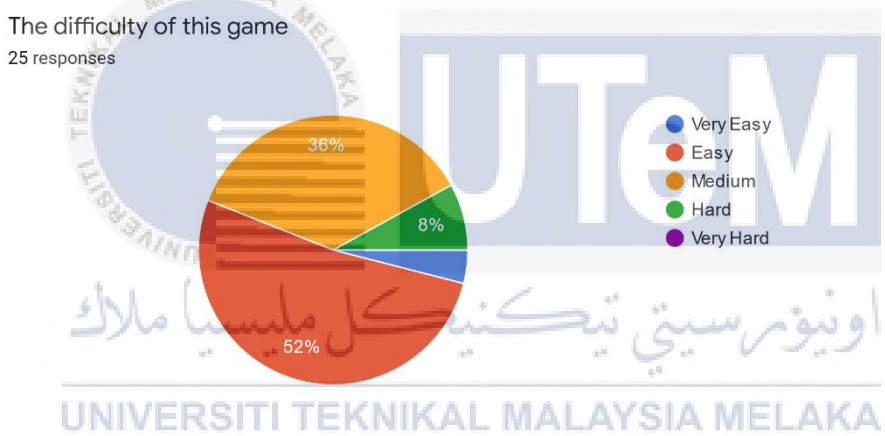


Figure 6.16 Result of Question 1 Part C

The pie chart in figure 6.16 shows that 52% of the respondents are choosing easy as the difficulty of this game., 36% of the respondents are choosing medium as the difficulty of this game, 8% of the respondents are choosing hard as the difficulty of this game and 4% of the respondents are choosing very easy as the difficulty of this game.

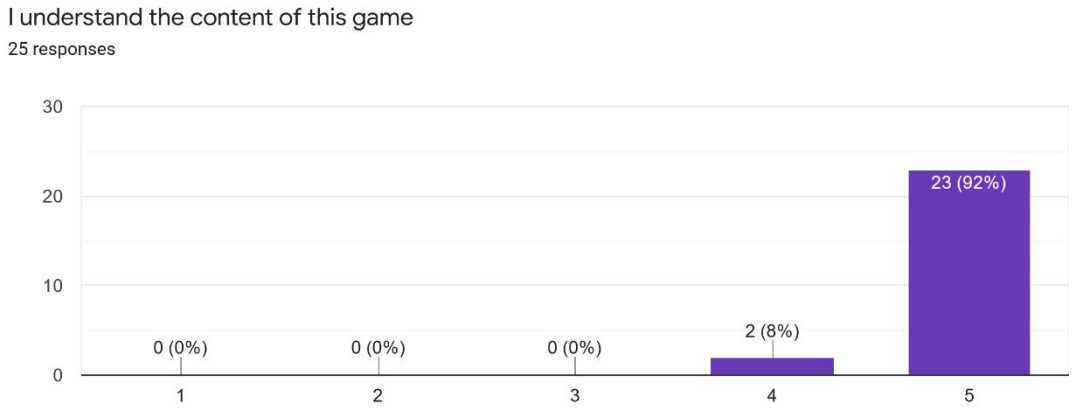


Figure 6.17 Result of Question 2 Part C

From the graph in figure 6.17, the graph shows the majority which 23 responses (92%) strongly agree that they understand the content of this game, and 2 responses (8%) only agree that they understand the content of this game.

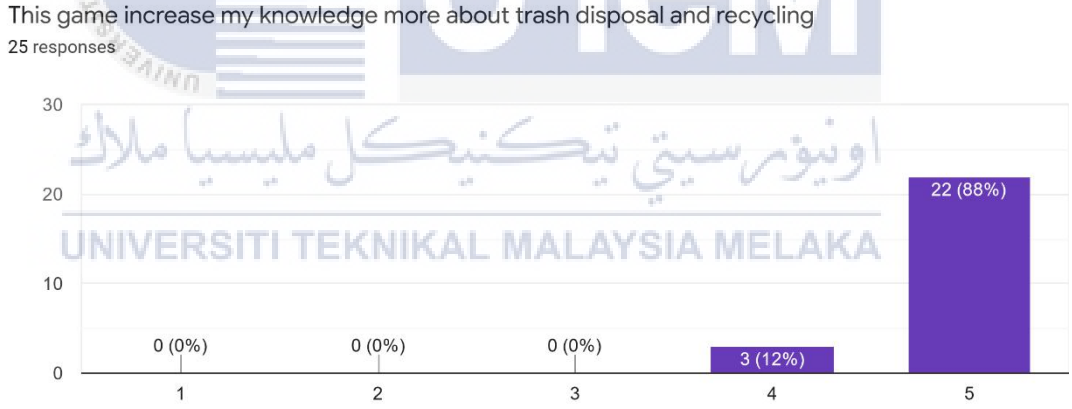


Figure 6.18 Result of Question 3 Part C

From the graph in figure 6.18, the graph shows the majority which 22 responses (88%) strongly agree that this game improve their knowledge more about trash disposal and recycling, and 3 responses (12%) only agree that this game improve their knowledge about trash disposal and recycling.

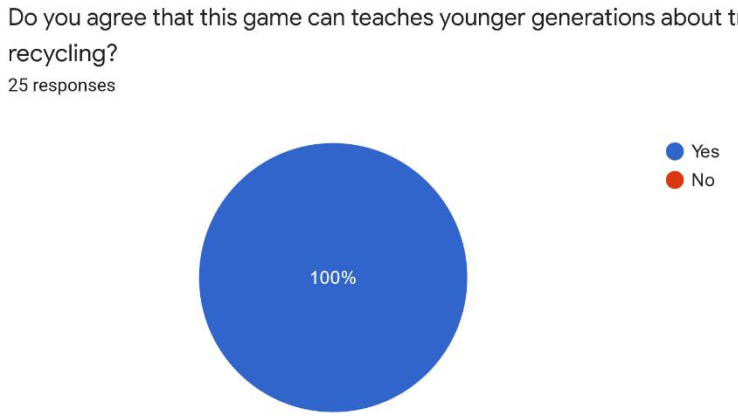


Figure 6.19 Result of Question 4 Part C

The pie chart in figure 6.19 shows that all (100%) of the respondents agree that this game can teaches the younger generations about trash disposal awareness and recycling.

Analysis from Part C: Knowledge

	Mean	Standard Deviation
I understand the content of this game	4.95	0.22
This game increases my knowledge more about trash disposal and recycling	4.95	0.22

Table 6.2 Knowledge Mean and Standard Deviation

Based on table 6.2, we can see that the mean score above 4 with a less standard deviation which stated that all the respondents are agree that they gained new knowledge and awareness about trash disposal and recycling while playing Untrashed!

Part D: View

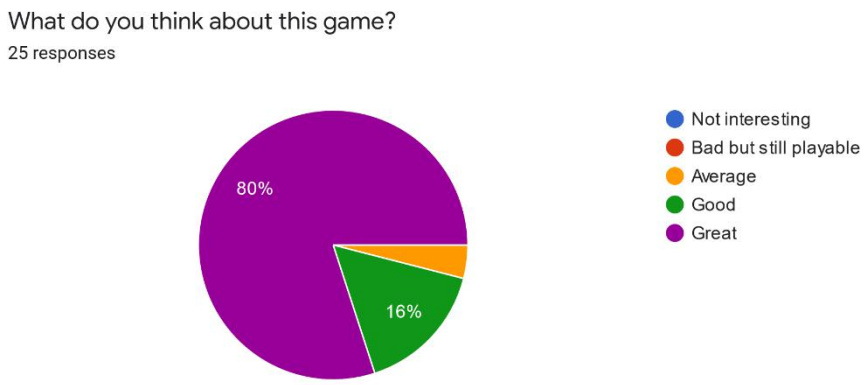


Figure 6.20 Result of Question 1 Part D

The pie chart in figure 6.20 shows that 80% of the respondents are choosing Great for this game. 16% of the respondents are choosing Good for this game and 4% of the respondents are choosing Average for this game.

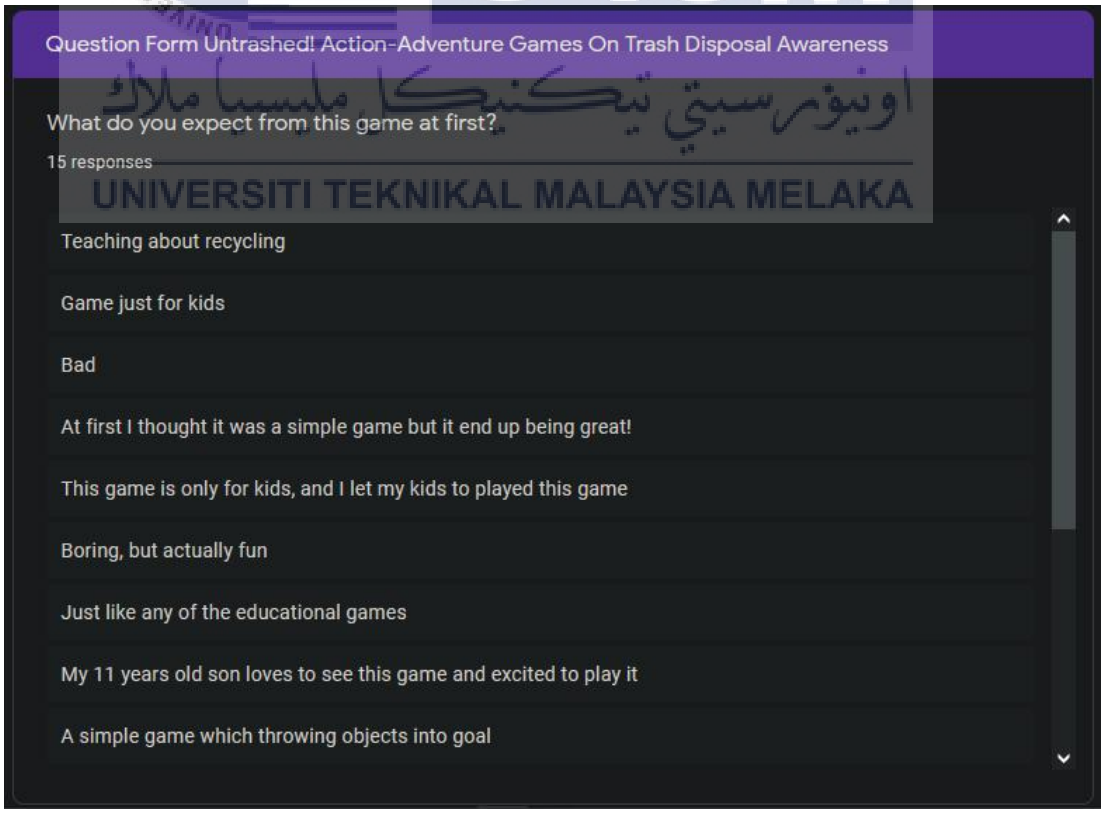


Figure 6.21 Result of Question 2 Part D (i)

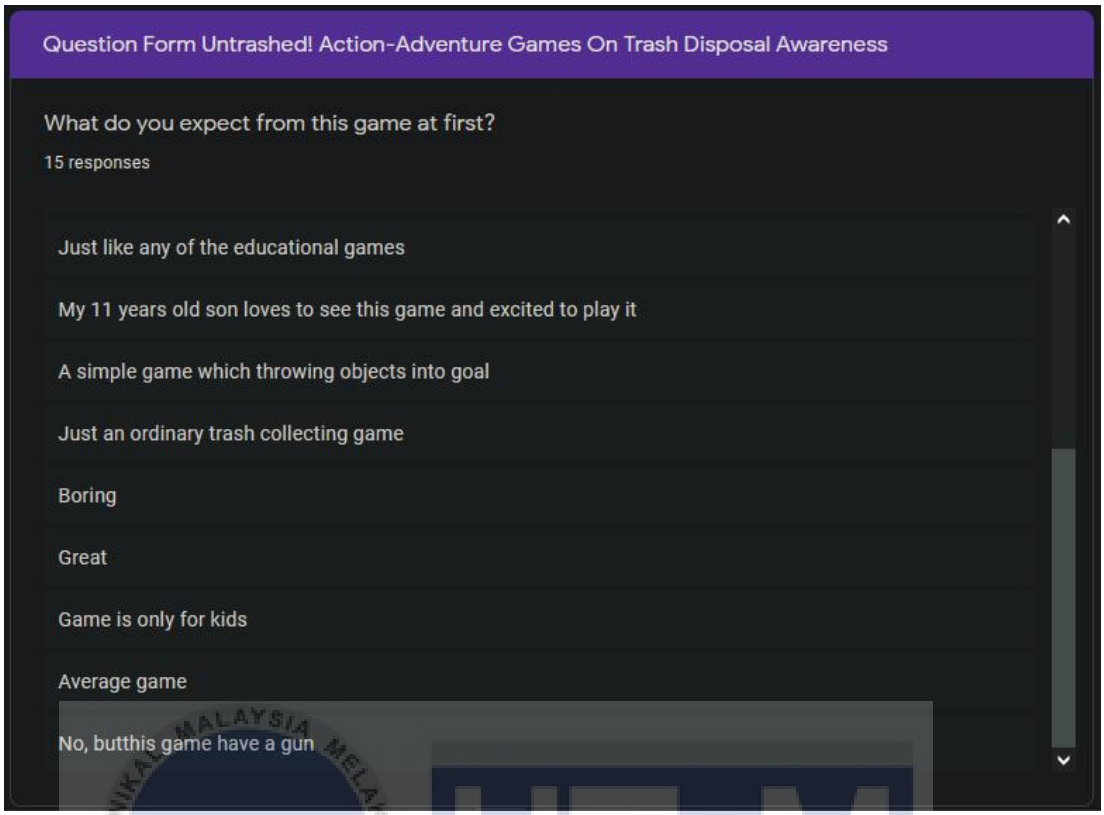


Figure 6.22 Result of Question 2 Part D (ii)

Out of 25 respondents, 15 of them were giving expectation about this game at first. 3 of them (20%) answered bad and boring at the first sight for this game, 6 of them (40%) thought that this game was a simple and regular educational game, 3 of them (20%) thought that this is the games that are made for kids and 3 (20%) of them love it.

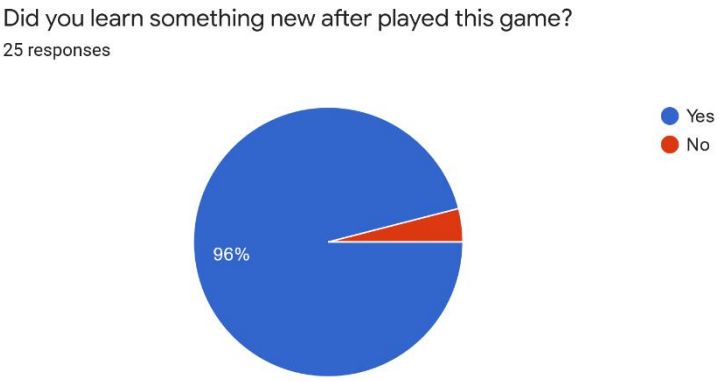


Figure 6.23 Result of Question 3 Part D

The pie chart in figure 6.22 shows that 24 out of 25 respondents (96%) learn something new after played this game and 1 respondent (4%) did not learn something new after played this game.

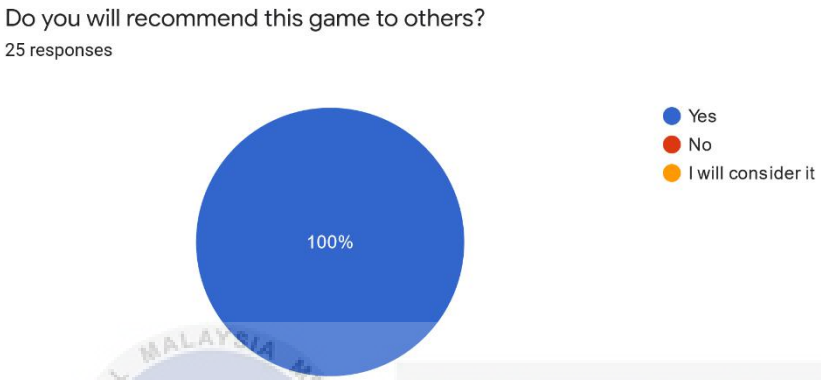


Figure 6.24 Result of Question 4 Part D

The pie chart in figure 6.19 shows that all (100%) of the respondents will recommend this game to others.

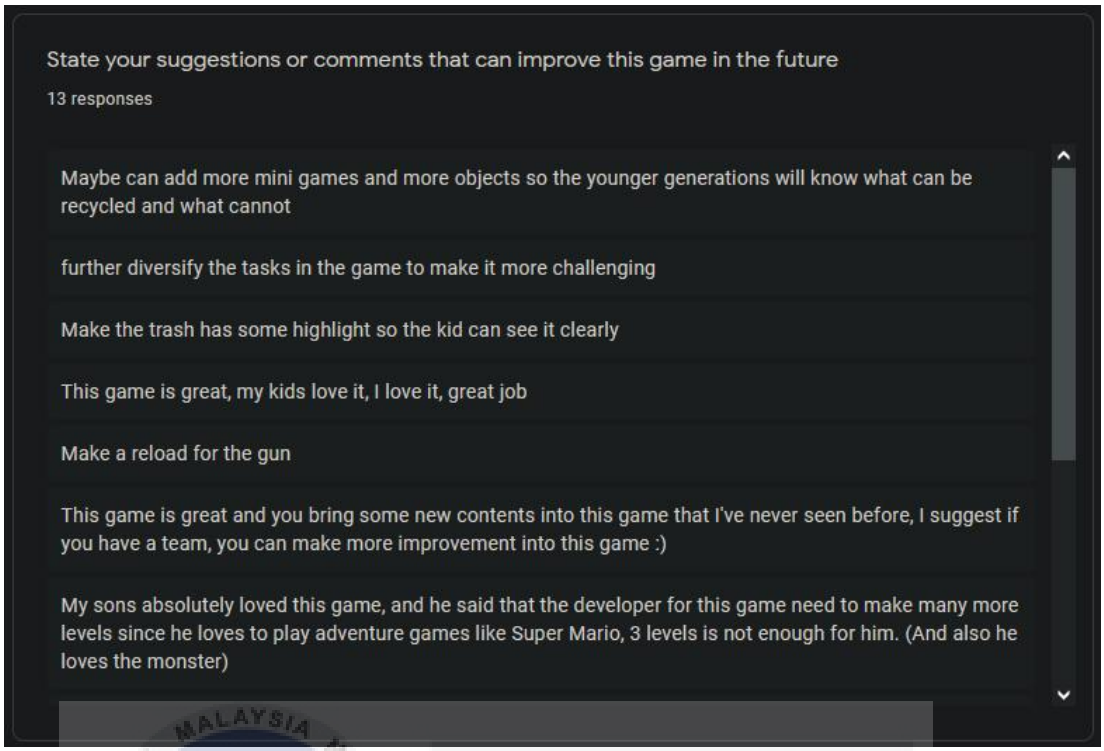


Figure 6.25 Result of Question 5 Part D (i)

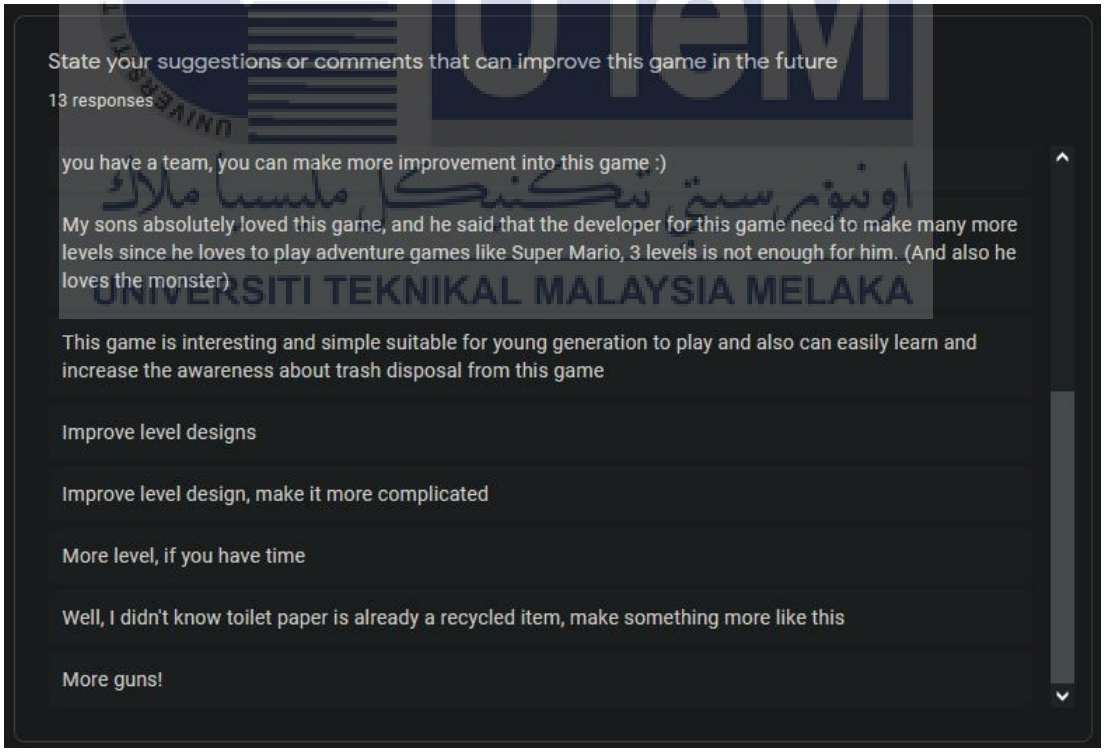


Figure 6.26 Result of Question 5 Part D (ii)

Out of 25 respondents, only 13 of them were giving suggestion and comments for further improvement. 5 of them (33%) were giving suggestion about improving the level design because it was too simple. 5 of them (33%) also were giving suggestion

to add more mechanic into this game. 1 respondent (6%) were giving suggestion about graphic improvements such as highlight the trash so that the player can see which one is the trash.

Analysis from Part D: View

Figure 6.21 and figure 6.22 shows the theme encapsulates the first impression and expectations of the participants about this game at first. A combination of many impressions such as very bad, bad, average, good and great based on figure 6.16 the result of question 1 part C.

For the first participant impression, the answer to the questions is that this game is teaching about recycling and the player that focus on the genre aspects. Most of the participants (40%) answered based on the same answer which is this game is just like any educational game answered by the seventh participant, a simple game which throwing objects into goal, answered by the ninth participant, just an ordinary trash collecting game answered by the tenth participant, average game answered by the fourteenth participants and the fifteenth participants only like this game because of the shooting genre. Based on the figure 6.20, we can conclude that the participants on these categories will pick this game as bad or average at the first sight.

The second categories of the participants are the user who looks for the enjoyment of this game. Figure 6.21 and figure 6.22 shows that out of 15 respondents that answer this question, 3 of them dislike this game. The review given from the third participants was bad. The sixth participants answered boring but fun and the eleventh participants give their honest answered as boring. We can conclude that all these 3 participants will pick not interested and bad for the view of this game.

The third categories of the participants are the user who are focusing on the graphics and the user who measures the game by ages. Figure 6.21 and figure 6.22 shows that 3 of the participants thought that this game is just for kids by the visual of

the graphics. The second participant answered that this game is just for kids, the fifth participants answered that this game is for kids, and he lets his kids to play this game and the thirteenth participants also answered that this game is just for kids. The result shows that these participants can be categorize as the user that view this game as an average or a good game.

Lastly, the fourth categories of the participants are the user that enjoyed the game. Based on the figure 6.21 and figure 6.22, the result shows that 3 of 15 participants that answered the question does not have a problem by looking at this game for the first sight. The fourth participants answered that he thought that this game is for kids but end up looking great, the eighth participants answered that his kids love to see this game and excited to play this game, meanwhile the twelve participants answered great as the first sight for this game. This can be concluded that these participants can be categorize as the user that view this game as a good or great game.

6.5 Conclusion

In conclusion, this chapter briefly explain about testing and results from the respondents after observing the respondents play testing through the game itself or by watching the walkthrough and gameplay before answering the questionnaires. There is a total of 23 questions and 25 respondents who is participated. The results shown that most of the respondents strongly agree that the game is positive in every aspect. Based on the respondent's recommendation, the challenges can be improved to be more challenging for wide variety of the use of the game mechanic.

CHAPTER 7: CONCLUSION

7.1 Observation of Strength and Weaknesses

The strengths in my projects are the gameplay mechanics and great content. The gameplay mechanics in this game have a various option for the player to enjoy the game instead of the main objectives only, for examples, player can unlock mini games by finding hidden mini games in the actual level in this game, and the mini games gameplay are different than the gameplay in the actual game. For the content of this game, there is not many action-adventure games that are created about recycling, cleaning, and trash disposal awareness, this makes this game one of the very least action-adventure games that are existed about recycling and trash disposal awareness. Lastly, this game is effective on giving the user experience about recycling and awareness towards trash disposal. According to the results of the survey, the project's production was successful and simple to use, based on input from the testers.

For the weaknesses of this project that are based on self-observation and user feedback, this game has its ups and downs. The weakness in this game is the level design itself. The level design is too simple and many of the user feedback from the surveys suggestion to improve my level design and added more levels into my game to make this game feel realistic and aesthetic. Other than that, the user interface also needs to be improvised because it had no option for the player to adjust the sound, brightness or change the game control.

The challenge that I encountered from develop this game is due to covid-19 pandemic this year and it is difficult to get help from expert and other people. I am also weak at designing whether in 2D or 3D design so I cannot produce better interface and design in this game. However, during this pandemic era, I would use

the online platform such as Instagram, WhatsApp, and Discord to introduce and promote my games to the expert and other participants that wanted to be the game tester for my project.

7.2 Proposition for Improvement

With the addition of user feedback and suggestions from the questionnaire given, there are several propositions that are eligible to be considered as future improvements based on the testing evaluation.

The major improvement is improving the level design. The level designs need to be more realistic and complicated instead of the simple one because it is to make the player feels like more challenging to find the trash and feel that the objects placement should be in the right places.

The second improvement are the user interface (UI). The world environment UI should also have more variation so that the player feels "player-friendly" and the game is easy to operate in terms of lighting and music.

7.3 Contribution

The contribution to the project's development aids in the stimulation of players skills using a different approach or playstyles because of the different various of content in this game that can increase the player knowledge. The objectives for this development are to analyze the level of awareness gained from the people that plays the game. This games also contributes to the younger generation. As a result of seizing those chances, this game is designed to be both entertaining and educational.

7.4 Conclusion

In conclusion, Untrashed! is a project that has been developed for the Final Year Project about the trash disposal awareness. It is crucial to work on improving games on a regular basis to create amazing games in terms of quality and interactions. The main objectives of Untrashed! also have been achieved where the elements of action-adventure games for trash disposal awareness have been observed and level of awareness about trash disposal from people who played this game has been analyzed and the result given was positive feedback.

REFERENCES

Paper Towel & Toilet Paper Rolls - Napa Recycling. (2021, May 10). Napa Recycling and Waste Services. https://naparecycling.com/guide/paper-towel-toilet-paper-rolls/

Harris, N. (2021, April 19). 10 Earth Day Facts for Kids. Parents. https://www.parents.com/fun/parties/special-occasions/fun-facts-about-earth-day/

Matthews, S. (2021, February 16). How to Dispose of Old Batteries the Right Way. Battery Solutions. https://batterysolutions.com/news/dispose-old-batteries-right-way/

Reasons Why We Should Care About the Environment | ERA ENVIRONNEMENT. (n.d.). Reasons Why We Should Care About the Environment. Retrieved June 23, 2021, from https://www.eraenvironnement.com/reasons-why-we-should-care-about-the-8927-environment/

Intelligent Artifice - Why game design is important. (n.d.). Why Game Design Is Important. Retrieved June 23, 2021, from http://www.intelligent-artifice.com/2007/10/why-game-design-is-important.html

Game testing and evaluation on real devices: Exploring in the case of the Open Device Lab community. (n.d.). Game Development Life Cycle. Retrieved June 23, 2021, from https://journals.uic.edu/ojs/index.php/fm/article/download/9525/8059?inline=1

What is Educational Games | IGI Global. (n.d.). Educational Games. Retrieved June 23, 2021, from https://www.igi-global.com/dictionary/designing-engaging-educational-games-and-assessing-engagement-in-game-based-learning/9123

Learning From The Best: Action-Adventure Games. (2015, December 17). Student Resources. https://www.nyfa.edu/student-resources/learning-from-the-best-action-adventure-games/

Game Development Life Cycle. (n.d.). GDLC. Retrieved June 23, 2021, from https://www.linkedin.com/pulse/game-development-life-cycle-sumit-jain

McKeever, C. (2016, November 8). The art of game design and its importance. Corona Labs. https://coronalabs.com/blog/2016/11/08/the-art-of-game-design-and-its-importance/

Kotila, S. (2020, June 30). GDLC [Game Development Life Cycle]. GDLC. http://www.unity3dtechguru.com/2018/01/gdlc-game-development-life-cycle.html

The game of recycling or how to make children aware. (n.d.). Iberdrola. Retrieved June 23, 2021, from https://www.iberdrola.com/environment/recycling-for-kids

Stanton, R. (2020, October 12). Phasmophobia is the best ghost game ever made. Pcgamer. https://www.pcgamer.com/phasmophobia-is-the-best-ghost-game-ever-made/

Island Saver. (n.d.). MoneySense. Retrieved June 23, 2021, from https://natwest.mymoneysense.com/island-saver/

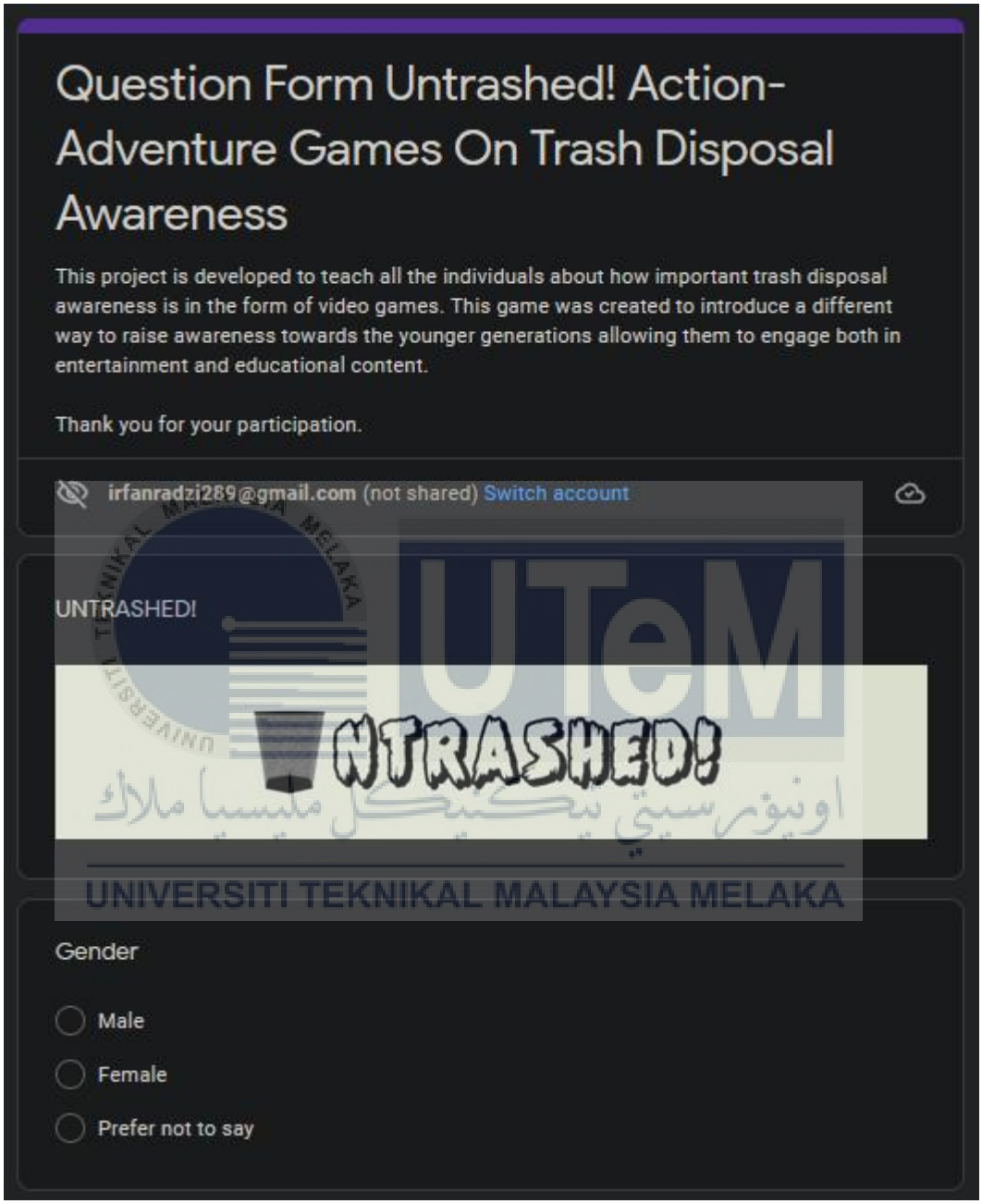
What does action-adventure game mean? (n.d.). Action-Adventure Game. Retrieved June 23, 2021, from https://www.definitions.net/definition/action-adventure+game

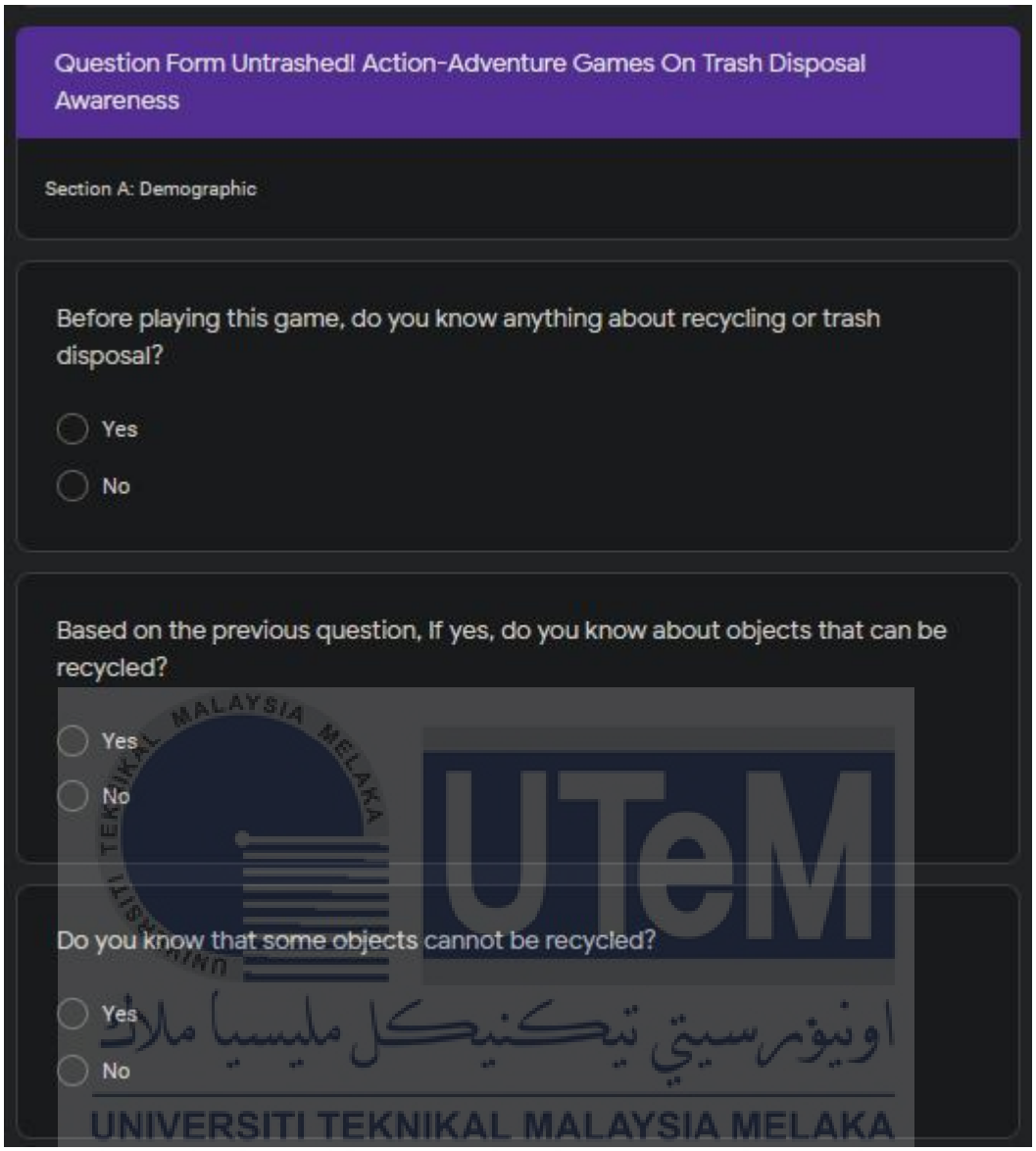
Guide for Island Saver - Walkthrough overview. (n.d.). Guide for Island Saver. Retrieved June 23, 2021, from https://www.trueachievements.com/game/Island-Saver/walkthrough/1

Akhulkova, Y. (2020, April 16). Game Popularity by Genre: Selecting a Target Market for a Game. Nimdzi. https://www.nimdzi.com/game-popularity-by-genre-selecting-a-target-market-for-a-game-nimdzi-finger-food/

APPENDIX A: DATA COLLECTION

Questionnaire.





Question Form Untrashed! Action-Adventure Games On Trash Disposal Awareness

Section A: Demographic

Before playing this game, do you know anything about recycling or trash disposal?

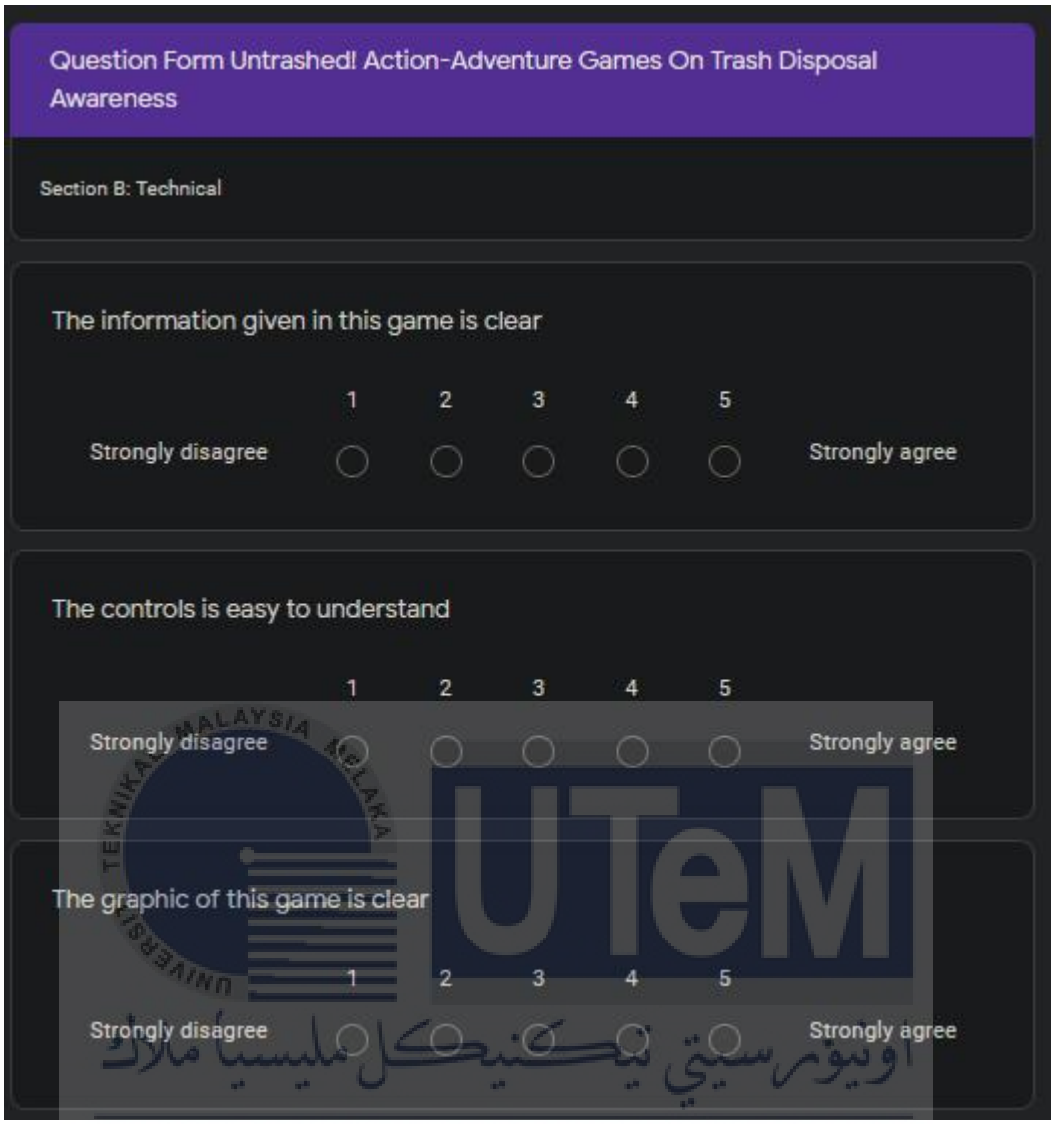
- Yes
- No

Based on the previous question, If yes, do you know about objects that can be recycled?

- Yes
- No

Do you know that some objects cannot be recycled?

- Yes
- No



Question Form Untrashed! Action-Adventure Games On Trash Disposal Awareness

Section B: Technical

The information given in this game is clear

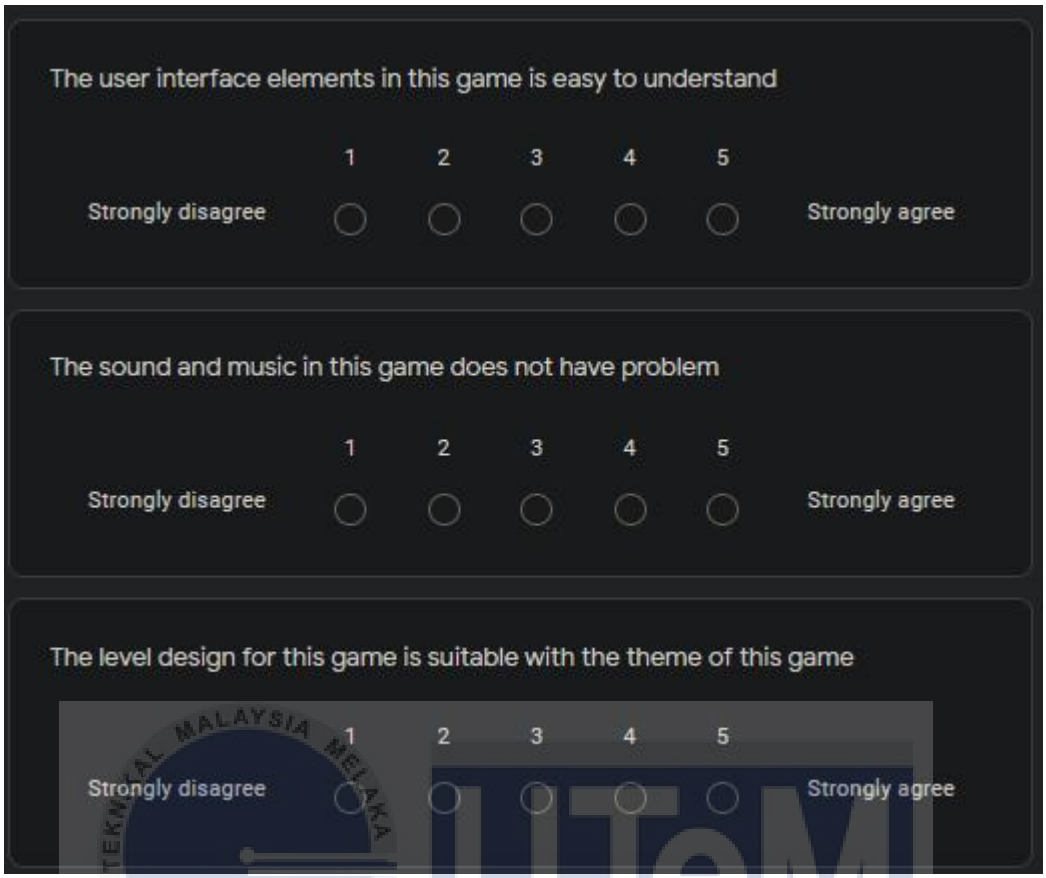
	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

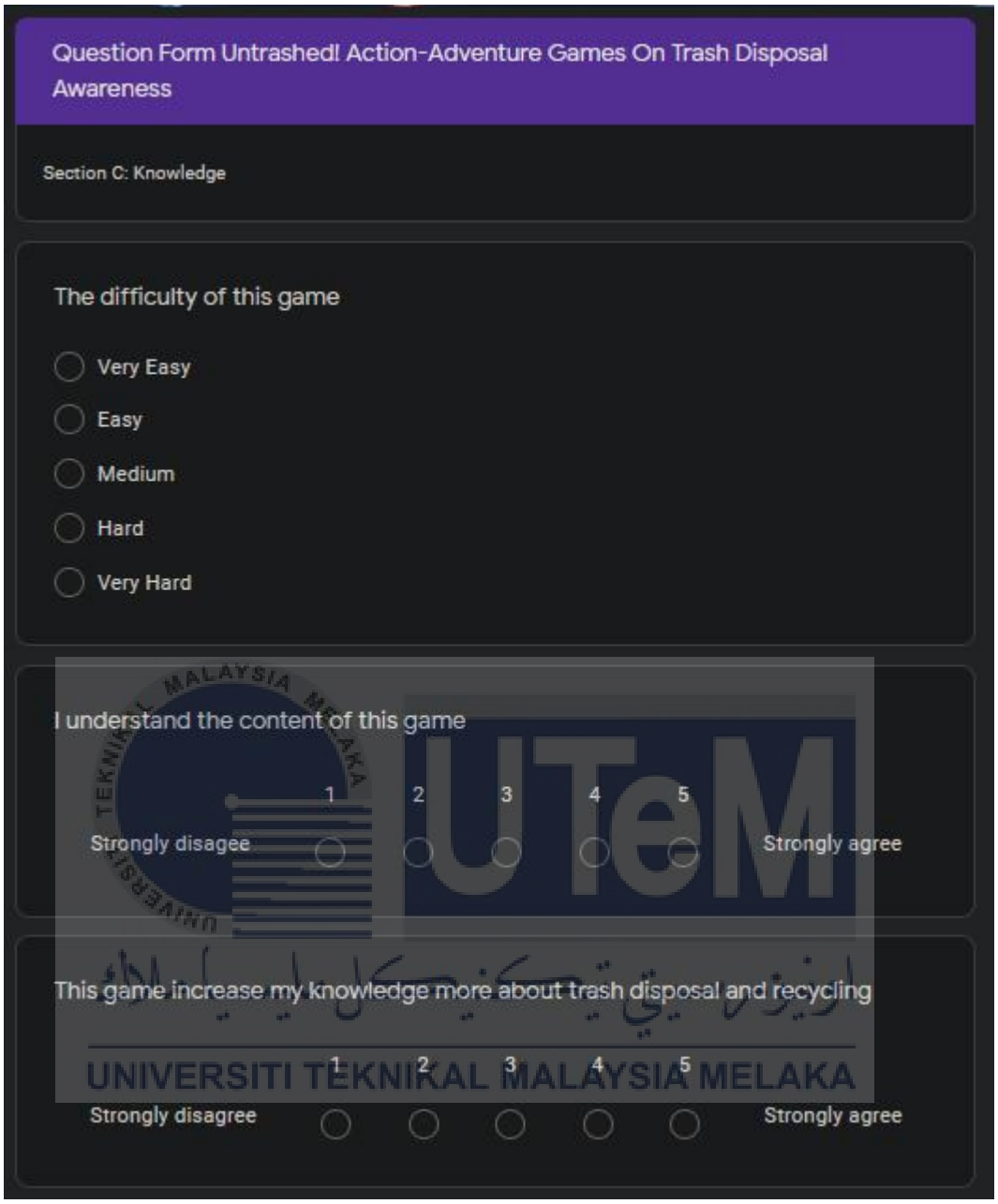
The controls is easy to understand

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

The graphic of this game is clear

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree





Question Form Untrashed! Action-Adventure Games On Trash Disposal Awareness

Section C: Knowledge

The difficulty of this game

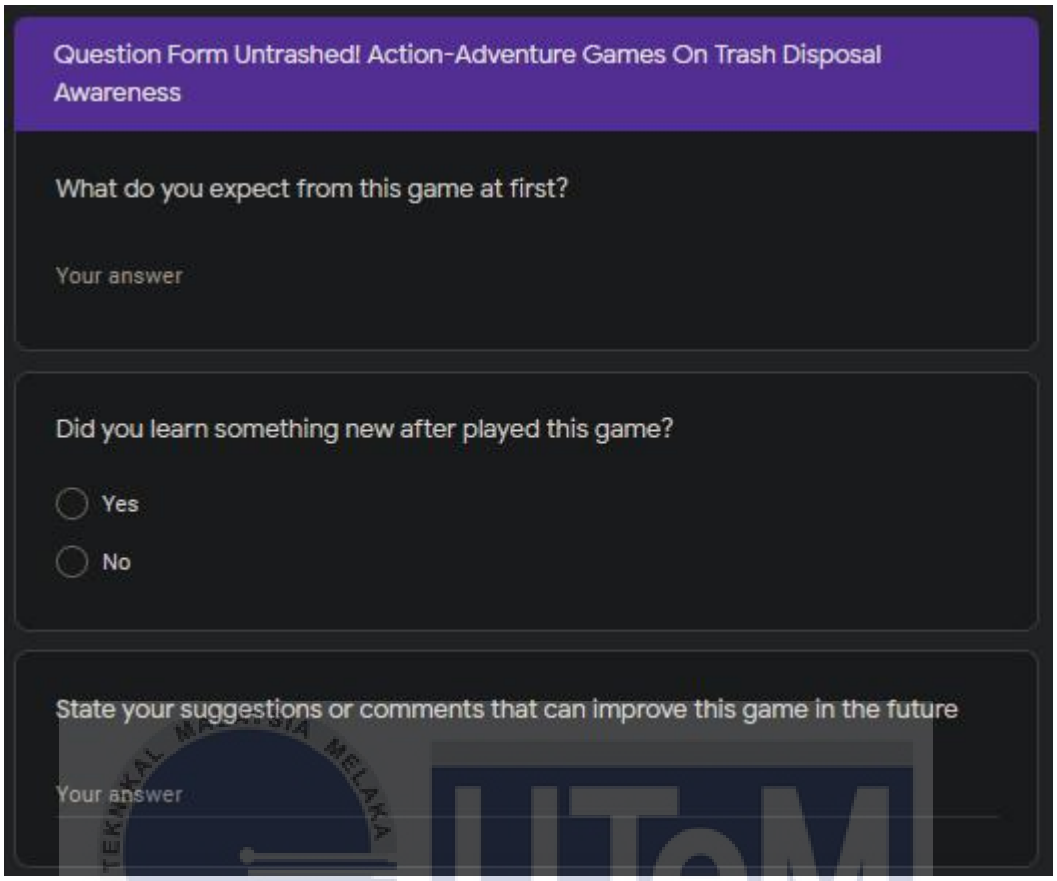
- Very Easy
- Easy
- Medium
- Hard
- Very Hard

I understand the content of this game

	1	2	3	4	5	
Strongly disagee	○	○	○	○	○	Strongly agree

This game increase my knowledge more about trash disposal and recycling

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree



Question Form Untrashed! Action-Adventure Games On Trash Disposal Awareness

What do you expect from this game at first?

Your answer

Did you learn something new after played this game?

- Yes
- No

State your suggestions or comments that can improve this game in the future

Your answer