THE INFLUENCES OF GAME LEVEL DESIGN

ON PLAYER'S IMMERSION

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Chapter 1: Project Introduction

1.1 Project Motivation

Motivation for this project came from our brainstorming session where we wanted to create something special and fun instead of the typical common games that can be found elsewhere. Hence, with this mindset, we move forward as one and propose the game, Twin's Elude.

1.2 Project Objectives

The main objective of this project is to create a playable game demo for the clients. The duration given to develop the game is a total of "21 weeks". The students are expected to complete the game within the given timeline, including the promotional materials for the game. Aside from that, in order to fulfill the degree requirements, we are also required to conduct a research related to the chosen game. The research title that I've chosen is **"The influences of game level design on player's immersion"**. The research purpose is to gain more knowledge regarding it and decides whether the final design implemented into the game manage to solve/answer the questions.

1.3 Team Members

Team Medic consists of three members in total, and each member will be handling their respective tasks in the project. Refer Figure 1.3.1 below for more information:

Name	Job Scope
Muhamad Elias Bin Mohd Alif Leong	Game Designer
Koh Wan Yee	Game Artist
Tan Wei Yon	Game Programmer

Figure 1.3.1: Team Members

1.4 Research Questions & Methods

As mentioned before, research that focuses on player immersion towards level design will be conducted throughout the development process, which will be further discussed at a later chapter. The research questions are listed in Figure 1.4.1 below:

Research Title	Research Questions	Research Methods
The Influences of Game Level Design on Player's Immersion	Does the game platform where you play the game affect your immersion?	**Feedback Survey**
	If the game level has repetitive level design mechanics, will it ruin your immersion?	
	When a game is too hard, will it break your immersion when playing the game level?	
	Does the game graphic affect how you feel about the level design?	

Figure 1.4.1: Research Questions & Methods

In order to further understand the impact of level design has on the player's immersion, a feedback survey will be conducted during the test play session to identify issue with the level.

The survey will be conducted using Google Form, which is the easiest and fastest way to get feedback from the audience without directly interacting with them during this pandemic period. After the test play session, a google link will be sent out for them to fill up the survey. We aim to get at least 10 participants to test out our game, and give feedback regarding it. If we have less than 10 participants, we might not have sufficient data to proof our claims.

1.5 Project Estimated Budget

The estimated budget for our project is listed in Figure 1.5.1 below:

Name/Item	Expenses (RM)
Electrical	600
Water	200
Internet Data Plan	400
Software & Hardware	FOC
Hard Copy Printing	500
Miscellaneous	800
TOTAL	**RM2,500**

Figure 1.5.1: Project Estimated Budget

The total estimated cost for the project is RM2,500. Due to the pandemic period, our team members will be staying at home to do the project. Hence, the project cost has been significantly decreased to a reasonable amount. The cost for the software's & hardware's are not included, because we have already bought it beforehand. Thus, it will not be calculated as a cost in this project.

Chapter 2: Background Study/Literature Review

2.1 Competitive Analysis

Before we proceed with the game proposal, we need to first analyses the market and identify who is our competitors, and what kind of mechanics/design will make our game different than theirs. Below are the games that we referred before proceeding with our game proposal for this project:

2.1.1 A Way Out

Figure 2.1.1.1: A Way Out

"A Way Out" is an online multiplayer co-op split-screen game where the player will be playing together in a split-screen manner regardless of whether they are playing the game locally, or online. The game was released in March 23, 2018, and its compulsory to be played with two players. Hence, the player will need to find a friend to play with them locally, or they can search for player online. However, they not only incorporate split-screen into the game, but they also make the game interesting by adding more layers to the cooperation mechanics itself, with a little spice of competitive spirit between the characters. Other than that, even the decision making in the game are done by both players, and an event will occurs depending on their decision.
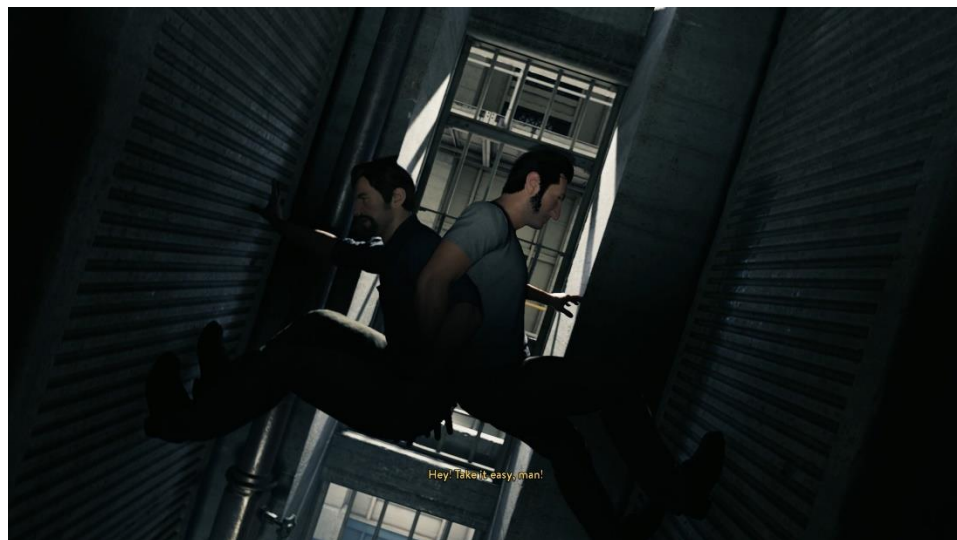
Figure 2.1.1.2: A Way Out Split-Screen

Figure 2.1.1.3: A Way Out Screen Merge

As shown in Figure 2.1.1.2 and 2.1.1.3, they utilize the split-screen beautifully by changing it in multiple ways such as horizontal, vertical. The screen change will occurs depending on the player actions and locations when they are playing the game.

2.1.2 Brothers: A Tale of Two Sons

Figure 2.1.2.1: Brothers: A Tale of Two Sons

"Brothers: A Tale of Two Sons" is a single-player adventure game that was released in August 07, 2013. The game mainly emphasizes on the brother cooperation factors with each other to solve the levels. However, this game can only be played with single-player and they will be controlling both the characters with different stick of the controller at the same. Refer below for the gameplay scene reference:

Figure 2.1.2.2: Brothers: A Tale of Two Sons Gameplay Scene

There are no split-screen in the game, but the without using both the characters to help each other, they will not be able to solve the level and proceed to the next.

2.1.3 Streets of Rogue
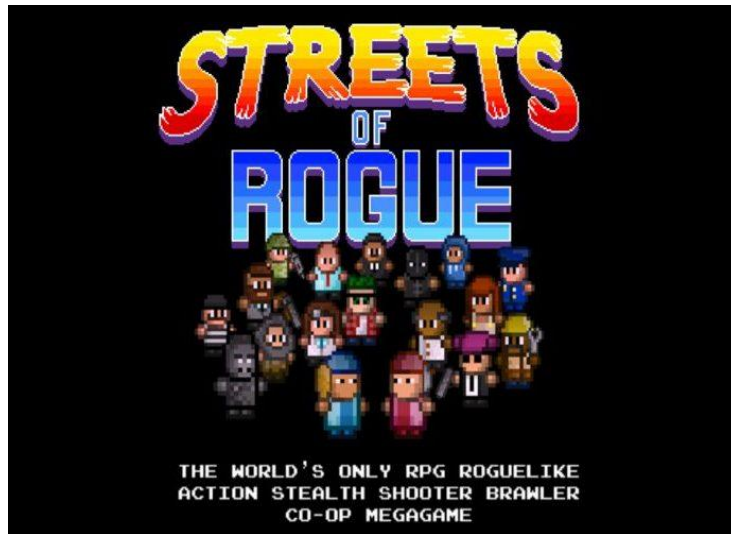
Figure 2.1.3.1: Streets of Rogue

"Streets of Rogue" is a multiplayer cooperation game that was released in March 10, 2017. A maximum of 4 players can play the game together. If they are playing the game locally, then it will be in a split-screen. However, if they are playing multiplayer online, each of the player has their own respective screen. Hence, they will not be able to see other players action visually unless they use the voice messaging system available in the game to communicate.

Figure 2.1.3.2: Streets of Rogue Local Split-Screen

Figure 2.1.3.3: Streets of Rogue Online Multiplayer

As shown in Figure 2.1.3.2 & 2.1.2.3, the player only can see the other player action through the map. However, they can't see what they are doing unless they go to that particular area.

The game focuses on characters perks and each character that the player has chosen can/can't do certain things in the game. After the player has chosen their character, they will be thrown into a random level, and they will each conduct their own character quest in the level to complete the game.

The cooperation in the game is more to an indirect manners instead direct manners such as "A Way Out" or "Brothers: A Tale of Two Sons". The fun factors about the game are the variations of characters the player can role-play while playing the game together. Nevertheless, the cooperation factors are not really the main focus of this game, because every player conduct their own character actions to clear the level without interacting frequently with each other to clear everything.

2.2 Unique Selling Point

In order to differentiate us with the other developers available in the market that we've researched. We have created 3 main unique selling points for our game. Below are the three unique selling points:

1. Compulsory 2 Players 2D Game

Firstly, our game can only be played with two-players only. As shown on above game references, there are a lot of 3D games in the industry that use a similar method where they enforced the player to play with another player such as "A Way Out". However, this system is very rare to be seen in 2D games market yet, which make it unique.

2. Working Together

Secondly, most of the enemies and puzzles in our game can only be defeated/cleared with two players working together, which is similar to the game "Brothers: A Tale of Two Sons". However, we will execute it in 2D instead of 3D graphic. Aside from that, similar 2D split-screen co-op games such as "Streets of Rogue" tends to focus on each player action instead of the cooperation action between the players. Hence, for our game, we will emphasize on the cooperation factors and force the character to work together with each other to clear the level.

3. Screen Transition In 2D (Split-Screen to Merge)

Lastly, our game will be played in split-screen view and will transition to one camera view during the gameplay itself under special conditions. This is similar to "A Way Out" transition method. However, this system has never been done before in a 2D games before. Hence, it is the best opportunity for us to tackle this challenge and try to create similar feels in a 2D game. Since we don't have a voice/text chatting system, creating the split-screen system does helps us to tackle this issue too, because both the players can constantly see the other player actions without chatting.

2.3 Individual Project Scopes

Based on above unique selling points, we further break down our individual project scopes to create the game successfully. As the team game designer and leader, it is my responsibility to handle all the tasks listed in Figure 2.3.1 below:

Tasks	Description
Game Design Document	● The game design document mainly will be written by me. It serves as a guide for the team.
Level Design (Overall)	● Handling the overall level design such as creating the whole level from scratch using tile maps. ● Props, AI, Characters, Puzzle's design and placement in every level. ● Lightning & Fog Effects creation.
Behaviors Design (Players, AI, Props)	● Handling all the behaviors design in the game, such as how the player, AI, props will behave when something occurred.
Game Mechanics	● In charge of creating all the game mechanics in the game.
Narrative & Dialogue	● Write the whole story details from start till end and how the ending will be. ● Manage the game dialogue
Game Trailer	● Create the game trailer for the game.
Input Controls Design	● Handling the input controls design to make the player feel comfortable when they are playing the game.
Character Animation Adjustment	● Adjust the character animation with colliders that will affect the gameplay factors.
Bug Test	● In charge of testing the game bugs and writing a bug's document and sending it to the programmer/artist for fixes.
Sound Effects & BGM	● Find/Create the sound effects and BGM.
Manage Overall Project Progression	● In charge of handling the team schedule and priorities.

Figure 2.3.1: Individual Job Scopes

2.4 Individual Schedule

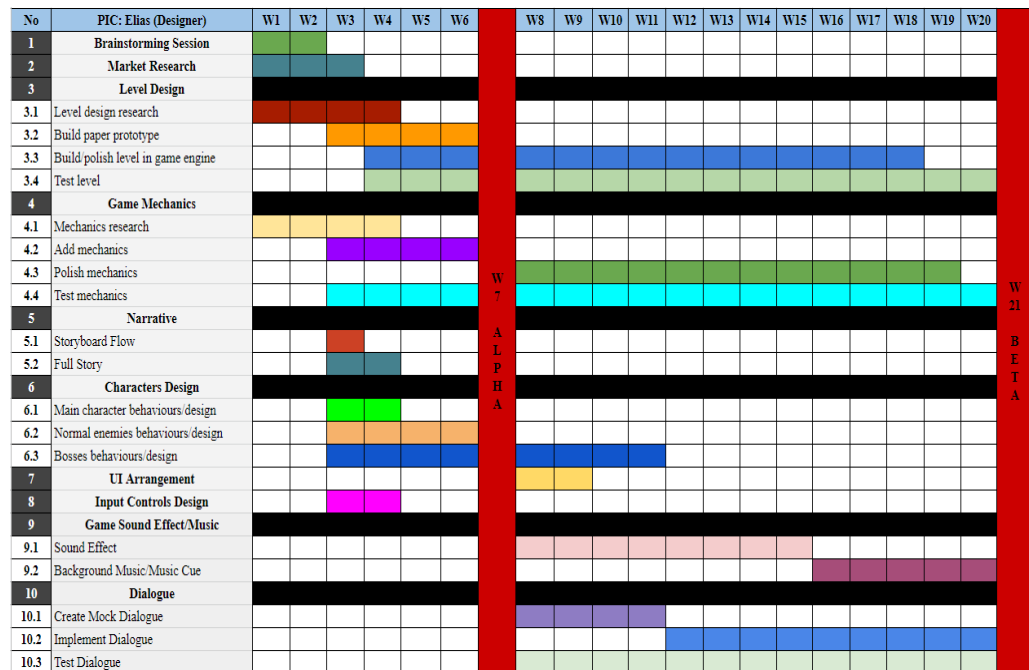| No	PIC: Elias (Designer)	W1	W2	W3	W4	W5	W6		W8	W9	W10	W11	W12	W13	W14	W15	W16	W17	W18	W19	W20	
1	**Brainstorming Session**																					
2	**Market Research**																					
3	**Level Design**																					
3.1	Level design research							W7														W21
3.2	Build paper prototype							A														B
3.3	Build/polish level in game engine							L														E
3.4	Test level							P														T
4	**Game Mechanics**							H														A
4.1	Mechanics research							A														
4.2	Add mechanics																					
4.3	Polish mechanics																					
4.4	Test mechanics																					
5	**Narrative**																					
5.1	Storyboard Flow																					
5.2	Full Story																					
6	**Characters Design**																					
6.1	Main character behaviours/design																					
6.2	Normal enemies behaviours/design																					
6.3	Bosses behaviours/design																					
7	**UI Arrangement**																					
8	**Input Controls Design**																					
9	**Game Sound Effect/Music**																					
9.1	Sound Effect																					
9.2	Background Music/Music Cue																					
10	**Dialogue**																					
10.1	Create Mock Dialogue																					
10.2	Implement Dialogue																					
10.3	Test Dialogue																					

Figure 2.4.1: Initial Personal Schedule

Figure 2.4.1 above shows the initial schedule for our individual scope, the schedule changes as time progresses during the whole development. Nevertheless, it still explains more than 80% of our individual project scopes in overall. Aside from that, the project is estimated to be completed within 21 weeks. The project is divided into two parts which is the "Alpha" stage and the "Beta" stage. The Alpha stage consists of 7 weeks and we will be using it to build up the core mechanics and flow of the game to create a solid ground for us to work on as we slowly build up the game. Afterwards, during the Beta stage which consists of 14 weeks, we will be focusing on adding new levels, enemies, gameplay improvement, and bug fixing to polish up the game further and present it to the clients.

As the team designer, the workload will be very heavy during the Alpha pre-production stage, because our team needs all the information in order for us to proceed with our work. Hence, it is my utmost priority to complete all the work necessary during the pre-production stage so that our team can have a better and clearer workflow for the entire project development.

Chapter 3: System Specification & Requirements

3.1 Project Development Tools & Resources

The overview of the development tools & resources we used for our entire project development are listed in Figure 3.1.1 below:

Name	Description
Unity Game Engine	The game is primarily built using Unity engine. We will be using Unity version 2019.4.13f1 to build our game.
Github Desktop	The tool is used to save, track, and synchronize changes across the team. This software allows us to conveniently increase our workflow speed without checking with other team members constantly.
Google Sheet/Docs/Slides	The tools are used to document all the necessary information that the team needs.
Google Drive	We use Google Drive to transfer large files among the team if it exceeded the Github Desktop transfer capacity. We also used Google Drive to back-up our game in case our game breakdown due to severe issues during the development.
Discord/Whatsapp	Two main software's we used to communicate and organize our meeting.
Photoshop CC 2019	For the 2D art assets of our game, we will be drawing it using Photoshop CC 2019.
Visual Studio Community 2017	This tool will be used to organize and write scripts for the project.

Figure 3.1.1: Development Tools & Resources

3.2 Game Minimum Specifications

Name	Hardware/Software Requirements
Operational System	Windows 10
Internet Speed	5mbps/sec
RAM Free	2GB RAM
Disk Space	500MB Free Space

Figure 3.2.1: Game Minimum Requirements

Figure 3.2.1 above shows the minimum requirements for our game. Our game is a 2D game. Hence, the minimum requirements are not high for the hardware. However, internet speed is important, and it is preferably higher to play our game. This is because we will need to send the data to the server and convey the data to another player for the game to works. Thus, if their internet speed is slow, there might be some connection bugs happening during the gameplay session.

3.3 Design Workflow Structure

For building up the level, the designer will mainly use the Unity game engine "Tilemaps" system to build up the whole level structure. Before the assets has been uploaded by the artist, the designer uses a placeholder asset and put it into the level first, and explain the entire flow to the programmer so that he/she can proceed to code for the game functions without waiting for the artist to complete their task. It is much more efficient to work this way, because the designer can request amendment from the programmer immediately if the functions are not working properly. Aside from that, the designer also handles other tasks not related to game/level design such as audio trimming, game trailer, and character animation adjustment to ease the team and increase the workflow speed for the entire development process. The overall workflow will be handled by the designer and it's their responsibility to guide the programmer and programmer on the overall workflow such as the character/enemy functions, art color contrast issue, etc.
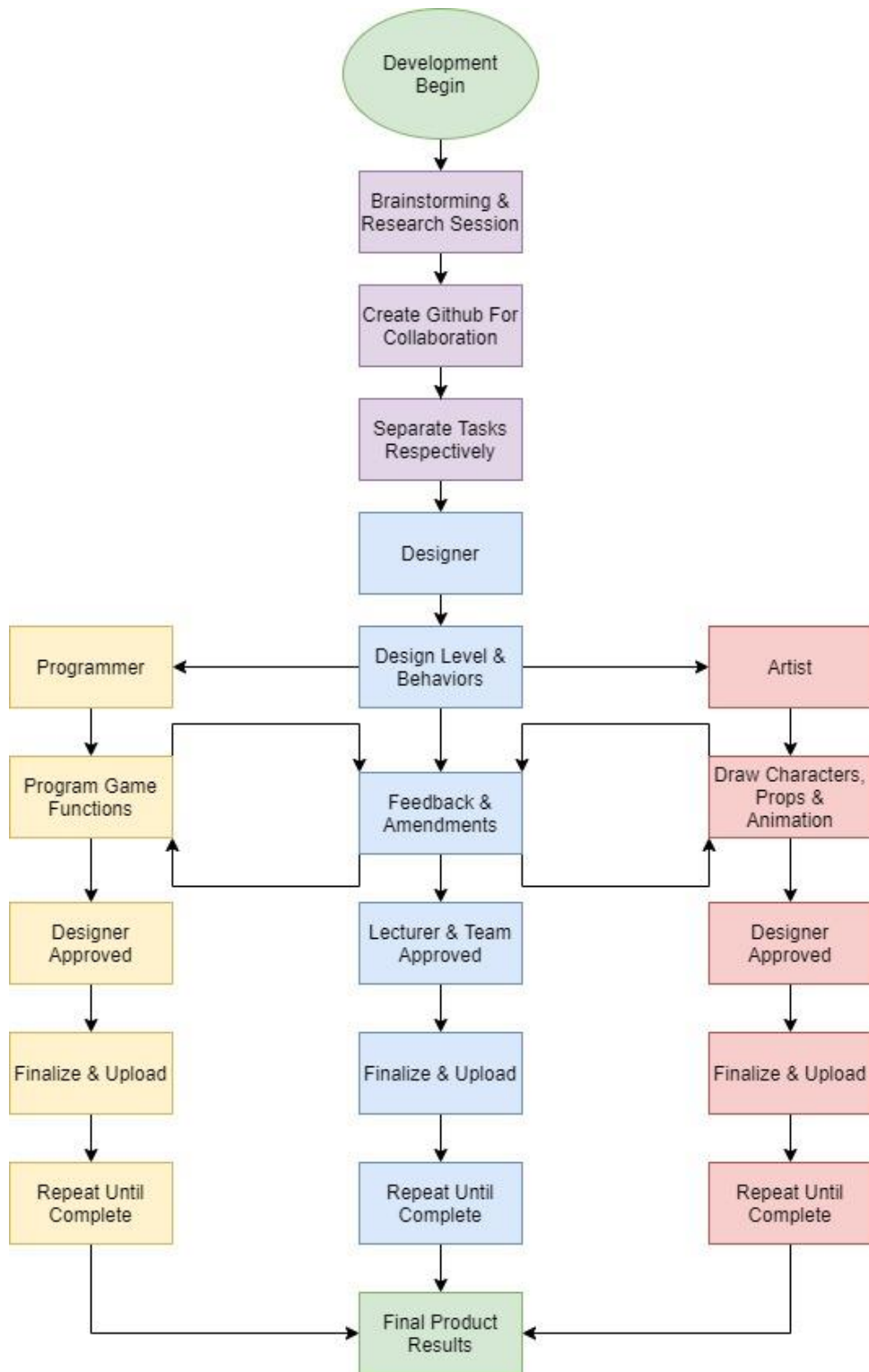
3.4 Overall Design Structure Flowchart

Figure 3.4.1 Overall Design Structure Flowchart

As shown in Figure 3.4.1, the development process is back-to-back between the team members in order to produce a good result. The designer will start the design process first and discuss with the team members of his direction. Then, the teammate will try to match the designer desired results as much as possible.

After they have completed the functions/arts that the designer required. The team will proceed to the feedback and amendments stage. The feedback & amendments stage are a repeated process that we will conduct before finalizing an assets or functions. This is to ensure that the player is fully immersed when playing the level. If there's any issue that needed to be fixed, the designer will inform the programmer/artist to do the amendment, and the process will be repeated again until we get the finalize results that designer approved.

Aside from that, the designer game and level design are not perfect as well. Hence, they require feedback from the teammate and lecturer in order to produce a better result with their design. This is because when the game failed to achieve the desired results, the designer will be at fault as they are the one who monitoring and managing the whole team development process.

Other than that, I've also taken the player immersion into consideration when designing the level and game. This is because if there are parts of the game such as the level, assets, colliders, or functions that can break the player immersion, the research can no longer be conducted, because the game fails before the research even begin. Hence, we need to take these into consideration and continue to test play the game over and over again to check all the issues and fix it as soon as possible.

Chapter 4: Design & Implementation

After deciding our workflow process, we started to implement the design and develop the game. Refer below for more information:

4.1 Game Introduction

Twin's Elude will be a 2D top-down view action-adventure co-op online multiplayer game where the player will be playing as either one of the twin characters, Elliot or Ayden. Other than that, the game is compulsory to be played with two players and the screen will be displayed in a split-screen manner in most of the gameplay session. Thus, the action of a player can be observed by another player while they are playing the game. This is to allow better coordination between the two as the game allows the player to move to separate locations respectively as planned in our unique selling points.

4.2 Game Story

Once upon a time, humanity was ruled by the cruel twin demon kings that were once human. They obtained their immortality by converting themselves into demons and ruled over the world with brute force for a long period of time. However, after a few hundred years, humanity finally managed to defeat the twin demon kings and the world is once again peaceful. Nevertheless, even though they have already obtained their victory, humanity still fears that the same history will repeat itself. Hence, a twin taboo rule has been created in order to prevent the birth of new demon kings in the future.

In a small village named Blestem, Elliot and Ayden were born as a twin. Even though their birth shocked their parent, they still decided to raise the twin secretly without being discovered by the villagers. Thus, the twin managed to grow up to elementary age safely with no issue until the fated day.

One day, while the parents are still out for work, Elliot and Ayden went out to the forest to play together, but they were spotted by a village hunter. The hunter was shocked when he saw the twin and immediately ran back to the village and reported it to the village chief. Upon hearing the shocking news, the chief immediately orders the villagers to capture the twin and bring them back to the village alongside their parent. The villagers storm their house and capture the twin, and their parents were captured during their work time. After capturing their whole family, the chief orders the villagers to bring the twin to the forsaken well. The forsaken well is a sacred place in the village whereas they will throw unlucky/curse items inside the well to purify the village and prevent it from getting cursed. However, little do they know that there's a scary monster dungeon far beneath the well.

The twin was forsaken by the villagers and was thrown inside the forsaken well. However, before they were thrown inside the well, the twin requested the chief to spare their parent, and the chief agreed to it out of respect towards the twin. Hence, their parent managed to keep their lives while the twin lost theirs, or so they thought.

While dropping into the well, the twin who thought they had lost their lives miraculously survived the drop due to the well water and they drifted away to a safe location. However, when they regained their consciousness, they saw a scary big door in front of them and they were too afraid to move forward. Nevertheless, they had no choice, and decided to open the door in order to survive. The survival story of the twin begins as they work their way out together to escape from the dungeon.

4.3 Game Objectives

The main game objective of this game is to escape from the dungeon by clearing all the levels. Aside from that, the players will also need to maintain their shared health and clear the puzzle together in order to proceed to the next level. They will need to protect each other in order to survive.

4.4 Target Audience

This game is catered for 12 years old and above. This is a suitable age range for our game because our game doesn't have a gory scene or a brutal death. Hence, it is qualified to be 12 years old and above game based on video game content rating system that is used to set the age rating of a game worldwide.

4.5 Target Platform

The target platform for this game will be Window OS (PC), as stated in our hardware & software requirements before. This is because PC is a much more popular platform for indie developers to launch their game due to the huge variation of target audiences playing it and the low-cost of launching the product. Hence, the potential of small games getting notice is significantly higher on PC in comparison to other platforms.

4.6 Game Mechanics

The overview of the game mechanics is listed in Figure 4.6.1 below:

Mechanics	Description
Pick Up / Drop	Both players can pick up and drop items whenever there's an item nearby.
Use	The player can use whatever item they picked up, the action varies between items they picked up, such as attack, throw, consume, and more.
Item Usage / Durability	Every item in the game has their own usage limit. The items will get destroyed when it can no longer be used by the player.
Inventory	Each player will have their own inventory interface that shows the items that they are currently holding. They can only hold one item at a time.
Rolling	Evade the enemies attack by rolling towards a direction, the player will be invulnerable while they are rolling. However, rolling doesn't work on some of the enemies in the game. This is to add more layers to the design and prevent player from spamming it.
Cloaking / Hiding	The player will be able to use cloak to hide themselves from enemies while they're in idle state. They can be discovered by the enemies if they are moving around the enemies for more than 2 seconds while in the cloaked/hiding mode.
Shared Health	Both players share the same health in the game, both of them will die if the health reaches zero. This is to promote the cooperation design and constantly make the player aware of their partner actions.
Elliot Special Skill	The big brother Elliot has a special skill that allows him to pick up heavy objects and put it on top of a puzzle to clear it.
Ayden Special Skill	Ayden are weak in strength. However, he is small and agile. Hence, he has a special skill that can allow him to burrow through small holes and get to another area to unlock/obtain something from inaccessible areas.

Figure 4.6.1: All Game Mechanics

4.7 Game Items & Traps

Below are all the items that the player can pick up/interact and traps in the game:

Item Name	Description
Fruits	The player can use this to recover their health, per fruit can be eaten twice. Hence, they can recover their health twice with just one fruit.
Sword	Sword deal highest damage to monsters, some of the monsters in the game compulsory need to be killed with a sword in order to proceed.
Throwing Rocks	Throwing rocks can be used to kill small and weak enemies such as slime. Aside from that, it also can be used to unlock certain puzzles in the game.
Cloaks	As mentioned in game mechanics section, they can use the cloak to hide themselves from the enemies when the player is in idle state.
Boxes	There are boxes all around the map. The player can destroy these boxes by rolling towards it or they can use weapon to hit the boxes. Once destroyed, the boxes will drop items at a percentage, different location and boxes have different drop rate set by the designer.
Hints	There is hint system available in the game to assist the player. They can view these hints to guide them on how to clear the level. Some of the puzzle in the game can utilize this hint system for them to clear it more easily.
Treasure Chest	Treasure chest contains the key to unlock door to the next area and most of the time, the player will need to put effort in order to obtain it such as clearing puzzle, or defeating enemies.
Spike Traps	Can damage the player when they are not rolling. Can also be used to damage the enemies.
Crossbow Traps	Shoot fire arrows that can damage the player significantly. Can be dodge by rolling.

Figure 4.7.1: All Available Items & Traps

4.8 Character & Enemies Design Behaviors

Below are the design behaviors for the player character and also enemies in the game:

4.8.1 Player Character Design

Figure 4.8.1.1: Elliot & Ayden

Most of the player actions are self-explanatory in above sections (Refer 4.6 & 4.7). However, there are multiple hidden functions that are not explained to the player in the game but they can see it in actions. Refer below for more information:

Invulnerable State

When the player is attacked by the enemies, they will enter invulnerable state temporarily to prevent the enemy from re-attack them for a duration of time. The time has been set to 0.5 second to prevent the player from abusing this system. Within this 0.5 second, they will need to get away from the enemies or kill the enemies to prevent the enemies to damage them again.

Death & Continue

Whenever either one of the players has died, the death animation will be played, and the player screen will change to the death scene. From there, they can decide to replay and quit the game, the replay of the game will begin where the player has lost their lives, if they lost their lives in the boss room, they will restart inside the boss room itself without the needs to replay the whole level again.

4.8.2 Slime Design Behaviors

Figure 4.8.2.1: Slime

Slimes are the first enemy that the player will encounter in the game. They have similar speed with the player. The behaviors for the slime enemy are listed below:

4.8.2.2 Patrol State

The slime will patrol to a certain distance set by the designer and it will continue to patrol provided that they still haven't detected the player.

4.8.2.3 Chase State

When the goblin detected the player, they will enter the chase state, and they will start to chase the player to attack them.

4.8.2.4 Attack State

After the slime has reached the appropriate distance with the player, they will change to attack state and start to attack the player by jumping towards the player. The slime can jump quite a distance. However, their attack damage is very low, as this enemy purpose is to let player get comfortable with the game combat system. The slime will spam their attack based on the animation duration that the designer has set. There's a slight delay between the slime attack to balance out the game to prevent the player from dying too fast.

4.8.2.5 Death State

When the slime dies, they will play the death animation, and their body will disappear from the world. Goblin has a percentage to drop "Fruits" upon their death.

4.8.3 Goblin Design Behaviors
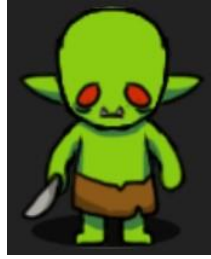
Figure 4.8.3.1: Goblin

Goblin is a hard-hitter and can kill the player with few attacks. They also have similar speed with the player. The behaviors for the goblin enemy are listed below:

4.8.3.2 Patrol State

The goblin will patrol to a certain distance set by the designer and it will continue to patrol provided that they still haven't detected the player.

4.8.3.3 Chase State

When the goblin detected the player, they will enter the chase state, and they will start to chase the player to attack them.

4.8.3.4 Attack State

After the goblin has reached the appropriate distance with the player, they will change to attack state and start to attack the player with their knife. The goblin can only attack at close range. Hence, they need to be very near to the player before they can attack them. The goblin will spam their attack based on the animation duration that the designer has set. There's a slight delay between the goblin attack to balance out the game and prevent the player from dying too fast.

4.8.3.5 Death State

When the goblin dies, they will play the death animation, and their body will disappear from the world. Goblin has a percentage to drop "Sword" upon their death.

4.8.4 Rocky Design Behaviors

Figure 4.8.4.1: Rocky

Rocky serves as a walking trap and they can damage the player within range. They walk slightly slower than players. The behaviors for the rocky enemy are listed below:

4.8.4.2 Patrol State

Rocky will patrol a designated location while launching its attack to the surrounding every few seconds. The spike go to four direction and the player will need to avoid them to prevent getting damaged. Aside from that, this enemy will not detect the player. Hence, it will not chase the player even if they go near it.

4.8.4.3 Special Condition

Rocky can't be damaged with throwing rocks. The player will need to use a sword in order to kill this enemy. If they don't have a sword, it is best to roll and dodge this enemy attack to proceed to other area.

4.8.4.5 Death State

When rocky dies, they will play the death animation, and their body will disappear from the world. Rocky has a percentage to drop "Throwing Rocks" upon their death.

4.8.5 Wolf Design Behaviors
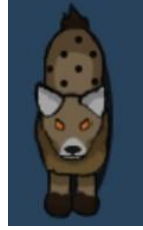
Figure 4.8.4.1: Wolf

Wolf is the fastest enemy in the game, they walk twice the player speed. Hence, the player can never outrun them. Thus, it is not advisable to fight with the wolf, the player can be safer if they used the cloak to hide from this enemy. The behaviors for the wolf enemy are listed below:

4.8.5.2 Patrol State

Similar to others, the wolf will patrol to a certain distance set by the designer and it will continue to patrol provided that they still haven't detected the player.

4.8.5.3 Chase State

When the wolf detected the player, they will enter the chase state, and they will start to chase the player to attack them.

4.8.5.4 Attack State

After the wolf has reached the appropriate distance with the player, they will change to attack state and start to attack the player by biting them. The wolf can only attack at close range. Hence, they need to be very near to the player before they can attack them. Similar to others, the wolf can't spam their attack towards the player.

4.8.5.5 Death State

When the wolf dies, they will play the death animation, and their body will disappear from the world. The wolf will not drop anything when they died.

4.8.6 Minotaur Design Behaviors
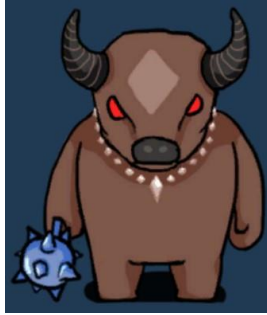
Figure 4.8.6.1: Minotaur (Boss 1)

Minotaur is the first boss of the game that the player needs to face. This boss in unkillable. Hence, the player is not advised to fight them. The behaviors for the Minotaur are listed below:

4.8.6.2 Chase State

At the beginning of the boss fight, the Minotaur will set either one of the players as start to chase them to attack. They will change their chase target based on multiple conditions.

4.8.6.3 Attack State

When the Minotaur reaches a distance with the player, it will start to attack the player 3 times. Once the Minotaur has already attacked a player 3 times, it will start to change target and start chasing another player instead and repeat the process over and over until the player clears the level.

4.8.6.4 Rage State

When the Minotaur is chasing a player, another player can hit the Minotaur with the sword to change its chase direction. Once another player has attacked the Minotaur, it will enter "Rage State" and started to chase the player who attacked him. When it reaches appropriate attack distance, it will launch a Rage attack once towards to that player and deal significant amount of damage. Once he launched his Rage attack, the Minotaur will return back to its normal state and repeat again the chase state.

4.8.7 Fired Boss Design Behaviors

Figure 4.8.7.1: Fired Boss (Boss 2)

Fired Boss is the second and final boss of the game. The boss is killable with water gun available in the boss room. The behaviors for the Fired Boss are listed below:

4.8.7.3 Attack State

This boss will not chase the player, it will stay at a high ground where it is unreachable by the player and continue to cast fireball attacks at randomize rate towards the player. The fireballs are randomized by their spawn rate, speed, and cast rate. Hence, the player will find a very difficult time to predict how the boss is going to attack. Aside from that, rolling will not be effective against this boss, the fireballs will be able to attack the player even when they are rolling. Thus, they need to dodge to fireball with movement keys alone.

4.8.7.4 Vulnerable State

When the boss has finished casting its attack rotation, it will enter the vulnerable state where the player will jump down from the platform to be attacked by the player.

4.8.7.4 Near Death State

When the boss health reaches below 10%, it will cast its final attack rotation and jump down to self-explode. The self-explode will instantly kill the player regardless of their health. Hence, the player will need to kill the boss before its fully charge the self-explode skill. Once the player has killed the boss, it will drop a key for the player to unlock the door that leads to the ending scene.
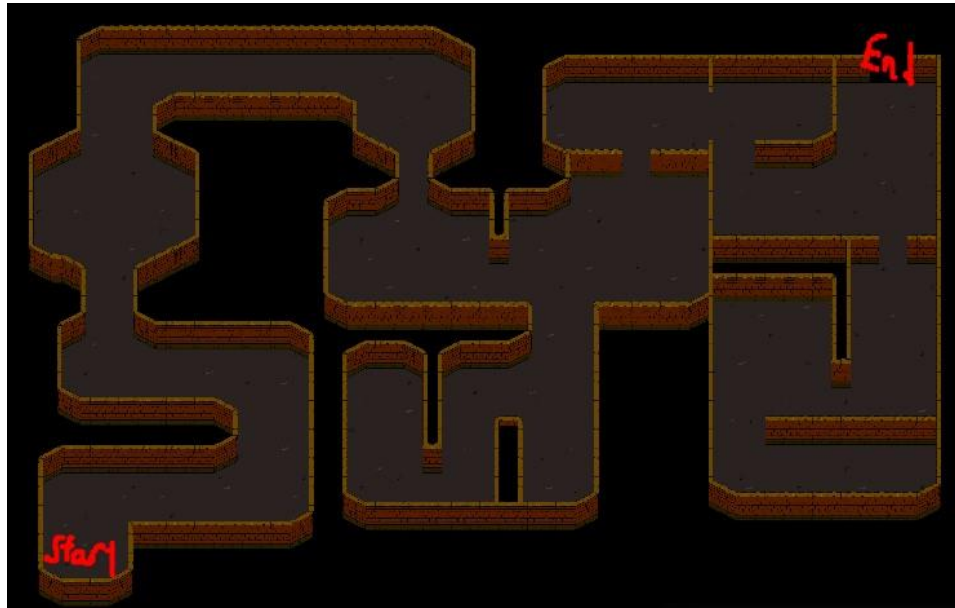
Figure 4.9.1: Initial Level 01 Design

Figure 4.9.1 above shows the initial design for the level 1 of our game. The level was designed in a merge version and the whole map felt too big in overall. Hence, when the player playing the game, they will either get confused or felt boring cause the level was too big without any interaction. The player also needs to walk a distance before they can reach the next area which is a hassle for most of them.

Aside from that, it is also very difficult for the designer to add on extra levels or locations in the map due to this issue, as I will need to break down the level from scratch and re-arrange the whole thing. Thus, I've revised the level and created a better version with more flexibility to change the design whenever and however I want it. It is very fortunate that Level 02 for the game hasn't been created yet when this issue occurs.

Refer below for the revised levels:
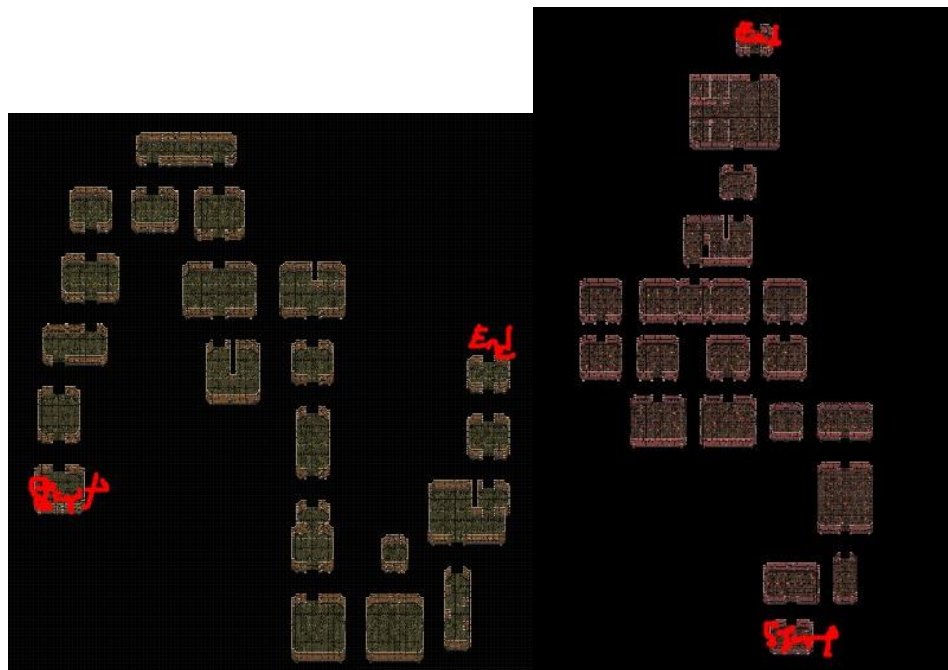
Figure 4.9.2: Revised Level 01 & Level 02 Design

As shown in Figure 4.9.2, the new levels are separated by section, and the player will teleport to next area when they opened up a door in that section. Hence, they will no longer need to travel a great distance to reach the next area, which will break their immersion when playing the level. The left side picture with the slight green color map will be the Level 01 of our game, while the red color map is the Level 02.

Other than that, this new design also allows me to focus my design in the respective section and plan my design better, because I can now add or delete a section anytime I want when it's necessary. Aside from that, the sound has also been confined into each respective room. Hence, they will not be able to hear the sound from the other sections, which increases the player anticipation, because they will never know what kind of challenges await them ahead.

Chapter 5: Results & Evaluation

5.1 Project Limitations

The overview of our project limitation is listed in Figure 5.1.1 below:

Limitation	Description
Time Constraints	The game project needs to be completed in less than 6 months, which is hard to accomplish because all of our team members take more than 3 subjects per semester.
	This issue slows down our project development time significantly, because there are too many things that need to be done at the same time while we are developing the game.
	We are unable to solve this issue due to the program structure design. If we want to have more time developing the project, we will have to sacrifice ourselves to extend another semester to complete the project which is not a good choice for all the team members.
Skill Constraints	Each of our members have different skill sets. Hence, it is difficult to help one another when they need it.
	For example, if the programmer needs help with programming, the artist and game designer will not be able to assist him much in writing the scripts as we lack the experience to do so.
	As the game designer, what I do to ease the programmer and artist is by explaining the flow and design as clearly as possible so that the programmer and artist will not get confused when they are doing their tasks. If the design and flow is too hard, we will further discuss on how to simplify it further.

Figure 5.1.1: Project Limitations

5.2 Research Answers

As mentioned in Chapter 1, after the game has been completed, we will be organizing a test play session to obtain the user feedback in order to proof the research questions. For our test play, we managed to obtained the feedback data from 11 participants that has already played our game.

Aside from that, for my research, all the format has been set to a scale of 1-5 (Disagree-Agree). Thus, when the tester done with the test play session, they are required to answer the research feedback form provided in order for us to gain more information regarding their test play experience. Below are the research results:

5.2.1 Participants Information
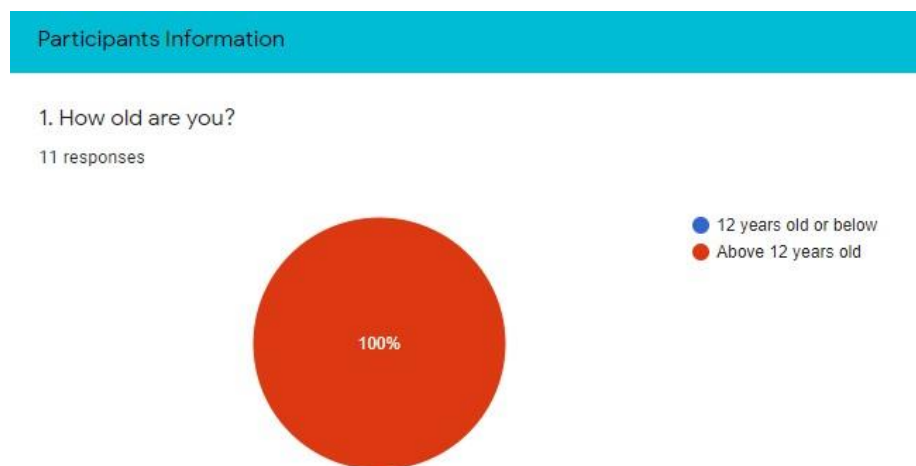
Figure 5.2.1.1: Participants Age

Figure 5.2.1.1 shows the age results for our tester. 100% of the tester are 12 years old and above because it is very difficult for us to get tester below 12 years old in the university.

5.2.2 Participants Experience
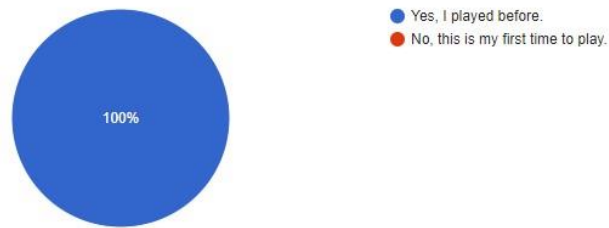
Figure 5.2.2.1: Participants Experience

Figure 5.2.2.1 shows the participants experience in playing 2D games. 100% of the played the game before. Hence, we can expect good research results from this data.

5.2.3 Research First Question

Figure 5.2.3.1: Research First Question

Figure 5.2.3.1 shows the results for the first question of our research. The question prompt user whether their immersion is affected by the game platform that they are playing the game. From the results, we can determine that the experience varies among testers. However, more than half of them is leaning towards the "Agree" side. Hence, it is safe to assume that majority of the players think that platform does matter when playing a game.

5.2.4 Research Second Question

If the game level has repetitive level design mechanics, will it ruin your immersion?

11 responses
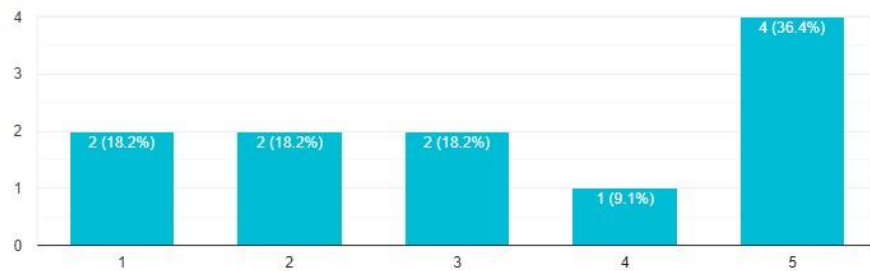
Figure 5.2.4.1: Research Second Question

For the second question, the tester was asked whether the repetitive level design mechanics ruins their immersion, and 4 of them agreed to this. The question is asking more towards the overall games in the industry instead of specifically targeting our game.

5.2.5 Research Third Question

When a game is too hard, will it break your immersion when playing the game level?

11 responses
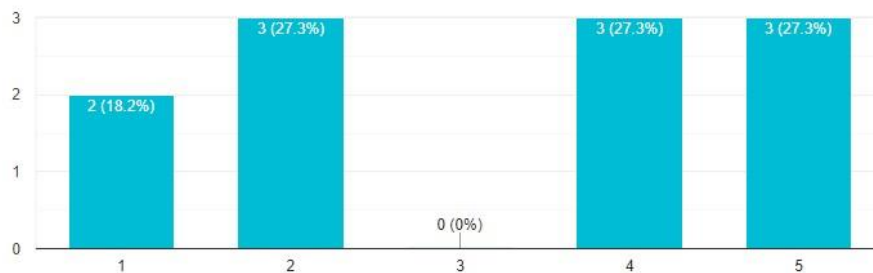
Figure 5.2.5.1: Research Third Question

For the third question, the testers have been questioned whether the game was too hard for them to clear, and 5 of them disagree on this, while 6 of them agreed to this. It is a very difficult decision to decide the results as it might just be preferences issue. Thus, more data are required in the future for this kind of question.

5.2.6 Research Fourth Question

Does the game graphic affect how you feel about the level design?

11 responses
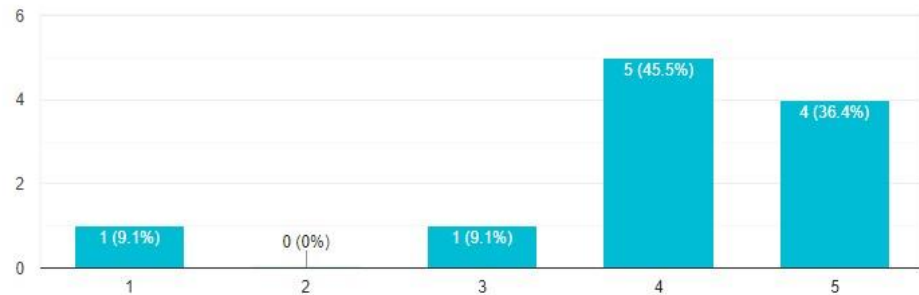
Figure 5.2.6.1: Fourth Question

The fourth and final question would be the graphic aspect of the game. Majority of them agreed that graphic does matter in the level design. Thus, we can determine that graphic does matters in overall level design of a game.

5.3 Testers Verbal Feedback

Other than the research questions, we also received verbal feedback from the tester as well. Regarding the graphic of our game, most of them finds the graphic and art style of the game to be good. Thus, in this aspect, our game successfully met the client's expectation. Aside from that, there's no complain from them regarding the game platform and also the level design flow itself, because they find it good in overall. The highest negative feedback we've received will be some of the puzzle available in the game. They find those puzzles too hard to clear, and it's breaking their immersion. This is also because the tester tends to avoid interacting with the hints and try to clear the puzzle by themselves. Hence, they got confused and frustrated when they can't clear it. The hints are meant to give the players "hints" to solve the puzzle. Nevertheless, majority of the testers expect the "hints" to provide immediate "answers" for them. In term of design aspect, this is very not wise, because if an answer is given to solve all the puzzles in the game, then it will not be called a puzzle anymore, and the game will lose its challenge in overall.

Chapter 6: Future Work & Conclusion

6.1 Future Enhancements

There are a lot of functions we discarded due to time limitations for the project. If we have the opportunity to improve the whole project, we will probably re-add back those intended functions into the game to make it more interesting to play. However, at current stage, it might not be possible for us to continue enhance the game, because we built the game with the intention of presenting it as a demo. Hence, from the programmer side, the code is a haywire, which make it very difficult to improve further. If we are really interested to continue in the future, we might re-do the whole thing again with a cleaner structure for us to add/drop anything.

6.2 Future Works

Our team chemistry considered to be good in overall in comparison to others. Thus, I think there are a lot of opportunities for the three of us to get together and develop a new game again, which is something I will look forward to in the future. Currently, I personally planning to develop a musical 3D combat games, and the game will be built using Unreal Engine instead of Unity. Even though it's an experimental project, I am excited to see the results of it.

6.3 Conclusion

In overall, our project was a success and there's not many teams that managed to achieve what we have done within these 21 weeks. I am proud with the results and also my teammates who take this challenge together with me. The research results were also within our expectation, and majority of the testers gave a positive feedback towards our game. That is more than enough for a beta game. We are proud of it and we will continue to improve as a game developer.

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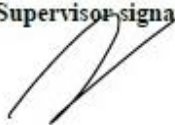
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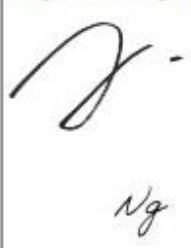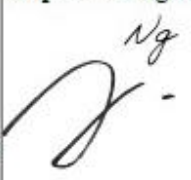
Appendices

Appendix A

Project Paper Consultation Logbook	
Project Title	Twin's Elude
Student Name	Muhamad Elias Bin Mohd Alif Leong
Student ID	1705608
Year/Semester	Y3S2
Supervisor	Dr. Aloysius Yapp, Mr. Benedict Ng

WEEK 01

Comments:

- Organise a meeting with the team to discuss which two games will be used for the proposal presentation.

- Do a competitive research to back up the idea for the proposal.

- Analyse the chosen game ideas and come up with a unique selling point for the game.

- What have been confirmed so far: "It will be a 2D game".

Supervisor signature:

Progress (please circle the feedback)
1   2   3   4   5
Poor   Satisfactory   Good

Date: 30/10/2020
2/11/2020

WEEK 02

Comments:
- Due to MCO, might need to do online multiplayer instead of local multiplayer for the 1st game idea.

- Include more visual supports to help the lecturers to understand how the gameplay works more cleary so that they can give more feedback regarding it.

- If possible, don't use other people works as example, use own sketches for better explanation.

Supervisor signature:

Progress (please circle the feedback)
1   2   3   4   5
Poor   Satisfactory   Good

Date: 6/11/2020

Appendix 1: FYP1 Logbook (1)

WEEK 03	
Comments: - Based on supervisors, both games seem okay and can proceed. - Choose the game after analysing the risk and whether it is possible to execute before the deadline given. - After choosing the game, need to immediately proceed with doing the tasks to show progress next week. - For my parts, I will be focusing on the gameplay related parts first, such as mechanics, level design, and also storyboard planning.	**Supervisor signature:**
Progress (please circle the feedback) 1 2 *3* 4 5 Poor Satisfactory Good	**Date:** 11/11/2020

WEEK 04	
Comments: - Must starts to work quickly with everything. To do list before Week 5: (Level 1 Focus for Alpha) - Complete the paper prototype for overall Level 1. - Complete the item list. - Complete the necessary mechanics design needed. - Complete the players, AI, Boss behaviour design. - Complete the story and storyboard planning. - If got enough time, write the Chapter 1 for research too. - Explain the design to team very clearly from A-Z to prevent confusion and speed up the work process.	**Supervisor signature:** Ng
Progress (please circle the feedback) 1 2 *3* 4 5 Poor Satisfactory Good	**Date:** 19/11/2020

WEEK 05	
Comments: - Need to emphasize on the co-op aspects much earlier - All the things that was designed must be included during the alpha presentation - Can cut down some details first for the alpha, but the level must be working and playable - Create a simple indicator for the alpha to let the other players know what their teammate is trying to do - Try to figure out a way to lessen the programmer burden to complete within the time constraint without reducing too much of what has been designed - Must complete at least chapter 1 for the research in week 5	**Supervisor signature:** Ng
Progress (please circle the feedback) 1 2 ✓3 4 5 Poor Satisfactory Good	**Date:** 26/11/2020

Please prepare yourself with the presentation on week 7 12/12/2020 10am – 3pm FYP1 Alpha.Remember to prepare chap1 until ch research writing.

Appendix 2: FYP1 Logbook (2)

WEEK 06	
Comments: - Some of the drawing by artist need some changes. - Level design part need to be done then help out other teammates. - For presentation better that the game can be played on two different PC to show the online networking working properly. - After discussion, have task artist to focus on the attack & dodging animation first for all characters to understand what they are doing in the alpha instead of the walking animation first. - Work with the programmer if he need any helps to speed up process.	**Supervisor signature:** *Ng*
Progress (please circle the feedback) 1 2 3 4 5 Poor Satisfactory Good	**Date:** 3/12/2020

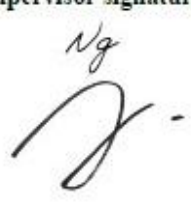| WEEK 07	
Comments: - Prioritize two players can play on different PC. - Put as much animation as possible especially for the attacks animation. - Prioritize boss fight functions. - Pitfall trap need to be changed in future. - Show a game that represent our final game in alpha. - Submit the research report on next wednesday.	**Supervisor signature:** *Ng*
Progress (please circle the feedback) 1 2 3 4 5 Poor Satisfactory Good	**Date:** 11/12/2020

Appendix 3: FYP1 Logbook (3)

Appendix A
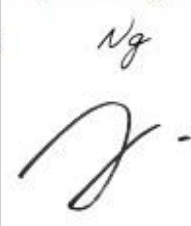
Project Paper Consultation Logbook	
Project Title	Twin's Elude
Student Name	Muhamad Elias Bin Mohd Alif Leong
Student ID	1705608
Year/Semester	Y3S3
Supervisor	Dr. Aloysius Yapp, Mr. Benedict Ng

WEEK 01

Comments:
- Can consider using opacity or fog to simulate the enemies detection range.
- Add more details to the maps like props, and shadow to make it more interesting.
- Put the objects/items at location where the player will immediately know what to do with it when they first encounter it.
- Clean the assets properly such as lining and colors.
- The character all need to have shadow.
- Can consider a knockback function to prevent the attack spamming from enemies.
- Starts to consider when to begin doing the cutscene and storyboard.

Supervisor signature:

Progress (please circle the feedback)
1   2   3   ✓   5
Poor   Satisfactory   Good

Date: 22/01/2021

WEEK 02

Comments:
- The animation will be handled by me to speed up the process
- Try to put all the animation inside the game by Week 3/4.
- By Week 3/4 need to finish everything about Level 1.
- The UI and graphic for the Level 1 need to be finalized.
- Think about what is doable to assist other teammate with their tasks.
- Help to research for the teammate in order to speed up even more.
- Will guide the programmer for the programming logic flow.

Supervisor signature:

Progress (please circle the feedback)
1   2   3   ✓   5
Poor   Satisfactory   Good

Date: 01/02/2021

Appendix 4: FYP2 Project Logbook (1)

WEEK 03	
Comments: - Damage effects for players and enemies need to see clearly - Rolling delay issues need to be fixed to prevent break immersion - Add sounds and effects to the actions and UI so that it will be more clear for both side of the player - Add interaction button at door as well to ease the player - Quickly add tutorial buttons so that other people can test play it without the developer keep on guiding them how to play the game - Add a UI at boss door to indicate that they need wait other player - Quickly finish level 1 and let other test play so that have time to add other stuffs to make it more interesting	**Supervisor signature:**

Progress (please circle the feedback)
  1   2   3   ✓   5
  Poor   Satisfactory   Good
	Date: 6/2/2021

WEEK 04	
Comments: - Re-edited spawn location for game objects in the game. - Added fog effects into the game to create the game feel. - Changed enemies value to make it more reasonable. - Created temporary sprite for the tutorials. - Edited hints - Changed enemies patrol points. - Make the tutorials flow inside the game using placeholder. - Added sword effects to make it more obvious where the attack is going.	**Supervisor signature:**

Progress (please circle the feedback)
  1   2   3   ✓   5
  Poor   Satisfactory   Good
	Date: 12/02/2021

WEEK 05	
Comments: - Edited all the current available animation by adding clip and add event for the sound and colliders. - Find and put sound into the game for the programmer to use. - Modified the item usage spawn % value. - Replace all old assets with the new assets with shadow. - Modify pivot for some of the assets with issues. - Test play the game and re-edit animation or programming based on the issue. - Rolling issue fixed. - Damage now showing more clearly for the player with blood and shakescreen.	**Supervisor signature:**

Progress (please circle the feedback)
  1   2   3   ✓   5
  Poor   Satisfactory   Good
	Date: 19/02/2021

Appendix 5: FYP2 Project Logbook (2)

WEEK 06	
Comments: - Understand which aspect the game wants to focus and choose only one to make the design clearer. - Understand what the character can do/cannot do and create a puzzle based on that. - Figure out what kind of collaborative puzzle can be created the game. - Search for singleplayer puzzle but change it into two-player. - Need to think how to turn the game to be something fun.	**Supervisor signature:** Ng
Progress (please circle the feedback) 1 2 3 ✔ 5 Poor Satisfactory Good	**Date:** 28/02/2021

WEEK 07	
Comments: - Introduce puzzle in different phase to make it easier for the player to understand what to do. - If have a lot of interaction puzzle, make the interaction key important in the game so that the player doesn't get confused. - Interactable object need to stand out to the player so they can know it is interactable. - Create a lot of situation where the interaction key are needed. - Expand level 1 to put the easy puzzle in so they know what to do in level 2.	**Supervisor signature:** Ng
Progress (please circle the feedback) 1 2 3 ✔ 5 Poor Satisfactory Good	**Date:** 07/03/2021

WEEK 08	
Comments: - Will quickly settle level 2 first then move on to Level 1 re-design so that programmer can focus on Level 2 fully while designer re-arrange the new Level 1 first. - Done new wall assets for level 1 & 2, can start arranging, ground tiles still haven't completed. - Level 2 puzzle functions done 3/4, assets still in progress. - Plan to show the full Level 2 by next week with the assets if possible.	**Supervisor signature:** Ng
Progress (please circle the feedback) 1 2 3 ✔ 5 Poor Satisfactory Good	**Date:** 11/03/2021

Appendix 6: FYP2 Project Logbook (3)

WEEK 09	
Comments: - Need to explain the development plan from week 10-12. - How the game going to be completed within this 3 weeks? - If possible show visually little brother is weaker and big brother is stronger to match their perk. - Add more sound effects to the game to make it more immersive, especially after clearing puzzle or activated something. - Need to have horizontal door for the game. - Need to assets that make the entrance and exit points obvious. - Change the shadow of 3rd puzzle for level 2. - Fix the UI bug showing 0 without any item there.	**Supervisor signature:** *Ng*
Progress (please circle the feedback) 1 2 3 ✔ 5 Poor Satisfactory Good	**Date:** 17/03/2021

WEEK 10	
Comments: - Level 1 re-design tilesmaps will be completed by this week and will be passed to programmer to code the new functions. - Props placements will be done by this week as well. - Adjustment of value & spawn rate will be done once programmer done their parts for Level 1 by this week. - Test play bugs and check if there's any issue with the current Level 1. - If Level 1 completes early than expected, see what can be improved on Level 2 if there's enough time.	**Supervisor signature:** *Ng*
Progress (please circle the feedback) 1 2 3 ✔ 5 Poor Satisfactory Good	**Date:** 24/03/2021

WEEK 11	
Comments: - Fix missing hints and change value of every props in the game. - Add a transition of cutscene/storyboard after clearing Level 1. - Ending cutscene need to put after Level 2. - Find sound effects for the whole game and integrate it into the final game. - Start to plan how to record the trailer and do the name card. - Start to write chapter 4 onward for the research.	**Supervisor signature:** *Ng*
Progress (please circle the feedback) 1 2 3 ✔ 5 Poor Satisfactory Good	**Date:** 02/04/2021

Appendix 7: FYP2 Project Logbook (4)

WEEK 12	
Comments: - If possible make the boss have more bullet variations. - Lava if can have animation would be great. - If possible, by next week, show a build that very representative for a game. - From start till end need to have, even though it's incomplete version.	**Supervisor signature:** *Ng*

Progress (please circle the feedback)
    1   2   3 ✔   5
  Poor   Satisfactory   Good
	Date: 9/4/2021

WEEK 13	
Comments: - Some assets graphic have issues need to fix if possible. - Font size for the hints need to change. - Red X UI need to change cause not consistent with others. - Door frame can walkthrough need to fix cause weird. - Change diamonds name to gems instead. - P1 died at certain location will not trigger death UI bugs.[fixed] - Different colour gems cannot project to another hints need to put to prevent confusion.	**Supervisor signature:** *Ng*

Progress (please circle the feedback)
    1   2   3 ✔4   5
  Poor   Satisfactory   Good
	Date: 16/4/2021

WEEK 14	
Comments: - The game has been completed so far with no game breaking bugs. - Proceed to do the promotional materials. - Game trailer already been completed after the consultation. - Only left with the brochure and cd cover. - The main menu for the game might be changed to a better version as well. - Will fully focus on research report after all of this has been completed.	**Supervisor signature:** *Ng*

Progress (please circle the feedback)
    1   2   3 ✔   5
  Poor   Satisfactory   Good
	Date: 23/04/2021

Appendix 8: FYP2 Project Logbook (5)

Appendix E

Final Project Title Form

Fill in the information below as detailed as you can after confirming project title.

Project Type:
- ☑ Product Based Project
- ☐ Research Based Project

(tick the appropriate box)

Student ID	Student Name	Email & Contact no
1705608	Muhamad Elias Bin Mohd Alif Leong	elias.leong@outlook.com 016-2001707
1801385	Koh Wan Yee	aruyuxbl@gmail.com 011-26431374
1600825	Tan Wei Yon	tanweiyon@hotmail.com 017-2188425

Supervisor: Dr.Aloysius Yapp, Mr. Benedict Ng

Project Title: Twin's Elude

_____

_____

_____

_____

Appendix 9: Final Project Title Form (1)

Project description:-

Twin's Elude is a 2D top-down view action-adventure co-op multiplayer game where the player
will be playing as either one of the twin characters, Elliot or Ayden.

Other than that, the game is compulsory to be played with two players and the screen will be displayed in a
split-screen manner in most of the gameplay session. Thus, the action of a player can be observed by
another player while they are playing the game.

Student name	Individual Project Scope
Muhamad Elias Bin Mohd Alif Leong	Game Design Document, Item/Props Design/Behaviors, Enemies & Player Design Behaviors, Level Design, Props Placement & Spawn Rate, Character Animation Adjustment, Bug Tester, Narrative Design, Game Mechanics, Game Trailer, Game Lightning & Fog Effects, Sound Effects & BGM, Manage Overall Project Progression
Koh Wan Yee	Character & Enemies Sprite Sheets, Item/Props Sprite Sheets, Character & Enemies Animation, Game UI Design, Cutscene Storyboard, Game Cutscene, Bug Tester, Promotional Materials Including Poster, Design Board, Namecard, CD Cover & CD Image
Tan Wei Yon	Player Functions, AI/Boss Fight Functions, Item Functions, Animation Functions, Screen Functions, Networking, Puzzle Functions, Narrative Functions, Sound Functions, UI Functions, Manage Github

Appendix 10: Final Project Title Form (2)